

**Self-management education in diabetes; How do we measure the Effectiveness of  
Diabetes Expo in improving self-management skills of individuals affected by  
diabetes?**

by

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“If you don’t know where you are going, how are you going to know when you get there?”

Yogi Berra

“A human rights-based approach gives importance not only to outcomes, but also to the processes. Human rights standards and principles - such as participation, equality and non-discrimination, and accountability- are to be integrated into all stages of the health programming process: assessment and analysis, priority setting, programme planning and design, implementation, and monitoring and evaluation”(WHO, Human rights based approach towards health).

Dedicated to my beloved parents, my beloved wife and the human rights workers in Pakistan and across the globe who selflessly resist sophisticated punitive tactics for their work and are willing to make huge unbearable sacrifices for the promotion and protection of human rights.

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## Abstract

The Canadian diabetes association is working to improve the quality of life of people living with diabetes through self-management education, research, and advocacy. Continued self-management education is the cornerstone in helping individuals living with diabetes. One of the important parameters in determining the effectiveness of any self-management education intervention is its ability to modify a risky health behavior. The Diabetes expo is one of the several projects implemented by Canadian Diabetes Association (CDA) that are aimed towards improvement of the self-management skills of people living with diabetes. The purpose of this study is to examine the effectiveness of a community diabetes self-management event and annual expo event hosted by CDA is discussed as a case study. First, review of previous documents and reports available with organization was done. Further, key informant interviews were conducted to identify the intended outcomes for evaluation of effectiveness of diabetes expo. To complete the task of the evaluation, logic model was used. In the next step indicators were identified which will measure the outcomes of the programme. In order to do that review of the Canadian Diabetes educator sections reference guide on best practices and critical literature review was also conducted. Review of the survey questionnaire used by CDA revealed the need for evaluation methods which will generate data for measuring the intended outcomes of diabetes expo. Constructs of health belief model (HBM) were employed in building the evaluation tool for the intended participants in a three parts survey questionnaire. The objective was to generate important data which will help project coordinators measure the change in perceptions along with other intended short term outcomes of the project. Finally, the data from the previous evaluation report was compared with the short term outcomes identified from the key informant interviews, critical literature review, and review of other documents. The data shows that diabetes expo is very popular amongst the intended participants. However its effectiveness is mainly determined by the achievement of the expected intended short term outcomes (changes in perception areas identified by HBM, empowerment) of a self-management education event.

**Keywords:** Diabetes, Self- management educational event, Effectiveness, Self-efficacy, empowerment, Constructs of the Health Belief Model

## Chapter: 1-Introduction and Background

### 1.1-Introduction

Diabetes is a complex chronic health problem affecting millions of people not only on a global scale but also millions of Canadian lives. WHO estimated the prevalence of diabetes at a global level to be 9% in 2014 among adults who are 18 years and older (WHO, 2014). 1.5 million deaths were estimated to be directly caused by diabetes in 2012 (World Health Organisation, 2014). Furthermore, if prevention strategies are not implemented, diabetes will become the 7<sup>th</sup> leading causing of death in 2030 according to a recent projection given by WHO (Mathers, C. D., & Loncar, D. 2006). The majority of Canadians diagnosed with diabetes today have type-2 diabetes. According to the recent statistics published by the Public Health Agency of Canada in its report on diabetes, almost 2.4 million Canadians (6.8%) were affected by diabetes in 2008/09 (Public Health Agency of Canada, 2011). The increasing pattern in the burden of diabetes was recorded mainly in Ontario, British Columbia, Saskatchewan, and the Northwest Territories. Estimates in the report project that the number of Canadians living with diabetes will reach 3.7 million by 2018/19 with the continuation of the increasing pattern in the burden of the disease seen in 2008/09 data. Exposure to various risk factors has been investigated by the studies to be associated with diabetes (Public health agency of Canada, 2011). While exposure to some risk factors such as genetic predisposition cannot be changed, the exposure to other important known risk factors such as smoking, sedentary life style and environmental determinants for diabetes can be minimized by simple interventions such as changes in life style. However, avoiding the exposure to avoidable risk factors cannot be achieved without self-management educations aimed towards improving self-management skills. Educating and engaging individuals living with diabetes including the general public in an educational programme aimed towards behavioral modification and improvement of their self-management skills is a precondition for avoiding exposure to the risk factors associated with the development of diabetes. Self-management has been described as a vital component in the management

of diabetes and other chronic diseases. Albert Bandura describes the benefits of self-management in the following words (Bandura, A. 2004).

“Self-management is good medicine. If the huge health benefits of these few habits were put into a pill, it would be declared a scientific milestone in the field of medicine.”

To tackle this growing global epidemic, the economic burden associated with it and to safeguard its population, the Government of Canada has prioritized the prevention of type 2 diabetes and supporting the Canadians who are living with all types of diabetes. Educating Canadians and increasing awareness about development of diabetes gain more importance due to its association with several risk factors and the link between diabetes and other chronic diseases such as renal problems and cardiovascular diseases. However, as already mentioned, the successful implementation of a cross-sectoral and inter-sectoral holistic health promotion or self-management education programme posits an important pre-condition. The Canadian Diabetes Strategy (CDS) launched by the government can be viewed as a strategy aimed towards meeting that precondition and engaging health organizations, governments as well as community-based groups to help tackle the burden of the disease (Public health agency of Canada, 2011). The evolution and implementation of CDS by the Canadian government can be seen in table 1.

## **1.2- Background**

The Canadian Diabetes Association advocates for the investments in programs, policies and strategies to prevent the development of diabetes and help people living with different types of diabetes. With predicted increase in the prevalence of diabetes over the next 10 years as growing number of Canadian continue to develop diabetes, evidence suggests that a structured program with a combination of comprehensive care and diabetes education is needed in improving the quality of life in individuals with diabetes (CDA, 2010). Diabetes education and its effectiveness in improving the self-management skills of individuals living with diabetes gains more recognition in the discourse around the cost effectiveness and cost benefits of such education programmes. However, the investment decisions of the policy makers,

programme planners are influenced more by evidence base that will support the effectiveness of such education programmes intended towards improvement of the self- management skills. In order to generate such evidence, a project was initiated by the Diabetes Educator Section of Canadian Diabetes Association to identify best and promising practices in diabetes education based on the available evidence supporting the effectiveness of diabetes education. The detailed description of the project is given in appendix-A. While the catalogue also serves as a framework for the diabetes self-management education programmes initiated by the Canadian Diabetes Association yet, it is not a comprehensive list of best practices. Therefore, as mentioned already, the information compiled in the catalogue serve as a guidelines information resource as well as a starting point for the health care providers, researchers, donors and diabetes educators in deciding which practice best matches the needs of their community. Ultimately any such community education programme will be the one which is guided by evidence and is tailored in a manner which will meet the cultural, societal and environmental determinants of the diabetes or any other chronic health problem. The self-management education programmes initiated by Canadian Diabetes Association (CDA) are meant to provide support and enable people living with diabetes by improving their self-management skills. The organisation has launched educational projects based on the catalogue's best practices that are aimed towards educating Canadians on diabetes self-management and the complications associated with uncontrolled diabetes. The list of the self-management education projects implemented by CDA can be seen in table 2. Community diabetes expo is one of such programmes implemented by CDA. It is a multidisciplinary diabetes self-management educational event and provide people affected by diabetes with opportunities aimed towards improving the self-management skills of the intended participants by diabetes education (CDA, 2015). The components of a typical Diabetes expo can be seen in table 3 in the appendix section below.

### **1.3- Definition of Diabetes Expo**

The Canadian Diabetes Association defines diabetes expo as

“ A mid-day 4 to 5 hours highly interactive day long multi-disciplinary diabetes self-management community education event which includes professional speakers, experts, health care providers,

information materials, demonstrations and a tradeshow showcasing the latest products available and free samples (CDA, 2014).

#### **1.4-Target audience**

The intended population for the diabetes expo programme engaged by Canadian Diabetes Association is not only individuals affected by or living with diabetes but also anyone who is interested in gaining information on healthy eating and active living. Care givers and health care professionals can also benefit from the information on products, services and latest developments in diabetes related research (CDA, 2014).

#### **1.5-Community partners in CDA's diabetes expo, best practices and characteristics of an effective diabetes self-management educational interventions.**

Lorig and Colleagues discusses the key elements of community-based self-management education which are important for the effectiveness of diabetes self-management education. The first and most important characteristic or best practices to be adopted in community based self-management education is that it is based on the problems perceived by intended individuals. In other words the content of the educational programme is determined by the needs of the individuals living with diabetes. The client centred needs assessment of individuals and communities affected by diabetes is also identified as one of the promising practices in the catalogue of diabetes educator section of Canadian Diabetes Association (CDA, 2010). Second important characteristics is that the content of the programme gives importance to the teaching of skills such as decision making and problem solving. The objective of the education remains the same in all forms of self-management education which is to prepare people living with diabetes by improving their self-management skills as well as confidence to take control of their disease on a daily basis. Third important feature is that such self-management education takes place in community settings, community centers, schools and churches. Hosting education programmes in community settings in collaboration with community partners are not only convenient but also meet the requirement of providing a culturally competent self-management education in order to be effective. This feature also corresponds to the client centred best practice identified by CDA's diabetes educator section. An effective self-

management also takes into consideration the scheduling of the self-management education based on affected individual rather than the availability of the professional expertise. Thus, educational sessions or events activities should take place on weekend mornings or in the evenings. Finally, in order to introduce best practices and make the self-management education more effective, it is important that educational sessions are facilitated by people who are not only experienced, known, culturally competent but also trusted and fluent in the communications skills of the recipient community. Therefore, the educators need to be experienced in their role. Lorig and colleague argues that such experience to the diabetes educators can be provided through training programmes which are carefully developed and incorporates the recipient-based best practices. Therefore in community-based self-management education anyone in the community from a community outreach worker, a homemaker, a shop steward, a community and a retired teacher can assume the role of a diabetes educator (Lorig, K., & González et.al, 2000). The detailed list of the community partners can be viewed in the appendix-B. Comparing the characteristics identified by Lorig and colleagues, the programme leaders have endeavored to not only incorporate the best practices identified by CDA diabetes educator section into CDA's diabetes expo but also have the key elements of an effective community based self-management education event identified by Lorig and colleagues.

### **1.7- Analysis of diabetes expo in context of the promotion strategies of the Ottawa Charter of Health promotion**

In this section, diabetes expo is briefly analysed in context of the strategies outlined by the Ottawa charter of health promotion. 3 strategies of the Ottawa charter in specific are used in this section to describe the diabetes expo in meeting three important short term outcomes.1- Empowerment 2- Developing personal skills 3- Creating supporting environment. Diabetes expo empowers the intended participants by giving them the opportunity as defined by the organisation to have an easy access to information and giving education that will enable the participants to have knowledge, required change in attitude, develop self-efficacy and skills to put knowledge into practice and thereby be in control of their diabetes. The information, knowledge and skills in turn will also enable the intended participants to make

informed decisions about their work and living environments which have a profound impact on health behavior (Naidoo, J., & Wills, J. 2010).

### **1.6-World Health Organisation's (WHO) human rights based approach (HRBA) towards health, the equity lens, Diabetes Expo and diabetes self-management education.**

WHO's human rights lens is employed in the study to analyse diabetes expo for its equity impact. It is important for any effective diabetes self-management education intervention to have the key elements of equity and equality. A self-management education intervention which has the key elements of availability, accessibility, acceptability (culturally competent) and quality according to general comment no 14 are the important underpinnings of equity and equality (WHO). Guiding human rights based principles are participation and inclusion of the disadvantaged groups, non-discrimination and gender equality. A human rights based approach towards health education projects requires incorporation of human rights sensitive lens in planning the programme and focus more on not only the processes but also the outcomes. Moreover, the HRBA focuses on strengthening the capacities of not only duty bearers but also the right holders. The duty bearers in this study are the Diabetes expo project coordinators, volunteers and CDA's decision makers whereas the right holders are individuals living with diabetes. Although, the WHO's human rights based approach towards evaluation of the self-management education is out of the scope of this study, the guiding principles of inclusion, availability, accessibility and acceptability are the parameters used for application of equity lens to the CDA's diabetes expo project in this study and discussed in the discussion section.

### **Chapter 2- Statement of the problem**

Diabetes education is a lifeline for people affected by diabetes. It provides the people affected by diabetes an opportunity to gain vital insights into the self-management behaviors that will help control the diabetes and improve the quality of life. CDA identifies people affected by diabetes as an individual who has either type-I or II diabetes, has a family member living with diabetes or affected by diabetes in other manner (Personal interview). The demand for diabetes educators and effective diabetes education increases as number of individuals affected by diabetes and the morbidities associated with it also increases. Needless

to say that the relation between the complications associated with diabetes and the burden on the health care services further signify the importance of diabetes education. A former president of the American Association of diabetes educators described the importance of diabetes education in the following words.

“Diabetes is an ongoing disease. Life changes, treatment changes and management changes. Patients should be able to receive ongoing education as it is needed.”

Virginia Zamudio Lange

The diabetes education programmes initiated by CDA endeavour to provide people affected by diabetes an easy access to the proper, multidisciplinary self -management tools which can reduce the burden on the health care services by reduction of the number of hospital visits due to complications associated with diabetes in people living with diabetes. However, the challenge as mentioned above is the effectiveness of any such self-management educational programme.

### **2.1-Research Questions**

Is CDA diabetes expo effective? In other words how do we measure its effectiveness in improving the self-management skills of individuals living with diabetes?

### **Chapter -3: Methodology**

The first step in the task of evaluating the outcomes of any health care intervention, in this case diabetes expo is to have a clear idea on the intended outcomes that the programme coordinators want to measure.

In order to identify the educational, psychological or behavioral outcomes and making the survey questionnaire to evaluate the effectiveness of diabetes expo following methods were employed.

- 1- Literature review.
- 2- Key informant interviews.
- 3- Review of the previous reports, programme mission statements and other programme materials.
- 4- Selection of a logic model.

- 5- Application of the constructs of the health belief model and health promotion strategies from the Ottawa charter for health promotion in preparation of survey questionnaire for evaluation of the diabetes expo.

### 3.1- Critical Literature review

A critical literature review was done using MEDLINE to explore the short term, medium and long term outcomes of diabetes self-management education. The key words used were self-management education, outcomes, effectiveness, self-efficacy, empowerment etc. The purpose of the critical literature review was to identify the outcomes and characteristics of an effective diabetes self-management education intervention. (Norris, S. L., Engelgau, M. M., & Narayan, K. M. 2001). The evidence is not comprehensive on short term outcomes of the diabetes self-management education. However, self-efficacy, feeling of empowerment, perceived benefits, perceived barriers and other psychosocial outcomes are also consistently cited amongst other important outcomes as an important outcome of diabetes self-management education summarized in table-4. These outcomes can also rightly be viewed as a precursor for improvement in self-management skills as well as life style of individuals living with diabetes (Goudswaard, A. N., Stolk, R. P. et.al, 2004). The complex nature of diabetes management becomes more pronounced when the individuals living with diabetes develop other chronic conditions such as hypertension, renal disease, chronic respiratory illness or joint problems (Schwarz, 2011). Simply prescribing the right dose of oral hypoglycemic agents, the precise dose of oral insulin and the right meal plans is not sufficient to achieve adequate glycemic required for achieving a good glycemic control. There are also other factors such as lack of awareness, knowledge and poor self-management skills which are attributed to frequent hospitalizations due to complications associated with poor glycemic control in individuals living with diabetes (Clement, S. 1995). The self-management diabetes education is vital for effective diabetes self-care and has been considered an important component of the clinical management of diabetes since the 1930s and the work of Joslin (Norris, S. L., Nichols, P. J., et.al, 2002). Marie Clark in her review of published studies examines the effectiveness of diabetes self-management education. The key findings of the studies are summarized in table-5. Findings show that

while DSME is consistently identified as a component of diabetes care the implications for physicians practice is still unclear(Clark, M. 2008). Growing body of evidence shows that the disease is largely self-managed and without personal motivation an effective control of diabetes cannot be achieved. For people living with diabetes, a clear understanding of various therapeutic approaches, problem solving strategies, behavior change, the treatment options available, their own feelings, values and goals are important chapters in diabetes self-management. Most importantly, since the affected individual is at the center of the process of self-management education during the entire period of contact with the educator, the need to understand their role as decision maker in day to day care also becomes more important (Funnell, M. M., & Anderson, R. M. 2002). However, the definite impact of diabetes self-management education on the outcomes in people living with diabetes remains unclear. While the literature consistently supports diabetes self-management education as an important component of diabetes self-care yet, researchers and critics still tend to debate about the effectiveness of diabetes education. (Lindenmeyer, A., Hearnshaw, H., et.al, 2006). A rather fecund area of investigation for researchers as this field is lagging behind when compared to other evidence-based topics to date. Duprez and colleagues argue that this lagging behind can partly be attributed to the lack of consensus on patient-centered goals and the desired outcomes for diabetes education (Duprez, V., Pover, M., et.al, 2014). For instance, shah and colleagues in their study on effectiveness of diabetes education in older patients make their observation on modest improvements in the quality of care and no reductions in long-term clinical events (Shah, B.R., Hwee, J., et.al. 2015).

### **Definition of self-management and Diabetes self-Management education**

In simple words diabetes self-management-education is defined as the process of teaching people to manage their diabetes (Norris, S. L., Nichols, P. J., et.al, 2002). Heisler and colleagues have defined self-management as ‘a set of skilled behaviors one engages in managing one’s own illness’ (Heisler et.al, 2003).Similarly, Clement describes diabetes self-management education as the process of providing individuals living with diabetes with the required self-management skills and knowledge to perform self-

care, manage crisis, and adopt lifestyle changes in order to successfully manage this disease. The ultimate goal of the self-management education is to enable the individual living with diabetes to become the most knowledgeable active participant in his or her diabetes care (Clement, S.1995).

### **3.2-Multi-disciplinary diabetes self-management education**

Diabetes self- management education is an important component of the treatment of diabetes. Keeping in mind the risk factors and complications associated with diabetes, the caring for people living with diabetes mellitus should include interventions or educational programmes that are multidisciplinary. In other words the diabetes self-management education should involve health care professionals such as nutritionist, physician, optometrists, dentist, nurse, psychologist, and social worker. Having mentioned that, the ability of the people living with diabetes to adhere to the recommended care, their ability to change the life style in turn determine the success of these educational interventions. However, the development of these abilities is again fomented by an effective multidisciplinary diabetes education. Therefore, effective multidisciplinary approach towards diabetes self-management education is one of the salient characteristics of a comprehensive care for the people living with diabetes (Ferreira Grillo, Maria de Fátima, Neumann, et.al.,2013).The Canadian Diabetes association has incorporated the best practices supported by evidence from the research studies in its educational programmes. For instance, to increase the effectiveness of Diabetes Expo experts from various disciplines shown in table-6 participate in the Ask the expert component of Diabetes Expo, participants get the chance to benefit from the advice and information given by the experts in different areas of diabetes care. The guiding principles for the component are shown in appendix-C.

### **3.3-Individual diabetes self-management education and group diabetes self-management education**

In a systematic review with meta-analysis that included 1,532 patients from 11 studies, the effect of group education was evaluated and a reduction of 1.4% in HbA1c was observed in four to six months (-1.4%; 95% CI: -0.8 to -1.9;  $p < 0.01$ ), and maintained in 12-14 months (-0.8%; 95% CI: -0.7 to -1.0;  $p < 0.01$ ) until two years (-1.0%; 95% CI: -0.5 to -1.4;  $p < 0.01$ ). In addition to the improvement in HbA1c, a

reduction in body mass index (BMI) of  $-1.6 \text{ kg/m}^2$  ( $-1.6 \text{ kg/m}^2$ ; 95% CI:  $-0.3$  to  $-3.0$ ;  $p = 0.02$ ) and systolic blood pressure ( $-5 \text{ mmHg}$ ; 95% CI:  $-1$  to  $-10$ ;  $p = 0.01$ ) was observed. However, one of the likely limitations of this systematic review is that both randomized controlled trials and non-randomized trials were included in this systematic review which may likely have caused an overestimation of the actual effect of the group education. The same improvement in HbA1c levels were not duplicated in a randomized controlled trial published by the same group of researchers recently. In the study, individuals affected by diabetes were randomized to an eight-hour structured group educational program. This was conducted in two-hour weekly sessions. Participants were encouraged to actively participate in asking questions during the meetings and contribute by sharing their experiences during the sessions. An improvement in the HbA1c of 0.41% was observed in the group and maintained for one year. Similarly, Duke and colleagues evaluated individual diabetes education in a systematic review which included nine studies with a total of 1,359 patients. No effect on the HbA1c was observed in the six studies that evaluated the effect of face-to-face education vs usual treatment ( $-0.1\%$ ; 95% CI:  $-0.3$  to  $0.1$ ;  $p = 0.33$ ). However, a small benefit attributed to the interventions was observed in the patients with baseline HbA1c levels of  $>8\%$  in a subgroup analysis ( $-0.3\%$ ; 95% CI:  $-0.5$  to  $-0.1$ ;  $p = 0.007$ ) (Duke, S. S., Colagiuri, S., et al., 2009). In the said systematic review, no differences were observed when the effect of the individual education was compared with the effect carried out in groups. Similarly, in a randomized controlled trial recently published, individual education which involved three monthly meetings, each with duration of one hour was compared with four weekly meetings, each with duration of one hour group education (Sperl-Hillen, J., Beaton, S., et al., 2011). In this randomized controlled trial, the individual education was observed as more effective with a reduction of  $-0.51\%$  HbA1c than the diabetes education performed in groups ( $-0.27\%$ ;  $p = 0.01$ ) and the reduction in HbA1c in latter group was comparable to the HbA1c in control group ( $-0.24\%$ ;  $p = 0.83$ ). However, the researchers argue that one of the potential reasons for the lack of effect in this randomized controlled trial could be due explained by the increased number of patients randomized to group education not completing the educational course ( $12.4\%$  vs.  $4.1\%$ ;  $p < 0.01$ ).

### **3.4-Reinforcement education sessions and the importance of duration of diabetes self-management education session.**

The fundamental idea behind any health education process is to achieve a change in risky health behavior. In simple words behavioral modification is the intended objective of health education. However, diabetes self-management education (DSME) and behavioral modification is a continuous process and doesn't happen overnight. Moreover, individual circumstances and the learning requirements also vary from one person to another. Having mentioned that, because majority of the diabetes education programmes are implemented for a specified period of time, the desired effect of any diabetes education on the intended population wanes away over time after the conclusion of diabetes self-management educational programme. This raises a very important question about the effectiveness of half a day 4 hours diabetes self-management educational event such as the diabetes expo by Canadian Diabetes Association. Norris and colleagues investigates this waning effect in a systematic review of randomized controlled trials. The review found that the effect of education was greatest in the period immediately after the conclusion of educational programme to which the intended participants were exposed to and a reduction in HbA1c by 0.76% was observed. During the follow up period a gradual reduction in the effect of education was observed (-0.26% at the end of four months (Norris, S. L., Lau, J., Smith, et al., 2002). Another interesting finding of the meta-analysis is the reduction in HbA1c by 0.04% with every hour of contact between the diabetes self-management educator and the patient (Grillo, M. F., Neumann, C. R., Scain, et al., 2013).

### **3.5-Self-management education provided by laypersons or by their peers**

The cultural and language differences is another important factor that can influence the transmission of knowledge between the educator and the patient. Engaging friends, peers, or members from the community of the individual living with diabetes in diabetes self- management education can benefit people affected by diabetes type 2 by removing inequities or language and cultural barriers in access to the diabetes self-management education. In a randomized controlled trial, the role of community health workers who were also members of the family healthy strategy (Estratégia da Saúde da Família– ESF) was assessed in

achieving control of diabetes. A reduction in the HbA1c level which was non-statistically significant was observed in patients who participated in consultation with nurses and community health workers (-0.8%;  $p = 0.137$ ). However, when compared to the controlled group, reductions were observed in diastolic blood pressure (-5.6 mm hg;  $p=0.042$ ) and triglyceride levels (-35.5 mg/d l;  $p = 0.041$ ). Similarly, another innovative educational intervention was tested for six months on 244 patients living with diabetes. The self-management education given by a nurse was compared to a group exposed to a mutual support plan between members of the group, i.e., the individuals living with diabetes themselves. The members of the group were trained for the increasing their self- management skills and then paired with another group of individuals living with diabetes. These pairs of individuals living with diabetes were then encouraged to talk to each other on a weekly basis, using a telephone service that registered calls and also sent reminders in order to encourage and ensure contact with colleagues. The pairs of individuals in these groups could also participate in an optional group sessions at intervals of 1, 3 and 6 months. At the end of the study period the HbA1c was compared and a difference of -0.58% in HbA1c was observed when compared with the group receiving self-management education from the nurse (Ferreira Grillo, Maria de Fátima, et al., 2013).The Canadian Diabetes Association has also implemented Peer-to-Peer Support group programmes for the self-management education of individuals living with diabetes. These groups are facilitated and participated by trained volunteers in a community setting. Each support group may include a guest speaker and has one or more than one facilitators. The peer-to-peer support groups may discuss several topics focusing on problems experienced by individuals living with diabetes including the ways and means of coping with these problems. The CDA's Hope Diabetes Group meets every month and every third Thursday at the Fraser Canyon Hospital conference room. The group features guest speakers on various topics of important nature and provides an opportunity to the participants to support each other by sharing their experiences. Strine and colleagues studied the impact of formal diabetes education on the preventive health practices and behaviors of persons living with type-II diabetes mellitus. Using data from 2001 and 2002 behavior risk factors surveillance system, they studied the association of diabetes self-management education with preventive health behaviors in 22,682 persons living with type 2 diabetes. They found that approximately

48% of all study participants living with type 2 diabetes mellitus had never attended a diabetes self-management education course. The comparison of participants with exposure to diabetes self-management education who were using insulin and those who were not showed that the participants attending self-management training sessions were more physically active. The group receiving self-management education sessions were also doing good in receiving an annual eye examination and flu vaccine and checked their blood sugar regularly as well as feet examined for sores (Strine, T. W., Okoro, C. A., et al., 2005). Similarly Naik and colleagues tested an active-learning, empowerment approach to ABCs of diabetes self-management education and found that the incorporation of an active-learning, empowerment-based approach to diabetes self-management education can lead to greater knowledge retention and understanding. In their randomized clinical trial they tested the effectiveness of two clinic based group educational methods in 84(97%) of participants living with diabetes. A post intervention assessment was also done. The participants randomly recruited in the empowerment arm participated in a group session that included two educational innovations. The empowerment arm participated in a group session that incorporated two educational innovations 1- team-based learning methods to foster active learning 2- A conceptual metaphor to foster understanding. Whereas the participants recruited in the traditional diabetes education arm received a didactic group educational sessions with a focus on self-management diabetes educational materials and on the diabetes ABCs. Individual review of the current ABC values was given to the participants in both arms. The understanding, knowledge and recall of the diabetes ABCs was evaluated using a questionnaire administered 3 months after enrollment in the study. It was observed that after three months, participants living with diabetes in the empowerment group showed greater understanding of the diabetes ABCs ( $P < 0.0001$ ), greater knowledge of guideline-derived target goals for the ABCs ( $P < 0.0001$ ), greater knowledge of their own values ( $P < 0.0001$ ) when compared with participants living with diabetes in the traditional arm. However, the context, location and the small size of the sample population in the study incites further enquiry of this approach at a much bigger settings such as hospital setting or at a community level (Naik, A. D., Teal, C. R., et al., 2011). Similarly, Clark in her review shares key findings from the studies on the effectiveness of the diabetes self-management education. The findings are

summarised in table-1(Clark, M. 2008). From the meta-analyses, it was observed that higher effect sizes were produced by lower quality studies. Other noteworthy findings were the improvement in knowledge and skill performance in the recipients of self-management education programmes of longer duration. It was further observed that while knowledge and skill effects continued to improve over the longer term, the improvements in the weight loss declined over the same period. Similar trend was observed for improvement in metabolic control which peaked between 1 and 6 months and then declined. However, an opposite trend was observed in psychological outcomes, knowledge and skill effects (Clark, M. 2008).

### **3.6-Environmental determinants of diabetes and its implications for diabetes self-Management Education.**

Diabetes and coronary heart disease or other cardiovascular diseases such as hypertension are the kind of chronic non-communicable diseases that share several modifiable or preventable risk factors such as sedentary life style, obesity, alcohol, tobacco smoking and lack of physical activity etc (Mann, J. I. 2002). Interestingly, the risk of developing cardiovascular diseases such as coronary heart diseases, silent myocardial infarction and hypertension also increases in individuals living with diabetes when metabolic control is successfully not achieved. Hu and colleagues examines this interaction of preventable risk factors and the development of type 2 diabetes in women in their study (Hu, F. B., Manson, J. E., Stampfer, et.al, 2001). Plausible to argue that development of diabetes in an individual predisposes an individual to the development of cardiovascular diseases if the individual continues to be exposed to the above mentioned preventable risk factors. Similarly, the interaction of risk factors can also be appreciated in the review article by Leahy on the genetic predisposition in the pathogenesis of type-2 diabetes and the ability shared by the environmental risk factors associated with the pathogenesis of diabetes to stress the glucose homeostasis mechanism (Leahy, J. L. 2005). This interaction of risk factors, the excess risk attributed to the exposure to various risk factors associated with diabetes mellitus as well as the complications associated with diabetes mellitus provides sufficient scientific evidence for the designers and funders of the self-management education programmes for making necessary improvements in the multidisciplinary approach towards self-management education programmes. Therefore, lifestyle modification or improvement in self-management skills which can rightly be viewed as the medium and long term intended outcomes of a 4 hours diabetes

self-management community education event, will not only reduce the risk of development of diabetes but also the risk of development of cardiovascular diseases as well as the complications associated with uncontrolled diabetes mellitus which also include the development of cardiovascular health consequences. Similarly, air pollution is an environmental risk factor that is associated with not only the development of cardiovascular diseases and chronic as well as acute respiratory diseases but insulin resistance, impaired glucose metabolism and type 2 diabetes mellitus have also been associated with air pollutants. The mechanism suggested for the development of diabetes due to exposure to air pollutants is low grade inflammation and oxidative stress causing impairment in insulin signaling leading to the development of diabetes mellitus (Meo, S. A., Memon, A. N., Sheikh, et.al, 2015). While the association between exposure to air pollution and prevalence of diabetes remains unclear, the findings of the studies supporting a clear association between air pollution and diabetes are inconsistent. For example, a slightly increased risk for development of diabetes or mortality in people living with diabetes is reported by some studies and some studies report no association. On the counter side, there are studies which report no association or association only in women and men (Janghorbani, M.et.al, 2014). Diabetes affects multiple systems of the human body. Cardiovascular diseases such as hypertension, coronary heart diseases as well as diabetes chronic kidney diseases are the complications of poorly managed or uncontrolled diabetes mellitus (Bakris, G. L. 2011).

Furthermore, eye, gastrointestinal tract, sexual health, microcirculation and musculoskeletal complications are also associated with diabetes mellitus. The interesting interaction between the risk factors associated with the above mentioned health consequences elevate the risk of diabetic complications (Shaw, K. M., & Cummings, M. H. (Eds.) 2012).Exposure to chemicals like Arsenic and persistent organic pollutants (POPs) which contaminates the food such as rice and drinking water has also been associated with cardiovascular complications and diabetes (Mohammed Abdul, K.S., Jayasinghe, S. S., et.al, 2015). Given the complications caused by uncontrolled diabetes mellitus and the association of the health consequences caused by diabetes with other risk factors such as air pollution and diabetes mellitus itself, the implications for self-management education programmes are also profound. In other words, to enable

the individuals affected by diabetes make healthy choices and protect themselves from the exposure to chemicals and other pollutants in the environment associated with diabetes and other above mentioned devastating health consequences, a review of the self-management education programmes such as diabetes Expo and Webinar series implemented by Canadian Diabetes Association by the planners and implementers of self-management education programme is warranted in order to make the self-management diabetes education more effective. Some strategies for doing so is discussed in recommendation sections.

### **3.7-Review of the programme mission statements, previous reports and other programme materials**

On review of the programme mission statements, previous reports and other programme materials, the themes which were identified as consistent throughout the documents were healthy lives, preventing the onset and consequences of diabetes, education, information, transparency, partnership, equitable access, equity, peer support, healthy diet, and mental health, advocacy for the individuals living with diabetes. The reports used for review and identification of inputs, outputs, outcomes were Diabetes educator section annual report, 2014, annual report clinical section, 2014, 2013 version of Clinical practice guidelines updated in 2015, United for Diabetes 2014 Annual report and other documents. The outcomes identified are listed in table-4.

### **3.8-Key Informant Interviews**

In order to learn more about the intended outcomes for evaluation of the effectiveness of diabetes expo, two key informant interviews with project coordinators and 4 informal discussion sessions were completed. The information required for the evaluation was identified and the questions of the key informant interviews were designed to yield that information. Data gathered from the interview identified self-management skills, healthy life styles, healthy diet, access to information, education, awareness, empowerment and improved quality of life as the outcomes of diabetes expo. Further the information obtained from the interview identified cultural competency as important characteristics for the effectiveness of the self-management education. The questionnaire used for the key informant interviews can be found in appendix- D and E.

### **3.9-Development of Logic Model for planning and evaluation of Diabetes Expo**

After gaining insight on the outcomes of CDA's diabetes expo, the next important step was the development of a logic model. As an evaluation tool, the logic model allows planners to make program design decisions that will influence the trajectory of the evaluation. For example, with continuous improvement in mind, the logic model allows precise communication about those aspects of the program that would benefit from evaluation findings. Logic models help give a direction to any project. During the key informant interviews, it was transpired that the programme planners are coordinating and planning the Diabetes Expo project without the application of the logic table. The lack of a sense of direction for the implementation of the projects was a critical finding. In order to complete the process of evaluation the development of an appropriate logic table which incorporates the activities and processes of the project successfully was vital. The logic table was chosen for evaluation of diabetes expo as shown in Figure-2(Taylor-Powell, E., Jones, L., & Henert, E. (2003).

### **3.10- Inputs Outputs and Outcomes of Diabetes Expo**

From review of the programme description documents, key informant interviews with the diabetes expo project coordinators, critical literature review the inputs, outputs and the outcomes of Diabetes Expo were identified and used in the logic model. The inputs, outputs and the outcomes identified are shown in figure3 and figure 4.

### **3.11-Evaluation Questionnaire**

After the identification of outcomes, the next critical challenge in the task of evaluation is to identify the information on the measurable indicators which will give an idea about how effective diabetes expo is in achieving the above mentioned outcomes. Ideally as mentioned above, the information or an indicator for the outcome identified should be observable and measurable. However, as mentioned in the critical literature review, self-management education and behavior change is a continuous process and it doesn't happen overnight. Therefore, indicators or biomarkers for effectiveness

of the self-management education such as HbA1c, blood sugar level, the number of hospitalizations for diabetes emergencies which are consistently used in the literature to gauge the effectiveness of the self-management education programmes of 3 to 6 months duration can be viewed as effective indicators in the measurement of the long term outcomes/objectives of any self-management education programme. In order to measure the outcomes of a mid-day diabetes expo, where the contact time of the participants with the educators or information providers is only 4 hours, a standardised survey questionnaire is used by CDA. A 3 part survey questionnaire is distributed in the participants of the expo at the end of the diabetes expo. One part is given to the intended participants, the second part is intended for the project/programme coordinators and the third part is intended for volunteers. In order to avoid the violation of the privacy of the participants at the expo and encourage the completion of the standardized written survey, participants were given an option of completing the survey anonymously at the event. The figures showing the responses of the participants in diabetes expo hosted in Nanaimo examined as a case study in the study can be viewed in figure -1(CDA, 2014).

## **Chapter 4- Results**

### **4.1-Methods used by Diabetes Expo project coordinators**

The survey questionnaire as shown in appendix-F was prepared using Canadian Diabetes Association's Survey Monkey account and the data was extracted from the Survey Monkey. Microsoft Excel was used for data analysis.

### **4.2-Data Analysis**

A total of 125 participants participated in the survey and 45(365) completed the survey. Analyses of the survey data from the expo shows that that the fall Expos were well received by participants and volunteers. The majority of expo participants were female and from the 55 years and older age group. Female participants were greater in number compared to males. The Expo advertising methods that were most effective in reaching the intended participants were newspaper and TV advertisements, sending flyers and emails to potential participants. Furthermore, interest shown by the participants in the useful and helpful topics covered in the expo varied from one participant to another. Majority of the participants found the

discussion on diabetes management, nutrition and healthy living most useful. Feeling of empowerment was reported by participants who self-reported making lifestyle changes in the areas of increasing physical activity, making healthier food choices, and monitoring blood glucose following the participation in the expo. The participants felt the Expo speakers were knowledgeable and reported that they enjoyed the lectures and information sessions. Overall, the participants reported that they were satisfied with the Expo, and expressed interest to return in 2015.

#### **4.3-Limitations of the data**

The collected data was limited to those participants who completed the survey on a voluntary basis. Therefore, the results of this evaluation may not be generalised to all the stakeholders in the planning and implementation of the expo. Another potential limitation is the human error in data entry. Acquiescence bias and knowledge deficit bias can also cause overestimation or underestimation of an effect in the survey. Finally, the data gathered from the feedback of the project team as well as community partners could have provided a valuable input on areas of improvement such as coordination and cost-effective management for future purposes. While these areas are very important for the purpose of programming and future planning, the data collected on the above mentioned areas gives very little idea about the outcomes of the expo event. In other words the data is not measuring the meaningful intended change in the behavior of the participants. For example, in the questionnaire, only question no 9 is evaluating the self-efficacy of the participants which can rightly be called as one of the measurable immediate outcomes of the event. Self-efficacy is one of the important constructs of health belief model. The application of the constructs of the health belief model can further help guide in evaluation of the intended short term behavioral outcomes and is discussed below.

#### **Chapter 5-The health belief model, evaluation and CDA's Diabetes expo evaluation tool.**

The health belief model is one of the several conceptual models that have been used in health education in order to describe, predict or explain the factors which will account for an individual's health-related behavior. The components of the model commonly termed as constructs in the behavioural sciences literature can not only be employed as guidance to the programme planners at the "how to"

stage of planning the intervention but can also be used as guide to the programme evaluators in developing the evaluation tools that will define the intended outcomes as well as measurements. The measurements can then be used to assess the effectiveness of the diabetes education programmes or any other self-management education programme in question (Nutbeam, et al., 2010). The first construct called as perceived susceptibility refers to the perception of the intended participants about their susceptibility to develop diabetes. Second construct known as perceived severity talks about the belief of the individual in the nature and extent of the harm that will occur from diabetes as a result of a particular health-related behavior (Sharma & Romas, 2011). Perceived benefits is the third construct that refers to the belief of the participants at diabetes expo in the benefits of the methods suggested for minimising the risk or severity of the disease that will result from the continuation of a particular health related behavior that will increase the risk of individuals of developing diabetes. The fourth construct of the health belief model talks about the participant's perception of the barriers in adopting the suggested actions. For instance, the information provided in the diabetes expo may have improved the perception of the participants about benefits involved in taking the suggested actions. However, the participants may still perceive the recommended actions to be painful, inconvenient or upsetting (Sharma, M & Romas, 2011). The fifth construct of the belief model known as cues to action, describe the precipitating factors that makes a person realise the need to take action. The cues to action can be classified as internal or external. Internal cues as the term indicates may be an individual's perception of the bodily state. Whereas, external cues are the triggers for action after exposure to stimulus such as the education provided at the CDA's diabetes expo or webinar, a health promotion media communication, or follow up examination post card by the doctor. The cues to take action however, is linked to the perceived susceptibility and the perceived severity of an individual. A slight stimulus is enough to precipitate action if the perceived susceptibility or perceived severity is high and vice versa (Sharma & Romas, 2011). As noted in the critical literature review, the time of contact between the educator and the intended individual is important and determines the intended change in the behavior. It was noted from the findings of the studies that the learned behavior wanes away over a course of time. Therefore, self-management diabetes education

events such as diabetes expo are more suited to provide the required reinforcement stimulus for the desired action. In order to effectively assess the effectiveness of diabetes expo in providing the intended participants with the desired stimulus, an evaluation method based on the six constructs of health belief model which will assess the perception of an individual living with diabetes is proposed. Further, as already mentioned above, it is very hard to evaluate the improvement in the self-management skills of individuals living with diabetes after exposure of the intended participants to a half day educational event. In other words events like Diabetes expo can help in the achievement of the short term objectives only. Interestingly, the achievement of the short term objectives are the first step towards improvement in the self-management skills which is a long term objective. CDA diabetes expo provide a unique opportunity in not only improving 6 types of perceptions identified by HBM but also assessing its effectiveness in the improvement of six types of perception of the intended participants. The perceptions of the participants that will determine the health-related behavior in the future, provided the expo achieve its short term outcomes namely improving the perceived susceptibility, perceived severity, perceived barriers, perceived benefits and self-efficacy. Self-efficacy is the fifth construct of the health belief model which talks about the ability of the participant to adopt a positive health related behavior. The improvement in the self-efficacy is one of the important short term objectives that can be achieved by hosting such events such as CDA's diabetes expo and educating the intended participants. The challenge however, is the measurement of the short term goals which include self-efficacy of the intended participants. As mentioned above this can be achieved by formulating an evaluation a tool employing the constructs of the health belief model as shown in appendix-G which will gauge the short term objectives of CDA Expo. From the above discussion, improvement in the 6 types of perceptions which includes self-efficacy can be more appropriately categorised as short term objectives of a 4 hours CDA diabetes Expo and is hard to realise without an event which will include the right combination of elements aimed towards improving the perceptions including self-efficacy (Sharma & Romas, 2011). Without improvement in the perceptions, the long term goal of the improvement in self-management skills cannot be realised.

## Chapter-6- Discussion, Conclusion, Recommendations

### 6.1-Discussion

The findings of the survey questionnaire distributed at the end of the expo show that CDA's diabetes expo event is popular and acceptable amongst the intended participants. Venue, access to the venue and facilities at the venue also influence and determine the level of the intended participants and hence the reach of the intended participants. Moreover, although one of the purposes of the expo is to reach individuals living with diabetes, the expo is an all-inclusive event. However, it is important to mention that the participation by individuals in 18 to 34 and 35 to 54 years age group is below 10%. The goal of primary prevention for self-management education cannot be achieved without the engagement of the diabetes affected individuals in 18 to 34 and 35 to 54 year age group in any self-management education or a diabetes self-management education programme. Further, there are some abandoned sections of the population such as South Asian, East Asian and Aboriginal. Finally, the survey response of the participants show that self-efficacy which is the important immediate short term outcome of the expo event can be achieved through these midday 4 hours diabetes self-management educational event. However, the event can also help achieve important short term outcomes such as improvement in the perception of susceptibility, severity, barriers, and benefits of the intended participants. In order to measure these important short term outcomes, application of the constructs of the health belief model in the evaluation tool is warranted which will help measure not only self-efficacy but also the above mentioned short term outcomes. This information gathered from the evaluation tool employing the constructs of the health belief model can be used to measure the effectiveness of diabetes expo. It will help guide the CDA as well as the experts participating in providing the education to the participants of the diabetes expo on minimising such perceived barriers by providing reassurance, further education and taking further actions required for correcting the misperception. The diabetes expo is hosted in all the major cities and in select communities across Canada. It meets the requirement of the incorporation of the guiding principles of inclusion of the disadvantaged groups, non-discrimination and gender equality in planning of the project as outlined in the WHO's human rights based approach towards

health. However, there is a room for improvement in order to include all sections of population which are susceptible to development of diabetes as discussed in introduction section.

## **6.2-Conclusions**

CDA's diabetes expo is a 4 hours midday health promoting, self-management educational and awareness bringing event. Improvement in the self-management skills and life styles takes a long time and 4 hours exposure is not enough to improve the self-management skills or changes in unhealthy life style. However, 4 hours contact with educators provides an opportunity to the educators to provide an effective stimuli for a change in risky health behaviors which make an individual vulnerable to development of diabetes and adversely affects the quality of life of individual already affected by diabetes. It provides an opportunity to achieve the goal of self-efficacy in the intended participants which is the first step towards improvement in the life style and self-management skills. As mentioned above in the section on health belief model, self- efficacy itself is achieved through improvement in the perception on four constructs identified by health belief model which are pre-requisites for the achievement of self-efficacy. Although event is effective in terms of the opportunity that it provides for providing a stimulus refresher message to the intended participants and the motivation as well as a sense of empowerment that it provides to the intended participants, yet there are areas of improvement as identified in the preceding sections which will make the programme more effective if addressed by the programme leaders.

## **6.3-Recommendations**

- The goal of prevention is important for any health education or self-management educational programme to achieve. In order for the diabetes expo to achieve this goal, the inclusion and participation of all age groups are important. This can be achieved by hosting such educational events or programmes in schools of BC.
- The disparities in access to these educational programmes as the data shows can be eliminated by engaging faith centers such as mosques, gurdwaras and other cultural as well as faith houses in

the project. Further, the reopening of the local chapters of the organizations is important and so is the development of the promotion and educational materials in Punjabi.

- Keeping in view the acceptability and popularity of the event, the hosting of the event twice a year will keep the stimulus for changing life style and self-efficacy alive and especially so that the greater exposure or contact time between intended recipients and the educator in the self-management education sessions have resulted in better outcomes.
- Finally, in order to educate the intended audience on environmental determinants of diabetes, partnership building by Canadian Diabetes Association with organizations and participation by organizations such as BC lung association, Environment Canada in Diabetes expo as well as inclusion of a webinar on educating the intended audience on environmental determinants of diabetes in the organization's webinar series programme can make the self-management education programmes of the organization more effective towards achievement of the intended outcomes.

#### 6.4- Reflections

Diabetes is a kind of chronic non-communicable diseases which provides a unique learning opportunity for not only the novice but also the experience policy makers and public health practitioners to study and learn the interconnectedness and interaction of social and environmental determinants of health. It helps gain experience devise the multidisciplinary preventive strategies in order to address the excess risk associated with the interaction of the interconnected social and environmental determinants of health. Study of the risk factors associated with diabetes and diabetes self-management education as a strategy to reduce the excess risk associated with exposure to the social and environmental determinants of diabetes also provide convincing answers to some of the most challenging critiques by the critics of health education. Diabetes is also the economists and financial expert's litmus test for the cost-effective allocation of budget. Drawing on the findings of the survey, I have been able to further my understanding

on the discourse that surrounds the culturally competent preventive strategies and also the health consequences associated with the disparities factor in access to prevention strategies. With background in human rights work and hence a passionate advocate of World health Organisation's(WHO) human rights based approach towards health, the work that I successfully completed starting from providing support in planning the coordination of a multidisciplinary self-management community education event by using a logic model , evaluation tool and then the findings of the survey and interviews has provided further impetus, a sense of achievement and affirmation to the human rights work that I have been so passionately engaged in for the last so many years. Using diabetes as a case study for human rights based preventive strategies, the significance of equity and equality in programme planning, implementation and evaluation becomes more visible and pronounced for me. Equity and equality is the cornerstone of human rights based effective preventive strategies and also salient features of a gold standard public health practice. The study of the self-management education programmes also provided me an opportunity to reinforce my knowledge on not only the interaction of exposure to risk factors associated with development of diabetes, the gene environment interaction and revisit other important epidemiological or quantitative concepts. Most important experience that I gained from this evaluation study was the comparison analysis of the project planning, implementation, evaluation and public health practice in Pakistani public health setting and Canadian Public health settings and I learnt several distinguishing features between the two which are the underpinnings of a quality public health practice.

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### **Appendix: A- Description of the Canadian Diabetes educator section's best practices**

Diabetes Educator Section (DES), of the Canadian Diabetes Association(CDA) is a multidisciplinary professional section which leads, support and advocates for excellence in diabetes education for not only people living with diabetes but also health-care professionals. With the financial support from the Public Health Agency of Canada, an assessment tool was developed by the project to identify best practices and share the findings of the project with the government, diabetes educators, health care professionals, funders and decision makers. The project also complemented the available 2 key resources created by CDA which informs clinical practice and set the standards for diabetes education in Canada. A review of the literature was done on diabetes education projects from around the world showing practices in diabetes education which were evaluated according to a selection criteria as 'promising' or 'best'. The final product called "The best and Promising Practices in Diabetes Education" Catalogue was created which provides access to the practices in diabetes education that has shown positive results. The project was a success and provides an assessment tool that can also be used to update the catalogue and expand the knowledge of positive outcomes that can be achieved through diabetes education

**Appendix: B- List of the community partners participating in diabetes expo**

Self-management BC active choices	BC doctors of optometry
BC psychological Association	BC Transplant Society
College of Occupational Therapists of BC	Canadian Celiac Association
BC Dental Hygienists Association	Canadian Institute for the relief of Pain
Canadian Mental Health Association	City of Surrey Parks and Recreation
City of Vancouver board of parks	BC Association of clinical counsellors
Healthlink BC	Heart and stroke foundation
Healthy families BC	The kidney foundation of Canada BC and Yukon
Mood Disorders Association of BC	Live Well exercise clinic

**Table: List of radio channel partners for promotion of the event and engaging the intended Participants**

The beat 94.5	LG104.3
Rock 101	QMFM
Virgin Radio	The Fox 99.3
JRFM	News 1130
Sonic	Jack FM
RJ1200AM	Sher-e-Punjab Radio
Red FM 93.1	The Peak

**Table- List of TV channels and websites for promotion of the event and engaging the intended Participants**

<b>TV channel</b>
Global Entertainment
CTV British Columbia
CBC Television
Shaw Television
OMNI Television
City Vancouver
<b>Websites</b>
<a href="http://www.craigslist.com">www.craigslist.com</a>
<a href="http://www.vancouver.kijiji.ca">www.vancouver.kijiji.ca</a>
<a href="http://www.vancouver.gyos.ca">www.vancouver.gyos.ca</a>
<a href="http://www.vancouver.superads.com">www.vancouver.superads.com</a>
<a href="http://www.vancouver.yellocrowd.com">www.vancouver.yellocrowd.com</a>
<a href="http://www.vancouver-exchange.com">www.vancouver-exchange.com</a>
<a href="http://www.burnaby.postad.ca">www.burnaby.postad.ca</a>
<a href="http://www.eventbrite.com">www.eventbrite.com</a>
<a href="http://www.charityvillage.com">www.charityvillage.com</a>
<a href="http://www.vch.ca">www.vch.ca</a>

**Table: List of print media partners for promotion and engagement of the intended Participants of the diabetes expo**

Burnaby news leader	Abbotsford news	Alder grove star
Burnaby Now	InfoBurnaby	Burnaby board of trade
Surrey Board of Trade	Vancouver Sun	Surrey Now
Georgia Straight	24 hours Vancouver	Metro news Vancouver
Vancouver Courier	WE Vancouver	The Now( Coquitlam)
Tricity News	Richmond News	Richmond Review
Surrey Leader	The Now newspaper	Peace Arch News
New West News Leader	South Delta leader	Business in Vancouver

## **Appendix-C: - The multidisciplinary nature of Ask the Expert component of Diabetes**

### **Expo and the guiding principles**

The purpose of the Ask the Expert component of diabetes expo is to provide the participants with the opportunity to ask specific questions about diabetes and to talk with experts one-on-one regarding complications of diabetes and ways to avoid these complications. Ideally, an external agency such as local health authority, BC Podiatrists Association is invited for the participation of the experts. The Ask the expert element of the Expo is guided by the following policies and principles.

1-The mission of the Canadian Diabetes Association is to promote the health of Canadians through diabetes research, education, service and advocacy.

2-The clinical practice guidelines of the Canadian diabetes association for the prevention and management of diabetes in Canada

3-Direct Health care policy (Canadian Diabetes Association).

4-The experts participating in the ask the expert section are required to be licensed or certified from a nationally regulated profession that provides a relevant and professional service in Canada (CDA, 2015)

### **Examples of ask the expert participants.**

The list of the experts who are invited to give expert advice in multi-disciplinary diabetes self-management education community event and answer questions by the individuals affected by diabetes at the event is given in table-2.

**Appendix-D: 1<sup>st</sup> Key Informant Interviews, questionnaire.**

Q-1: Describe briefly your reasons for joining Canadian Diabetes Association.

Q-2: For how long have you been associated with Canadian Diabetes Association?

Q-3: When was the first time Canadian Diabetes Association hosted Expo and where?

Q-4: How was the expo project launched? More specifically who proposed the idea of Diabetes Expo and how was the programme created/planned?

Q-5: Was there any community needs assessment done before the launch of the expo project?

Q-6: How many expo events have you coordinated so far?

Q-7: How will you compare the expo events that you have coordinated so far in terms of a)- Number of participants in each expo b)-level of interest shown by the participants c)- self- efficacy and 4)- improvement in the self -management skills of the intended participants?

Q-8: Can you please reflect on the number of participants who are living with diabetes and are registered as participants for the upcoming Diabetes Expo on September 12? Is this number better (greater) than the previous expo in 2014?

Q-9: From your experience coordinating the Expo events, please describe briefly the level of interest shown by the intended participants? More specifically which indicator/variable will you choose to describe the level of interest of the participants.

Q-10: What are the short term, medium term and long term outcomes of the Diabetes Expo and Webinar series?

## Appendix-E: 2nd Key Informant Interview questionnaire

Q-1: From your experience coordinating the expo event do you think that the Expo event has been able to achieve its short-term, medium term and long term outcomes?

Q-2: What indicators does the CDA use to measure the outcomes achieved? In other words how do you measure the outcomes achieved?

Q-3: From your experience working with individuals living with diabetes, what is the biggest challenge/need that an individual with diabetes is faced with? Is CDA capable of providing necessary support to help individuals overcome the challenge identified?

Q-4: From your experience coordinating the Expo events, which segment of the population is affected most by diabetes and has the CDA been able to engage them successfully to help them benefit from its programme objectives?

Q-5: From your experience coordinating expo projects which component of expo project interest the participants living with diabetes expo most? Which component do you like most and why?

Q-6: From your experience working with Canadian Diabetes Association what are the challenges that Canadian Diabetes Association needs to overcome in order to meet the intended outcomes of the educational programmes in general and Expo project in specific?

Q-7: From your experience as a coordinator, are there any success stories of CDA that you will like to share?

Q-8- From your experience as a coordinator, how will you describe the role of the volunteers working with Canadian Diabetes Association in general and the Expo project in specific?

Q-9- Are there any recommendations that you will like to share for the improvement in Diabetes Expo?

Q-10: Please comment on the availability of the skilled manpower?

Q-11: Is the CDA local programme office over-staffed or understaffed? If it is understaffed, how do you manage it?

Q-22: Are there any conflicts of interests that you will like to share while you are dealing with different stakeholders in the projects initiated by CDA (e.g time, resources, commitment etc)

Q-23: Any other information that you think is relevant to the effectiveness of Expo project and that you will like to share?

**Appendix-F: Evaluation questionnaire used by CDA's diabetes expo programme coordinators**

Q-1- Which one of the following statements below best describes you? Please select all that apply?

**a-** Type-1 diabetes **b-** Type-II diabetes **c-** Gestational **d-** none.

Q-2- What age group are you part of?

**a-** 10-15 years **b-** 20-25 years **c-** 25-35 years. **d-** above 40 years

Q-3- What is your gender? **a-** Male **b-** Female **c-** none of the above **d-** no answer.

Q-4- The CDA is trying to reach certain groups in Canada, please indicate if you belong to any of the

following? **a-** Caucasian **b-** Hispanic **c-** aboriginal **d-** East Indian

Q-5- What led you to attend this Expo?

Q-6- Which of the following topics were most useful to you?

**a-** Foot care **b-** Nutrition **c-** Health care **d-** Physical activity **e-** Drug Medications

Q-7- On a scale from 1 to 5 how would you rate the following? (1 is the lowest level and 5 is the highest level of appreciation)?

**a-** Expo Venue **b-** exhibitors/display tables **c-** Ask the experts /Health checks

Q-8- Would you be willing to come back to the same venue if interested in next year's expo?

**a-** Yes **b-** No **c-** No answer.

Q-9- Which of the following changes do you intend to make to your lifestyle as a result of this expo?

**a-** my physical activity **b-** monitor blood glucose **c-** healthier food choice **d-** frequent visits to my physician **e-** No, I am not anticipating changes. **f-** No answer. **g-** Other (please specify)

## Appendix-G: Proposed Evaluation tool using constructs of health belief model

### 1-General Demographic Information

Q-1: Which of the following statements below best describe you (CDA, 14)?

- I am living with Type-1 Diabetes.
- I am living with Type-2 Diabetes.
- I have pre-diabetes.
- I am at the risk of developing diabetes.
- I am a caregiver of a person living with diabetes.
- I have or had gestational diabetes.
- No answer.
- Other (please specify).

Q-2: For how long have you had diabetes?

- 0-1 year
- 2- 5 years
- 6-10 years
- 7-14 years
- 15-20 years.

Q-6: What is your gender?

- 1-Male      2-Female      3-Prefer not to answer

Q-7. Canadian Diabetes Association is making efforts to meet the language requirements of our Communities in our diabetes education projects. Please indicate which one of the following is your first language.

- 1- English.
- 2- Chinese.
- 3- Punjabi.
- 4- Persian.
- 5- Pashto.
- 6- Urdu.
- 7- None of the above.

Q-14: What led you to attend this Expo (CDA, 14)?

- 1- My doctor/healthcare practitioner told me about the event
- 2- Internet search.
- 3- Referred by friend or family member.
- 4- Picked up flyer at my mail box at home.
- 5- Flyer/poster at a library, local health fair/community event.
- 6- Received an e-mail from CDA.
- 7- Social Media.

Q-13. Which of the following best describes your experience in reaching the expo venue today.

- 1- It was easy to reach.
- 2- Very easy to reach.
- 3- Hard to reach.
- 4- Very hard to reach.
- 5- Other.(Please specify)

Q-15: Which of the following topics were most useful to you (Please select your top 3) (CDA, 14)

- 1- Diabetes Management.
- 2- Nutrition.
- 3- Heart health.
- 4- Foot Care.
- 5- Physical activity.
- 6- Drugs/Medication.
- 7- Chronic Illnesses.
- 8- Healthy living
- 9- Other(Please specify)

Q-16: On a scale from 1 to 5 (1 is the lowest level and 5 is the highest level of appreciation), how would you rate the following (CDA, 14)?

- 1- Expo Venue.
- 2- Exhibitor/Display Tables.
- 3- Ask the experts/health Checks.

Q-17: If interested in next year's Expo, would you be willing to come back to the same venue (CDA, 14)

- 1- Yes
- 2- No
- 3- No answer

## **2-Measuring perceived susceptibility.**

Q-4: From your general knowledge experience, which one of the following age group is at risk of developing diabetes?

- 1-0-5 year      2. 6-15 years      3- 16-30 years      4- 31-50 years      5- All of the above.

Q-5: What age group are you part of?

- 1- 18-24.
- 2- 25-34.
- 3- 35-44
- 4- 45-54
- 5- 55-64
- 6- 65-74
- 7- 75+
- 8- Prefer not to answer.

Q-6: Research studies show that diabetes also tends to run in family. Which of the following statements best describe your family history of diabetes?

- 1- 1 family member living with diabetes.
- 2- 2 family members living with diabetes.
- 3- 4 family members living with diabetes.
- 4- More than 5 family members living with diabetes.
- 5- None.

Q-7: Research studies show that certain groups are more at risk of developing diabetes and CDA is trying to reach these groups in order to try helping them better. Please indicate if you belong to any of the following (CDA, 14).

- 1- East Asian (Chinese, Vietnamese, Filipino, Korean, etc.)
- 2- South Asian (East Indian, Pakistani, Sri Lankan, etc.)
- 3- Caucasian.
- 4- Aboriginal.
- 5- Black(Afro-Caribbean)
- 6- Hispanic/Latino.
- 7- Prefer not to Answer.
- 8- Other (Please Specify).

Q-8: In order to assess your risks better, CDA will like to know about your lifestyle. Please indicate which one of the following best describes your tobacco smoking history.

- 1- Heavy tobacco smoker.
- 2- Occasional tobacco smoker.
- 3- Was a heavy tobacco smoker but quit for the last 5 years?
- 4- Was an occasional tobacco smoker.
- 5- Don't smoke.

Q-9: Which of the following best describes your alcohol drinking habits?

- 1- Heavy drinker.
- 2- Occasional drinker.
- 3- Non-drinker
- 4- Others( Please describe briefly)

Q-10: Which one of the following best describes your eating habits?

- 1- I love fat rich and spicy foods and have it 3 times a week.
- 2- I love sweets and candies a lot and usually have a sweet dish with my main meals.
- 3- I am a vegetarian and like to have fruits with my main meals.
- 4- Other (Please describe briefly).

Q-11: Do you know that some sugary drinks contain as many calories as a whole meal and high calories from excess sugary drinks can lead to weight gain increasing the risk of diabetes, high blood pressure and heart disease?

- 1- Yes, I know
- 2- No, I don't know that.
- 3- Now, I know that.
- 4- Others (please describe briefly).

Q-12: Keeping your life style, age, family history in mind, from the scale of 1 to 5 please indicate your risk of developing diabetes?

- |    |    |    |
|----|----|----|
| 1- | 3- | 5- |
| 2- | 4- |    |

### **3- Knowledge questions: measuring perceived severity**

Q-1: Did you know that Diabetes is a global health problem and affects millions of people all over the world every year?

- 1- Yes, I know.
- 2- No, I don't know that.
- 3- Now, I know that.
- 4- Others (please describe).

Q-2: Research studies show that diabetes when not controlled affects multiple systems/parts of the human body. Which of the following statements best describes your complications of diabetes.

- 1- It has affected my eyes.
- 2- It has damaged my kidneys.
- 3- It has damaged my foot.
- 4- It has damaged my heart.
- 5- It has damaged my digestive system.
- 6- None

#### 4-Measuring perceived barriers

Q-1: From your experience participating at the expo today, please indicate how hard it will be for you to make changes in your life style advised by the educators?

- 1- Hard.
- 2- Very hard.
- 3- Easy
- 4- Very easy.

Q-2: From your experience, what is the biggest hurdle that will prevent you from taking actions in order to take control of your diabetes?

- 1- Money.
- 2- Discomfort/Inconvenience.
- 3- Motivation.
- 4- Time.
- 5- Schedule.
- 6- Other medical condition
- 7- Cultural inappropriateness.
- 8- All of the above.
- 9- None of the above.

#### 5- Measuring perceived benefits

Q-1: From your experience participating at today's expo, do you feel that the tips and education provided by the experts today will benefit you in taking control of your diabetes?

- 1- Yes
- 2- No

Q-2: From your experience participating at today's expo, do you feel that you will be able to detect the complications associated with diabetes?

- 1- Yes
- 2- No

Q-3: Please indicate what other benefits in your opinion can be achieved from today's event.

- 1- Time.
- 2- Easy access.
- 3- Saving money.
- 4- Avoiding discomfort.
- 5- Improvement in the quality of life.
- 6- All of the above.

## 6-Measuring self-efficacy

Q-1: Do you know that many individuals with diabetes who were able to fight diabetes are living a perfectly normal and successful life and you can also do that (Hurley et al.1992)?

- 1- Yes, I know.
- 2- No, I don't know that.
- 3- Now, I know that.
- 4- Others (please describe briefly).

Q-2: How confident do you feel that you can eat your meals according to the diabetes food guide every day?

- 1- Confident
- 2- Very confident
- 3- Not so confident
- 4- Not confident at all.

Q-3: How confident do you feel about taking exercise 15 to 30 minutes every day?

- 1- Confident
- 2- Very confident
- 3- Not so confident
- 4- Not confident at all.

Q-4: From your experience in participating at the event today, please indicate your confidence about controlling your diabetes?

- 1- Confident.
- 2- Very confident
- 3- Not so confident
- 4- Not confident at all.

Q- 5: How confident do you feel after participating at today's event that diabetes will not prevent you from doing activities that you will like to do?

- 1- Confident
- 2- Very confident
- 3- Not so confident
- 4- Not confident at all.

Q-6: As a result of this expo, I intend to make the following changes to my lifestyle (please select all that apply (CDA, 2014).

- 1- Increase my physical activity.
- 2- Regular monitoring of my blood glucose.

- 3- Make healthier food choice.
- 4- More frequent visits to my physician/health care team.
- 5- No, I am not anticipating changes.
- 6- Other (please specify).

### 7-Volunteer feedback.

Q-1: What age group are you part of?

- 1- Under 18
- 2- 18-24
- 3- 25-34
- 4- 35-44
- 5- 45-54
- 6- 55-64
- 7- 65-74
- 8- 75+

Q-2: Which one of the following best describes your affiliation with CDA?

- 1- I am participating as a volunteer with CDA for the first time.
- 2- I have participated as a volunteer twice before this expo.
- 3- I have participated as a volunteer with CDA in projects other than expo.
- 4- Other (please describe briefly)

Q-3: How will you describe your experience as a volunteer for the Fall Expo?

- 1-Excellent.
- 3--Very Good.
- 4-Okay
- 5-Poor
- 6-Very poor.

Q-4: On a scale from 1 to 5(1 is the lowest level and 5 the highest level of satisfaction), how would you rate your overall satisfaction with this fall's Expo?

- 5
- 4
- 3
- 2
- 1
- Others(please specify)

Q-5: How supported did you feel by your staff partner team members (CDA, 2014)?

- |                        |                            |            |
|------------------------|----------------------------|------------|
| 1-Very supported       | 2- somewhat supported      | 3- Neutral |
| 4-Not supported enough | 5- Other (please describe) |            |

Q-6: How would you describe the communications and instructions received for the Expo (CDA, 2014)?

- 1- Excellent.
- 2- Good
- 3- Fair
- 4- Poor

Q-7: Please rate how satisfied you think the participants were at the fall expo based on your direct observations and feedback in the community (CDA, 2014)

- 1-Very satisfied
- 2- Satisfied
- 3- Neutral
- 4- Dissatisfied
- 5-Very dissatisfied.
- 6- Other (please describe briefly)

Q-8: Will you participate again as a volunteer for CDA in any future Expo?

- |                                    |      |   |
|------------------------------------|------|---|
| 1-Yes                              | 2.No | 3-Depends upon my schedule and circumstances. |
| 4-Other (please describe briefly). |      |   |

Q-9: Which one of the following best describes your reasons/motivation to volunteer with CDA?

- 1- I wanted to gain experience with CDA.
- 2- I wanted to know more about diabetes.
- 3- I wanted to share my expertise.
- 4- I wanted to explore my interests and goals.
- 5- I wanted to have a sense of belonging and achievement.
- 6- I want to learn new skills.

Q-10: From your experience what is the most important factor that will influence your involvement negatively as a volunteer with CDA?

- 1- Time.
- 2- Financial reasons.
- 3- Leadership and management style of the organisation.
- 4- Location of the volunteer work opportunity.
- 5- Others (Please describe briefly).

Q-11: From your experience, were you able to achieve your objectives for your participation as a volunteer with CDA?

- 1- I agree
- 2- I strongly agree.
- 3- I disagree.
- 4- I strongly disagree.
- 5- Others(Please describe briefly)

Q-12: From your experience, are you satisfied with the role of your supervisor/manager at CDA?

- 1- Satisfied.
- 2- Very satisfied.
- 3- Unsatisfied.
- 4- Very unsatisfied.

## 8- Project Team Feedback

1-Please indicate which one of the following best describes your overall satisfaction with the expo?

- 1- I am satisfied with the way the expo was executed.
- 2- I am very satisfied with the way the expo was executed.
- 3- I am not satisfied with the way the expo was executed.
- 4- I am very dissatisfied with the way the expo was executed.
- 5- Other (please describe briefly).

2-Please indicate which one of the following best describes your experience with the coordination efforts of the expo project team compared to the previous expo last year?

- 1- The expo this year was very well coordinated than the expo last year.
- 2- The expo this year was well coordinated than the expo last year.
- 3- The expo this year was very poorly coordinated than the expo last year.
- 4- The expo this year was poorly coordinated than the expo last year.
- 5- There was no difference in the coordination of the 2 expos.
- 6- Other (Please describe briefly)

3-Please indicate which one of the following best describes your level of satisfaction with the performance of the volunteers involved in the expo this year?

- 1- I am extremely happy with the performance of the volunteers in the expo project team
- 2- I am happy with the performance of the volunteers in the expo project team.
- 3- I am not happy with the performance of the volunteers in the expo project team.
- 4- I am extremely unhappy with the performance of the volunteers in the expo project team.
- 5- Other (please describe briefly)

4-From your experience, how well the targets and goals of the expo were achieved?

- 1- All the targets and goals of the expo were achieved.
- 2- Some of the targets and goals of the expo were achieved.
- 3- None of the targets and goals of the expo were achieved.
- 4- Others (please specify).

5- From your experience, which one of the following will best describe your satisfaction with the Cost-effectiveness of the expo event this year?

- 1- I am extremely satisfied with the cost-effectiveness of the expo this year.
- 2- I am satisfied with the cost-effectiveness of the expo this year.
- 3- I am extremely dissatisfied with the cost-effectiveness of the expo this year.
- 4- I am dissatisfied with the cost-effectiveness of the expo event this year.
- 5- Neutral.
- 6- Others (please describe further)

7- From your experience which one of the following will best describe your view on the accessibility of the expo venue?

- 1- It was easily accessible for the participants.
- 2- It was accessible for the participants.
- 3- It was not easily accessible for the participants.
- 4- It was not accessible for the participants.
- 5- It should have been easily accessible for the participants.
- 6- Others(please describe)

**Table 1. The evolution and implementation of Canadian Diabetes Prevention strategy**

<b>Project</b>	<b>Focus areas</b>
Canadian Diabetes Strategy (CDS) (First phase 1999-2005)	Early detection, prevention, management of all forms of diabetes
Integrated strategy on healthy living and chronic disease	The Canadian Diabetes strategy became known as integrated strategy on healthy living and chronic disease in 2005. The focus areas Promoting health for every Canadian, Preventing chronic disease by reducing risks for Canadians at high risk and supporting early detection and prevention of chronic diseases
Canada's Physical Activity and Good Guides including a programme specially introduced for First Nations, Inuit and Metis	The guidelines describe the types and amount of physical activity that offer substantial health benefits to adults, youth, children and older adults. The guidelines also reflect advances in exercise science and contribution from experts in the field and align with international guidelines used in other countries.
Aboriginal diabetes initiative	Aboriginal Diabetes Initiative was incorporated in the Canadian Diabetes Strategy (CDS). Focus areas for the strategy is increasing awareness of diabetes among First Nations, Inuit and Metis in order to reduce the burden of diabetes in these high-risk communities.
The federal Diabetes partnership	The Public Health Agency of Canada, Health Canada and the Canadian Institutes of Health Research formed a partnership with the Diabète Quebec, Canadian Diabetes Association and the Juvenile Diabetes Research Foundation in 2009. The focus was to facilitate the evidence based work on common priorities to further diabetes prevention and management.
Early detection of diabetes and pre-diabetes: CANRISK	The public health Agency has also invested in the development of risk questionnaire called <a href="#">CANRISK</a> which is meant to enable Canadians know their risk of having pre-diabetes or diabetes and take the appropriate preventive measures in order to prevent or delay the onset of the disease.
The preventive chronic disease strategic plan	The plan is the work to be done from 2013 to 2016 by building on the accomplishments obtained by the Canada's Public Health Agency Integrated Strategy on Healthy Living and Chronic Disease.

Retrieved from [http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/strategy\\_funding-strategie\\_finance-eng.php](http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/strategy_funding-strategie_finance-eng.php)

**Table: 2 List of programmes implemented by Canadian Diabetes Association**

Programmes	Description
Virtual Health Coaching	A free telephone-based service, in which a certified health coach will help you prioritize your health goals. A certified health coach conducts two 45-minute one-on-one telephone sessions with a certified from the comfort of the home followed by a 20 minutes follow up session for the evaluation of the success of the session
Learning Series	The Learning Series is a series of presentations for individuals who are at risk of developing diabetes, those who are newly diagnosed as well as those with The purpose of these presentations is to increase awareness of signs and symptoms, risk factors, signs and complications of diabetes, and to encourage the participants to work with their health care team in order to manage diabetes with a healthy lifestyle.
Food Skills for families	A hands on programme that provides people living at risk of developing chronic disease or living with a chronic conditions including diabetes from the South Asian, new immigrants, First Nations as well as senior and low income groups with practical relevant advice on preparation of healthy meals. The programme include six sessions. Each session addresses a different topic based on the Canada Food Guide and its key messages.
Community Pharmacy Outreach Programme	The Program is a partnership between the pharmacies and CDA and pharmacies aimed towards providing information and resources in order to help better support to individuals living with diabetes
D-Camps	The focus of the D-camps is to provide children affected by type 1 diabetes with experiential learning opportunities in safe and fun environment. In the camp sessions children learn about diabetes management under the auspices of a trained medical professional.
CDA Webinar series	A 45 minute presentation followed by 15 minutes questions and answer sessions aimed towards providing information and education to health care professionals, diabetes carer, researchers as well as individuals affected by diabetes.
Walk and Talk programme	A free experiential education program open to all which includes a short presentation by a professional. Topics selected for education include healthy eating, active living, walking safely, setting personal goals.
Lace up with Team Diabetes	The programme is supporting Canadians living with diabetes or prediabetes by providing them an opportunity to participate in events organised by CDA such as running, walking or hiking at exciting Canadian and international events at around the world and home.

### Table: 3- Components of Diabetes expo

The CDA host Expo annually in select communities across Canada. It is an educational event taking place which offer opportunities to learn diabetes self-management and gain knowledge and skills while connecting and motivating people living with diabetes. Expert speakers participates in Each CDA Expo and includes an interactive tradeshows, local content, ask the expert component and talk by guest speakers. Every event comprise the following components.

- 1- 1:00 pm to 1:30 pm ----- Tradeshows, Ask the expert and Tradeshow
- 2- 1:30 to 1:35 pm .....Welcome and opening remarks.
- 3- 1:35pm to 2: 35 pm ..... Key note speakers
- 4- 2:35 pm to 3:55 pm.....Nutrition break, Exhibits, trade shows and ask  
The expert
- 5-3:55 pm to 4:55 pm..... Guest speakers.
- 6-4:55 pm to 5:10 pm..... Closing remarks and prize draws

**Table: 4- Intended outcomes of diabetes self-management education project**

Lipid profile, physical activity, healthy diet, HbA1c, Glycaemic control.	(Clark, M. 2008)
Motivation, information, education, beliefs and attitudes, Lipid profile, healthy diet, physical activity	(Grillo, M. D. F. F., Neumann, C. R., Scain, S. F., Rozeno, et.al, 2013).
Diabetes related problem solving, diabetes related knowledge & skills, self-efficacy, self-esteem, healthy diet, physical activity, depression, stress, anxiety	(Gage, H., Hampson, S., Skinner, T. C., Hart, J., Storey, L., Foxcroft, D., ... & McEvilly, E. A. (2004)
Self-efficacy, knowledge, attitudes, self-care behaviors, blood glucose, BMI, blood pressure and cholesterol levels, physical activity, diet, proactive coping, goal attainment	(Thoolen, B., De Ridder, D., Bensing, J., Gorter, K., & Rutten, G. 2008).
Diabetes self-care knowledge and skills, diabetes related hospitalisations, physician visits, attitudes.	(Rettig, B. A., Shrauger, D. G., Recker, R. R., et.al, 1986).
Blood pressure, BMI, Physical activity, Dietary habits, HbA1c	(Ko, S. H., Song, K. H., Kim, S. R., Lee, J. M., Kim, J. S., et.al, 2007).
Self-efficacy, diabetes related knowledge, self-care, empowerment	Wallace, A. S., Seligman, H. K., Davis, T. C., Schillinger, D., Arnold, C. L, et.al, (2009).
Knowledge, self-management skills, perception of desired targets, perceptions of standards achieved, perceived benefits/barriers, locus of control, perception of susceptibility.	(Bandura, A. (2004). Harvey, J. N., & Lawson, V. L. 2009).
Self-efficacy, physical activity, knowledge, attitudes, self-care skills, health service utilization, glycemic control	(Norris, S. L., Engelgau, M. M., & Narayan, K. V. 2001).

**Table: 5- Key findings of the studies on the effectiveness of the self-management education**

Study	Group studies(n)	Strength of audience	outcome
Corabian & Harstall[7]	Type-2 diabetes	Systematic review(included 3 meta-analysis, 7systematic reviews, 7 primary studies,	No firm conclusion regarding effectiveness of DSME on self-management
Deakin et al.[16]	Type-2 diabetes	Cochrane systematic review(Included 11 studies)	Group based DSME is effective in improving weight, glycemic control, knowledge and requirement for diabetes medications
Ellis et.al,[15]	Both Type-1 and Type-2 Diabetes	Systematic review(included 21 RCTs)	Modest but significant difference in glycemic control at initial and 2 week follow up
Gary et.al,[2]	Type-2 diabetes	Systematic review ( included 18 RCTs)	Blood glucose level in intervention group significantly reduced in compared to controls
Hampston et.al,[8]	Adolescents with type-1 diabetes	Systematic review(included 4 studies, 12 were RCTs)	Improvement in psychosocial outcomes larger than those for glycemic control
Noris et.al,[9]	Type-2 diabetes	Systematic review(included 72 RCTS)	DSME effective in short-term but further research needed to assess long-term effectiveness
Noris et.al[11]	Both Type-1 and Type-2 Diabetes	Systematic review(included self-management interventions in community settings)	Beneficial effects on glycemic control for adults in children/adolescents in home settings community settings
Noris et.al[10]	Type-2 Diabetes	Systematic review(included 31 RCTs)	Immediate post-intervention improvement in glycemic control not sustained at 1-3 months follow up
Steed et.al[14]	Both type-1 and type-2 diabetes	Systematic review(included 36 studies, 54% type-2 diabetes, 11% type 1 diabetes, 35% both)	Depression improved following psychosocial intervention but quality of life showed greater improvement following DSME
Sarkisian et. Al[13]	Older African American or Latino adults	Systematic review(included 8 RCTS)	Immediate improvement in post intervention phase. improvement in glycemic control not sustained
NICE[1]	Both type-1 and Type-2 diabetes	NICE Technology appraisal(included 4 studies for type-1, studies for both tpes-1 and typ-2 diabetes, 8 studies for type-2	Focused DSME may have some effect in improving glycemic control and quality of life but little evidence of longer term impacts

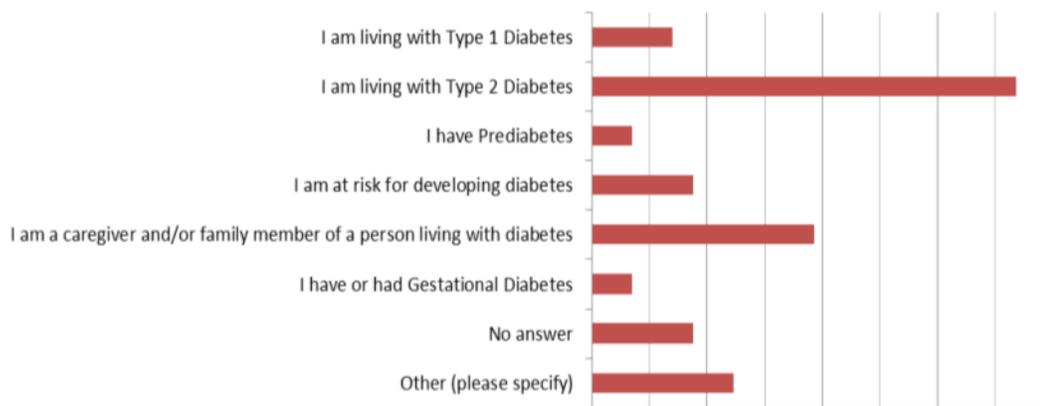
Adapted from: Clark, M. (2008). Diabetes self-management education: a review of published studies. *Primary Care Diabetes*, 2(3), 113-120. doi:10.1016/j.pcd.2008.04.004

**Table: 6-List of the experts participating in the “Ask the expert component” of CDA**

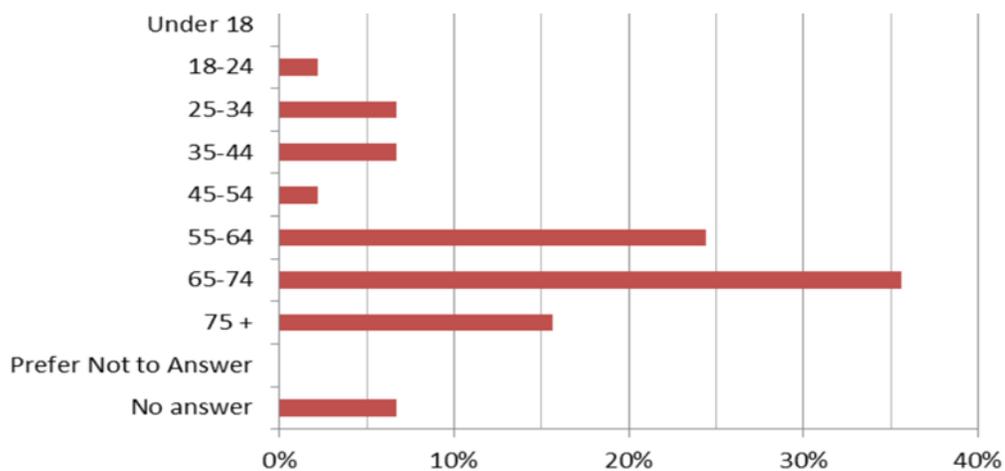
Expert	Education
Podiatrist	Foot problems in Diabetes
Nephrologist	Kidney problems in Diabetes
Cardiologist	Heart problems in Diabetes
Chiropractor	Joints and musculoskeletal problems in Diabetes
Ophthalmologist	Eye problems in Diabetes
Physical Activity expert	Exercise
Dietitian	Healthy diet
Optometrist	Eye problems in Diabetes
Mental health counsellor	Mental health problems in Diabetes
Insurance agent or broker	Revenue Canada
Occupational therapist	Accountant or tax specialist
Labor relations lawyer	Pharmacist

**Figure 1: Figures showing the survey responses of evaluation questionnaire used in Canadian Diabetes Association in 2014.**

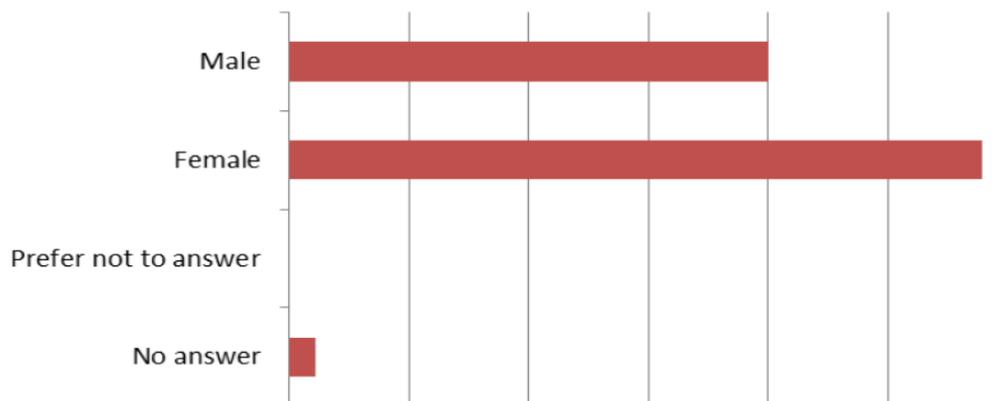
Q- Which one of the following statements below best describes you? Please select all that apply?



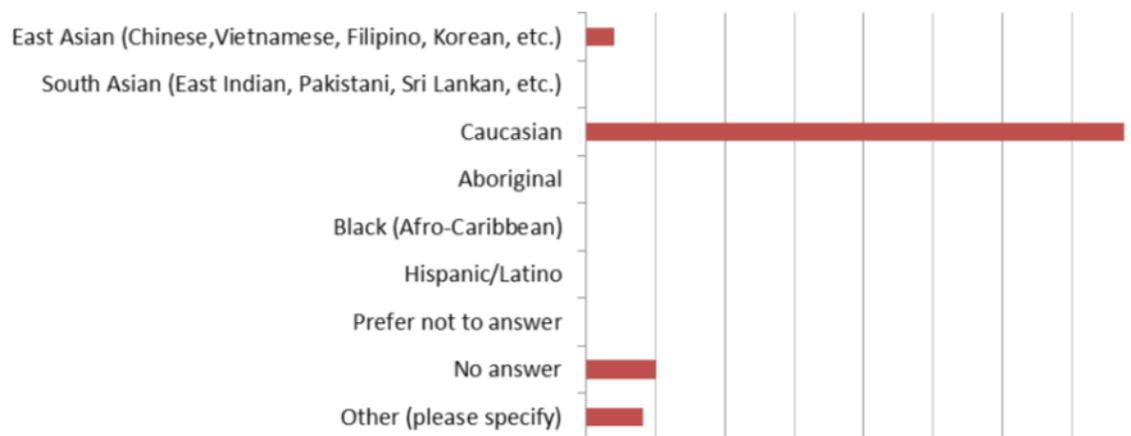
Q-2- What age group are you part of?



Q- What is your gender?



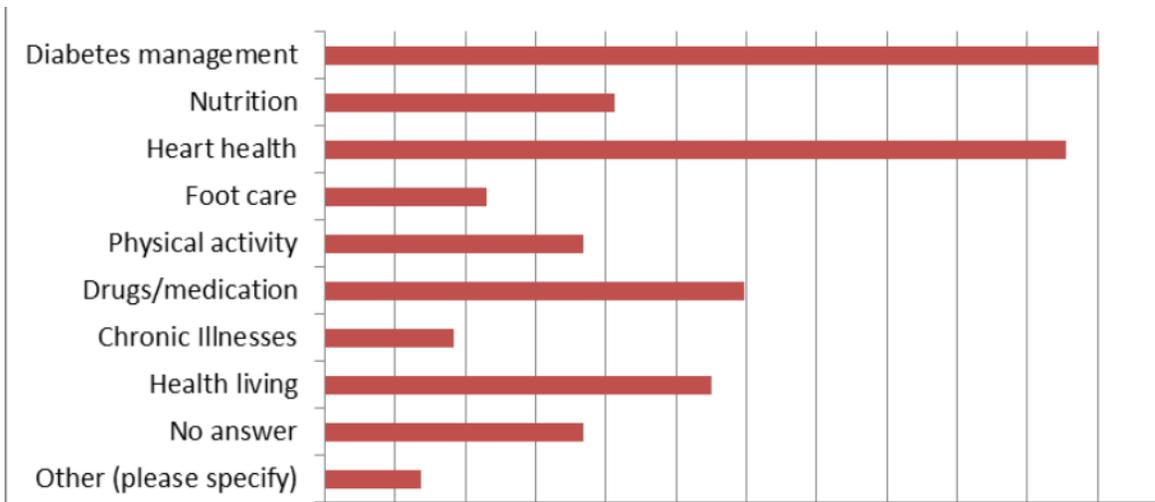
Q- The CDA is trying to reach certain groups in Canada, please indicate if you belong to any of the following?



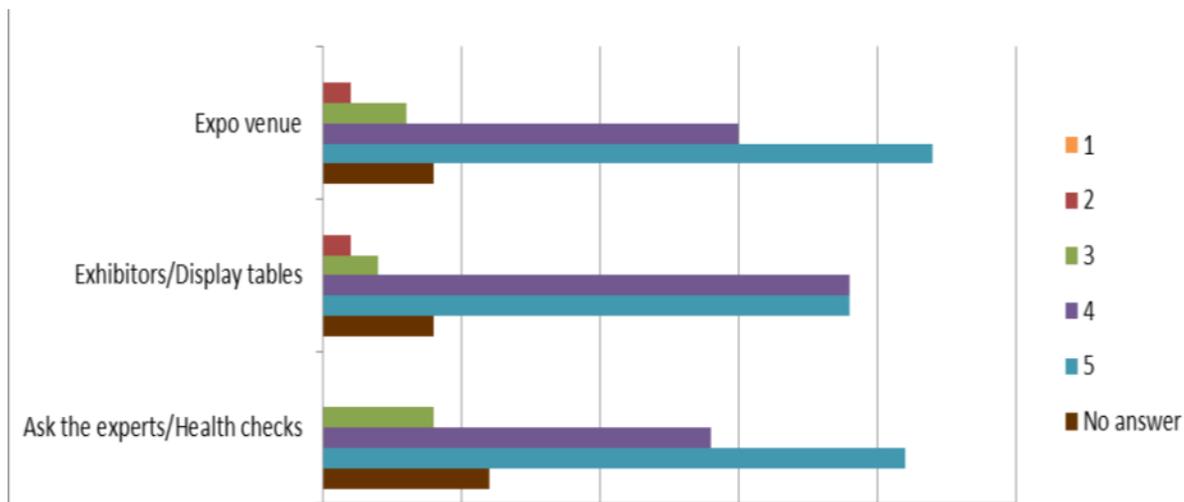
Q- What led you to attend this Expo?



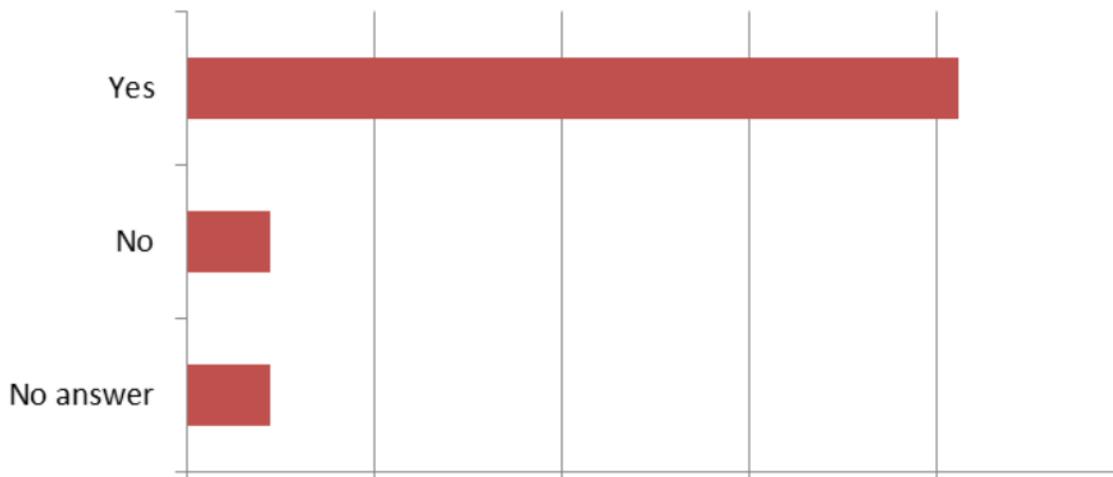
Q- Which of the following topics were most useful to you?



Q- On a scale from 1 to 5 how would you rate the following? (1 is the lowest level and 5 is the highest level of appreciation)?



Q- Would you be willing to come back to the same venue if interested in next year's expo?



Q- Which of the following changes do you intend to make to your lifestyle as a result of this expo?



**Figure: 2- Proposed Logic Model for Canadian Diabetes Association's (CDA) Expo**

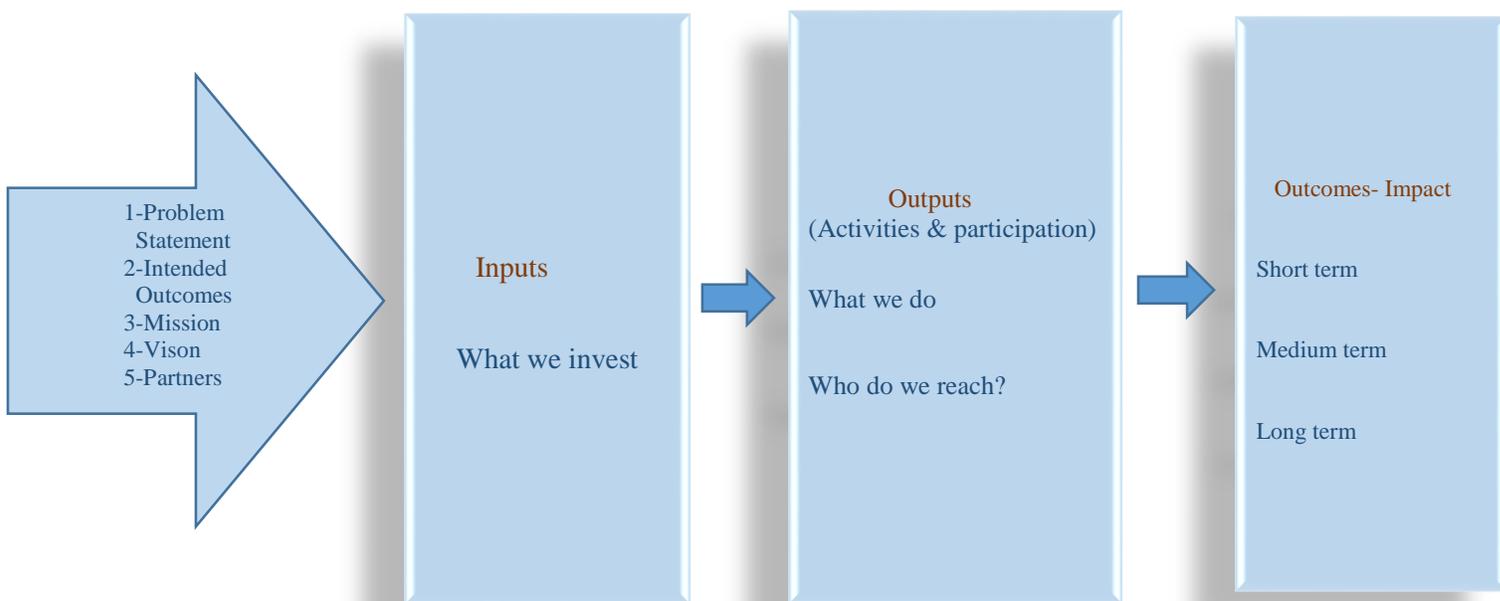


Figure: Adapted from Taylor-Powell, E., Jones, L., & Henert, E. (2003) Enhancing Program Performance with Logic Models.

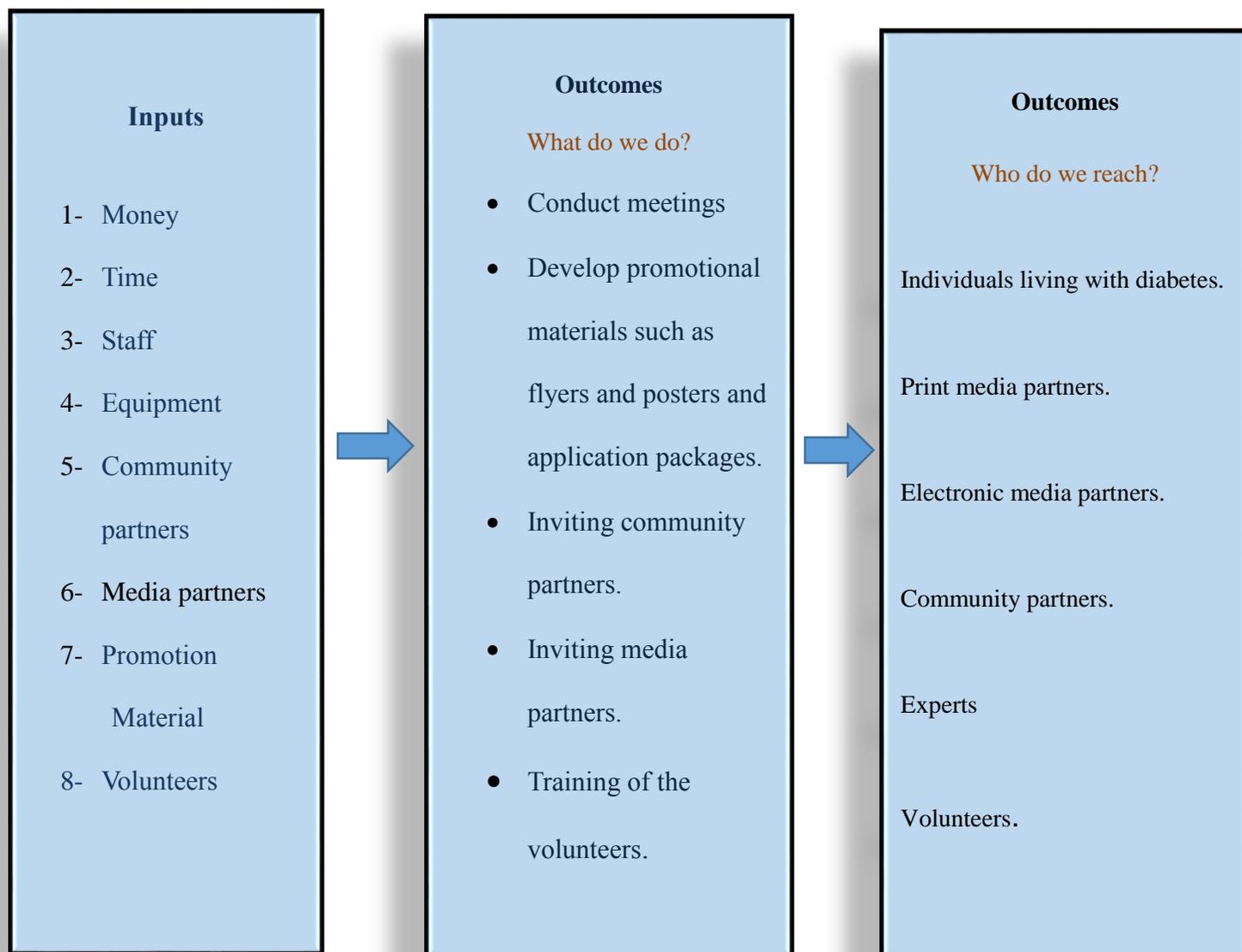
**Figure: 3- Inputs, outputs and outcomes of Diabetes Expo**

Figure: 4- Short term, medium term and long term outcomes of Diabetes Expo

