Research Paper

Applying Conversation Map Program as a Nutrition Education Program for Type II Diabetic Patients at Al Noor Hospital – Makkah – Saudi Arabia

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Abstract: *Diabetes mellitus (DM) is most prevalent and fastest growing diseases worldwide. Adults with type II diabetes attending facilitated group education had better clinical and behavioral outcomes than individual sessions. Objective to apply the Diabetes Conversation Map Tool as diabetes self-management education as measured by improved glucose control and self-managements of a healthy diet and blood glucose among adults with Type II diabetes. This study consists of two phases. In the pre-intervention phase structured questionnaire was introduced to 60 type II diabetic patients to identify the weaknesses and priorities of the educational intervention. The post-intervention phase involved the application of Diabetes Conversation® Map as education program to 15 convenience diabetic participants of which 53.3% were female aged 54±11.2 years at Al-Noor hospital diabetic center over 2 weeks. Outcomes measured included fasting blood glucose, type and quantity of dietary intake and overall life-style improvements. Results revealed There was a slight decrease of (1.05%) in fasting blood glucose, weight (0.16%), and BMI (0.211±1.31) and a significant decrease regarding 24-hour recall analysis of energy and some macronutrients intake (P<0.05). Fibers and regular meals intake (46.7%), increased significantly (P=0.027), and brown bread, olive oil and fresh vegetables consumption increased slightly. The result concluded that, the Diabetes Conversation Map Tool was effective method of diabetes self-management training to improve clinical and behavioral outcomes in adults with type II diabetes.*

Keywords: Diabetes, Conversation map, dietary intake, Saudi Arabia, Makkah.

Introduction:

Diabetes mellitus is a chronic disorder characterized abnormalities in the metabolism of carbohydrate, protein and fat (Burant, 2008).

The natural history of type II diabetes includes a preceding period of impaired glucose tolerance IGT (Impaired glucose tolerance: is a transition phase between normal glucose tolerance and diabetes, also referred to as pre-diabetes) /impaired fasting glucose (IFG) which provides an opportunity for targeted intervention within large communities (Mahan and Stump-Scott, 2008). As the prevalence of this metabolic disorder is rapidly increasing and current treatment fails to stabilize the disease in most patients, prevention should be considered as a key objective in the near future. Lifestyle intervention studies have consistently shown that quite modest changes can reduce the progression from IGT to diabetes by 50-60% (Wochenschr, 2003).The prevalence of diabetes is increasing all over the world. From 2003 to 2025, the world wild prevalence forecast of diabetes in adults is expected to increase from 190 million to 328 million (Sicree *et al.,* 2003).

Diabetes is associated with 5.2% of global mortality and account for at least 10% of the total health care expenditure in many countries (Roglic *et al.,* 2005).The prevalence of diabetes in the Arab world in 2000 was 6.49% and expected to reach to 8.1 % in 2025 (King *et al.,* 1998).

The overall prevalence of DM in adults in KSA is 23.7% of both sexes, between the ages of 30-70 years in rural as well as urban communities (Al-Nozha *et al.,* 2004). Diabetes *Conversation Map* Program tool is created by Healthy Interactions Inc. in collaboration with the American Diabetes Association (ADA), the US Diabetes *Conversation Map*® Program is a structured, interactive education session that uses images, metaphors, and thought-provoking conversation topics to provide a friendly learning experience for patients. This program engages patients in exploring health facts through dialogue and helps them draw their own conclusions. These interactions with health care professionals lead to learn about diabetes and lifestyle modifications that can lead to improved diabetes self-management.

Process of Program:

❖   The Conversation Map Visual: The map creates a common mental model or picture for all participants to learn from and discuss.

❖   The Conversation Questions: These questions are read by the educators and prompt the participants to discuss a variety of topics at various points throughout the session.

❖   The Discussion Cards: Which are used to bring additional information and engagement to the sessions? They have a game-like feel and help to learning.

❖   The Group (participants): Conversation Maps are designed to be used with groups of 5 to 7 participants.

❖   The Facilitator: They are designed to be fun, interactive, engaging, and full of learning no matter who participates.

❖   Action Plan: An important part in conversation map because provide participants to make changes in their choices and behavior.

Studies on the Effects of *Conversation Map* Program:

When implementing the *Conversation Map* education program, numerous considerations and preparations are required to make a smooth transition and that practice, belief in the process and determination are necessary for educators to become confident and to build their facilitation skills. Nevertheless, the group-based IDEA education method using the *Conversation Map* approach was executed as planned and showed promise to improve diabetes self-management behaviors. Clinical and behavioral outcome data are necessary and will be forthcoming (Worley, 2010).

The study of evaluation of the diabetes conversation map tool in adult self- management education, demonstrated that group-based DSME programs appear to have several advantages over individual instruction. Also the researchers found that the participants retain more self-care knowledge and have a higher perceived self-efficacy after attending group education when compared to individual sessions (Long., 2010).

The study of Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) program for people with newly diagnosed type 2 diabetes: cluster randomized controlled trial showed that the patients with newly diagnosed type 2 diabetes resulted in greater improvements in weight loss and smoking cessation and positive improvements in beliefs about illness but no difference in hemoglobin A1c levels up to 12 months after diagnosis (David, 2008). Hence, the study aims to identify the nutrition status of type II diabetic patients in Al-Noor hospital. To apply a suitable up-to-date nutritional intervention or education tool (conversation map program). And To evaluate the general outcome of the diabetes conversation map in Saudi patients.

Materials and Methods:

Study Design (Conversation Map Program):

This study consists of two phases: pre- and post-intervention. In the pre-intervention phase structured questionnaire was introduced with the aim to identify the weaknesses of the current diabetic patient practices and thus clarify priorities of the educational intervention. The post-intervention phase involved the introduction of interventional program to assess its effect on glycemic, and anthropometric measurement as well behavior of diabetic patients.

The conversation maps was chosen and modified according to the patients' characteristics and environmental and cultural issues to facilitate interaction between educators and patients according to IDEA study program (David, 2008).

Data Collection:

Pre-Intervention Phase:

The data was collected during the period of June–August\1432 by a questionnaire designed to assess the nutritional status of type II diabetic patients at al-Noor hospital by a direct interview. The questionnaire was completed by the researchers through interviewing sample.

The Post-Intervention Phase:

The same questionnaire was administered two weeks after the intervention took place. It was completed by a direct interview.

Population Selection Criteria:

Patients were selected for this study on the basis of the following inclusion criteria; diagnosed with type II DM, both genders, individuals from 30-60 years. The exclusion criteria include; without severe complications, disability, and failing to adhere to study protocol.

Sampling:

After being screened for eligibility, (60) subjects at Al-Noor Hospital from (The Diabetic and Endocrine Center) were chosen randomly and enrolled as a pre-intervention sample of the study.

Subjects for Group-based Diabetes Educational Program using the *Conversation Map* Tools:

Out of the eligible subjects, 15 convenience diabetic patients were agreeing to enroll in the program of intervention and to follow the protocol to the end.

Materials Used in Data Collection:

❖ Beam balance for weight and height measurements. Glucometer (*Accu-Chek*® *Active*, Mannheim Germany) for (FBS – RBS) measurements.

Material Used in Education Program:

Conversation Maps:

- Map 1 provides an overview of diabetes and is designed to debunk common myths and discuss feelings associated with having the disease.
- Map 2 focuses on the relationship between diabetes and food and includes strategies for healthy eating.
- Map 3 highlights the importance of monitoring blood glucose and using the results to manage diabetes.
- Map 4 describes the natural course of diabetes and stresses the potential long-term complications of the disease, including ways to delay or reduce risks.
- A fifth map that focuses on gestational diabetes was not used in the study (David, 2008).

Food Models of each Exchange List for the Illustration of Meal Planning Visually and Interactively:

❖ Digital food balance (10 kg), to demonstrate the appropriate serving size.
❖ Food pictures for multi-purpose education during the questionnaire filling.
❖ Diabetic meals (breakfast and lunch) were provided to them.
❖ A supportive package was given to each patient attended the program. It include several things:
- A booklet designed by the group, that includes general diabetic information, dietary managements, an exchange list, fasting and hajj managements.
- Measurements cups.
- Cards that demonstrate the serving size in house-hold measurements.
- Diabetic follow up booklet.

Dietary Managements Cards for Hypo and Hyperglycemia

The Study Questionnaire:

In this study a composed questionnaire based on previous study (what is the reference or references) has been used composed of 46 questions covering three sections as follows:

a. Section One: Socio-demographic data. The first section ask about general information include; sex, marital status, age, income, education level, smoking, physical status, medical information, and type of DM therapy.

b. Section two: Biochemical and anthropometric assessment.

c. This section concerned with the baseline and post intervention measurements, this section was completed by the researchers and nurses.

❖   **Biochemical Indicators:** this information have been collected from the patient files, this include; fasting blood sugar (FBS), for both pre and post groups.

❖   **Anthropometric Measurements**: in this study height, weight, body mass index (BMI) was measured for the patients.

•   **Height:** Height was measured by using a beam balance scale to the nearest 0.5cm.
•   **Body Weight:** Weight was assessed by using beam balance scale to the nearest 0.1kg.
•   **Body Mass Index (BMI):** Weight and height were converted into metric units to calculate BMI calculated using (kg/m^2).

d. Section three: Dietary assessment. It is a major part of nutritional assessment and play an essential role in any efficient health care system. The researchers applied the following methods to assess the type and quantity of food intake of the sample.

24-hr Recall: A single 24-hr recall sheet was used to recall the subjects' exact intake during the proceeding day.

Food Frequency Questionnaire (FFQ): This tool was used to record the dietary patterns of the patient and the type of their usual food intake.

The Ethical Clearance Sheet includes the Following Points:

Disclose details of the nature and procedures of the study, associated potential risks and benefits, Confirm that participation in the research is voluntary, Confirm that participants are free to withdraw from the study at any time, Explain how the results relating to individual participants will be kept confidential, Describe the procedures that provide answers to any questions and further information about the study [20].

The Intervention Program Process:

The implementation process is simply demonstrated by the word " START " [10].

❖   **S** *(set up)*: by reviewing participants' medical history, gathering supplies, setting up the meeting room, and determining the optimal map placement.
❖   **T** *(tell)*: component of the sessions with statements about the ground rules, scheduled breaks, location of restrooms, and respectful limits on participant speaking time. An upfront statement that the map is an educational tool and not a cartoon or a game helps to dispel negative first perceptions.
❖   **A** *(assess):* the group dynamic with patient introductions. Introductions set the stage and helped to know where patients are with respect to their diabetes management. This process also gave valuable insight into how to manage the group's personalities.
❖   **R** *(reflect):* by throwing questions back to the group. Correct any misinformation that surfaces and "fill in the blanks" as needed.
❖   **T** *(track):* the educational topics checklist, which allowed to verify that all topics have been addressed, even when discussed outside of the order of the maps. Being prepared with a supplemental packet of materials and handouts facilitates more in-depth discussion on topics as dictated by the group discussion.

The Outcome Evaluation Process:

The evaluation of the outcomes of the conversation maps on Saudi diabetic patients was done according to nutrition and monitoring process, and a general evaluation for the education tool. A copy is attached in the index.

Statistical Analysis:

At significant level of 95 % (p.value ≤ 0.05), All statistical analyses were performed with SPSS software 16th edition was used to find frequencies and percentage, mean, SD using McNmar test. To find the statistical significant difference for with in person differences paired T test was used for the paired differences of the variables (mean±SD)

Results:

Table 1 shows the baseline demographic information of the studied sample. The mean age was (54±11.2 years). Fifty three point three percent of the participants were female, while (46.7%) males. As for the education level of the sample, (0 %) were illiterate and (33.3%) had a university and post university education.

The study found in table 2 that (46.7 %) of the studied sample had diabetes in ≤ 5 years, and (60.0%) of the total sample have a family history of DM from the father side. (66.7%) of the patients are visiting the clinic, and (80.0%) of them uses the oral hypoglycemic agents. Regarding to exercise performance, table 3 indicates a slight change (40.0%) between pre (26.7%) and post (66.7%) intervention sample. The results were statistically not significant (P>0.05).

Table 4 illustrates the biochemical and anthropometric characteristics of the studied sample. There was a difference between the pre and post program intervention fasting blood glucose (7.26±39.3). Also, there were weight changes (1.06±4.80) and BMI changes (0.211±1.31). All these results were statistically not significant (P>0.05).

Table 5 Shows a significant change (P<0.05) regarding regular meals intake in pre and post intervention sample to increase from (13.3%) to (60.0%). All other results were not significant (P>0.05). Table 6 demonstrates the actual nutrient intakes based on a single 24-hr recall for the studied sample. The table shows a significant change regarding energy and iron only form the micronutrients. Significant at level (5%) and (1%).

Discussion:

Although the prevalence of type II diabetes mellitus is generally higher in developed countries, it is increasing most rapidly in developing countries (Wild *et al.,* 2004 and Brussels, 2003).The overall prevalence of DM in adults in KSA is (23.7%) of both sexes, between the ages of 30-70 years in rural as well as urban communities (Al-Nozha *et al.,* 2004). Persons with diabetes who receive self-management training have improved glycemic control and fewer long-term complications. According to the researches, adults with type II diabetes attending facilitated group education had better clinical and behavioral outcomes than patients who attended individual sessions (Funnell *et al.,* 2007).The prevalence of complications was positively associated with the duration of diabetes, irrespective of the patients' age (Morgan *et al.,* 2000). In another study by Wannamethee *et al.,* (2011), the risk for cardiovascular problems rose significantly after a man had had diabetes for eight years. Most of the intervention sample of this study had diabetes in ≤5 years of duration which decrease the probability of the sample to have severe complications and which is subjected in the sample choosing criteria.

This study shows that the majority of participants are highly educated (University and post university) which will reflect a good probability and redness to learn and apply the new information (David,

2008). In IDEA study (Worley, 2010), educators said some participants felt the *Conversation Map* subject matter was too basic for them and did not incorporate enough detail to equate with how far they had advanced in their self-management knowledge. The IDEA study recommended educators to consider how patient characteristics, including but not limited to sex and personality which can influence the dynamic of an IDEA-like group. As for the study, this recommendation was taken in concern by collecting the misinformation and misunderstandings from intervention patients while filling the pre-questionnaire so as to be targeted during the session and because the majority of the sample had high education level, these additional information's was generalized on all the sessions. The success of improved frequency of blood glucose monitoring practices, and the high rates of participant satisfaction with the program appear to indicate that the Diabetes *Conversation Map* Tool was a clinically useful intervention to promote self-management of type II diabetes (Long., 2010). The findings of this study indicate a decrease (7.26±39.30 mg\dl) regarding Fasting blood glucose of the intervention sample but statistically not significant change which could be attributable to the small sample size or study implementation duration. The overall average monitoring frequency after the session remained higher than the participant-reported monitoring frequency before the sessions indicating a positive change in behavior. These results agree with the study having the same sample size but differ in study duration (Long., 2010). A study showed that at 12-14 months there was some evidence that the group education program reduced body weight (Deakin *et al.,* 2009). This study findings show no significant changes regarding anthropometric and BMI measurements which also could be attributable to the pre mentioned factors affecting fasting blood glucose: sample size and study implementation duration or because of the insufficient weight loss to affect body mass index. The weight change of the sample was (1.06±4.80kg) which is an acceptable change regarding the implementation duration (2 weeks). However, according to the BMI categories classification, two patients of the studied sample have changed from being in the obese category to be overweight. These results agree with studies (Long., 2010; Funnell et *al.,* 2007; McGeary., 2009), who found that the conversation map® program have an effect concerning weight and BMI. Regular meal intake is a key step for the diabetic patient in regulating and monitoring blood glucose level (Smith and Paul, 2011). Regarding the dietary practices of the studied sample, this study shows that conversation map® program have a significant change on regular meal intake (P<0.05).

A study have showed that there was evidence that the group education program improved self-management skills as a result of self-monitoring of blood glucose levels and consumption of a healthier diet (Deakin *et al.,* 2009). In this study, a single 24-hour recall was performed and analyzed by *diet power* program. The results show a significant change in the total energy and macronutrients intake which means that patients are being more committed to healthy food choices and intake. These results are consistent with (Wardle *et al.,* 2002). During the implementation of the conversation maps, the researchers have focused more on the dietary intake and managements using supplemental materials which are probably attributable to the significant changes found by the study. This point was done according to the recommendations stated in IDEA study that the use of supplemental materials with the maps greatly enhances learning (Worley, 2010). This was particularly true for the dietitians who taught the second map visual that covers nutrition and the relationship between diabetes and food. Educators at both sites who facilitated this nutrition map advocated for the use of supplemental materials because they felt the map's subject matter "does not incorporate enough detail on planning meals, building menus, discussing recipes, evaluating portion sizes, reviewing food labels, and so on " (Worley, 2010).This study was limited by the short duration and follow-up, small convenience sample and having no control group.

Tables:

Table (1): Baseline demographic information of the Studied Samples

Characteristic	Intervention Group (N=15)
Age (mean ± SD)	54 ± 11.2 years
Gender No. (%) Male Female	7 (46.7%) 8 (53.3%)
Education level No. (%) Illiterate Elementary Intermediate High school University and Post University	0 (0.00%) 4 (26.70%) 4 (26.70%) 2 (13.35%) 5 (33.30%)

Table (2): Medical History of the Studied Sample

Characteristics	Intervention group (N=15)	
	No	**%**
Diabetes duration (years) ≤ 5 6-10 >10	7 3 5	46.7 20.0 33.3
Family history of DM Father Mother No	9 5 1	60.0 33.3 6.7
Visiting the clinic Yes No	10 5	66.7 33.3
Type of therapy Insulin injection Oral medication	3 12	20.0 80.0

Table (3): Exercise Performance among the Studied Sample

Characteristic	Pre (N=15)		Post (N=15)		P value
	No	**%**	**No**	**%**	
Exercise Performance Walking others None	4 - 11	26.7 - 73.3	10 - 5	66.7 - 33.3	0.096

Table (4): Anthropometric and Biochemical Means among Subjects Surveyed

Variable	Pre (N=15)	Post (N=15)	Paired differences	P value
Glucose Indexes				
Fasting glucose level (mg\dl)	178 ± 70.81	171.0 ± 57.4	7.26 ± 39.3	0.420
Anthropometric measurement				
Weight (mean ± SD)	83.53 ± 20.15	80.47 ± 19.24	1.06 ± 4.80	0.404
BMI (mean ± SD)	23.48 ± 20.15	23.27 ± 21.60	0.211 ± 1.31	0.545
BMI categories No. (%) underweight < 18.5	-	-	-	0.164
Normal 18.5 – 24.9	-	-	-	
Overweight 25 – 29.9	7 (46.7)	9 (60.0)	-	
Obese 30 – 40	6 (40.0)	4 (26.7)	-	
Morbid obese > 40	2 (16.3)	2 (16.3)	-	

Table (5): Dietary practices of the Studied Sample

Characteristic	Pre (N=15)		Post (N=15)		P value
	No	%	No	%	
Regular Meal intake					
Yes	2	13.3	9	60.0	0.016
No	13	86.7	6	40.0	
Skipping:					
Breakfast	5	16.7	3	10.0	0.110
lunch	3	10.0	1	3.30	
Dinner	5	16.7	2	6.70	

Table (6): Nutrient Intakes (mean ± SD) Based on Twenty-four hour Recall

Nutrient	Pre (N=15)	Post (N=15)	Paired differences	P value
Energy (kcal\day)	1560.20±460.30	1029.87±287.79	530.33±550.66	0.002**
Carbohydrate (g\day)	204.78±76.22	136.87±73.26	67.91±107.60	0.028*
Fat (g\day)	55.62±15.36	26.02±13.48	29.60±22.53	0.015*
Protein (g\day)	62.78±22.05	45.07±15.35	17.71±24.61	0.000**
Sugar (g\day)	24.81±14.34	21.16±15.88	3.65±10.71	0.208
Vit.B1 (thiamin) \ day	773.47±220.64	643.99±383.28	129.48±442.41	0.276
Vit.B3 (niacin) \ day	12.44±5.37	80.88±176.03	-68.44±176.43	0.155
Vit.B12 \ day	2.41±1.22	2.01±2.22	0.40±2.18	0.490
Iron \ day	10.83±3.31	7.31±4.33	3.51±6.15	0.044*
Zinc \ day	7.44±3.24	5.68±3.57	1.76±5.12	0.205
Cholesterol\ day	245.00±163.05	186.93±159.49	58.06±175.99	0.222

(Kcal): kilocalorie, (g): gram, * Significant at level 0.05 (2- tailed), ** Significant at level 0.01 (2-tailed)

Conclusions

The study demonstrates statistically significant changes in actual dietary intake and patterns parameters and provides data that diabetic *conversation map*[®] program is effective in improving self-managements nutrition education among diabetic subjects. Since the effect of *conversation map*[®] on dietary intake and patterns are positive, this study concludes that; improving life-style behavior and nutrition self-managements can be achieved not only by individual learning but also by attending educational programs such as *conversation map*[®] program, that have a positive effect.

Recommendations, Implications and Limitations

1- If results seen in this clinical project are repeated on a large scale, the Diabetes *Conversation*[®] *map* could prove to be an effective educational tool to improve glucose control, prevent complications and improve the quality of life for adults with type II diabetes.
2- A longer term study will be needed to ultimately determine whether this intervention will result in sustained lifestyle changes and improved clinical outcomes.
3- The use of peer educator as part of chronic care model can deliver an integral component of self management education that can enhance diabetes care intervention.
4- Encouraging the training of dietitians as a part of promoting the dietitians performance and become confident and to build their facilitation skills.
5- Also, it is recommended for application of the conversation map as a new nutrition education tool at different hospitals and clinical settings.
6- Modification of all conversation maps according to the regional characteristics and needs.
7- While benefits of Diabetes *Conversation*[®] *map* for human health and self-managements appear promising, more investigation on the beneficial properties of *Conversation*[®] *map* on diabetic patients is needed.

Acknowledgment

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