

## The Effect of Detailed Counseling on the Glycemic Index of Diabetic Patients

Hala Alhakeem, MBBCh, BAO, ABFM\* Turki Alhusaini, MBBCh, BAO\*\*  
Mariam Hasan, MD\*\*\* Shaikha Musameh, MD\*\*\*\*

**Objective:** To evaluate the outcomes of glycemia after counseling patients with type 2 diabetes mellitus.

**Setting:** GP Diabetic Clinic, Bahrain Defence Force Hospital, Bahrain.

**Design:** A Prospective Study.

**Method:** The patients were divided into two groups, both had type 2 diabetes mellitus. One group was the control (n=86) and the other was the intervention (n=83) group. The patients in the intervention group received a 15-minutes education session, whereas the control group received the regular 7-minute educational session. HbA1c levels were measured before the sessions and after 6 months.

**Result:** HbA1c in the intervention group revealed a statistical reduction in the level of HbA1c from  $8.84 \pm 1.95$  to  $7.82 \pm 1.51$ , P-value=0.001. At the same time, a considerable increase found in the level of HbA1c in the control group from  $9.66 \pm 1.63$  to  $10.28 \pm 1.24$ , P-value=0.003.

**Conclusion:** Detailed dietary/pharmaceutical counseling for patients with diabetes mellitus, undergoing treatment reduced the levels of HbA1c.

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Diabetes mellitus (DM) is the most prevalent disease worldwide. Its prevalence is projected to increase from 382 to 592 million of the population by the year 2035<sup>1</sup>. DM is a set of metabolic diseases due to defects in secretion or action of insulin or both. Type 1 is due to deficiency in beta cells which produce insulin and type 2 is due to the ineffectiveness of the insulin produced in the body. Gestational diabetes is due to impaired glucose tolerance and impaired fasting glycemia. In addition, people with DM have a propensity of developing complications as a result of the disease such as heart attacks, strokes, eye disease and peripheral vascular disease<sup>2</sup>. A study showed that the number of patients with diabetic conditions visiting endocrine clinics was 38.3%<sup>3</sup>. Diabetes was not affected by gender. However, age had an influence; as the age increase, the prevalence increase<sup>3</sup>.

Usually, counseling given for each patient at the BDF-GP diabetic clinic is brief (does not include a detailed counseling on nutrition and lifestyle changes). A lot can be done in the non-pharmacological aspect of management. Achieving body weight goal, lipid, glycemic levels control, and blood pressure maintenance could delay diabetic complications. Diabetic patients could achieve a healthy lifestyle when they

have received sufficient information and education to manage their blood glucose by following a strict dietary plan and other glycemic control measures.

Several studies revealed that good vitamin D level improves HbA1c. Intake of dietary fibers is also of prime importance in diabetic management. Effective education could improve patient adherence, which in turn lower the burden of complications, improve the quality of life and lower HbA1c level and maintain normal lipids and blood pressure<sup>4,5,6</sup>.

In a study, a two-hours weekly educational lesson was held for 8 weeks for patients to follow the guidelines in self-management; the program stressed on eating healthy food, having an active lifestyle, taking medication, and reducing risks<sup>7</sup>. In another study, patients had received an individualized, written, dietary plan provided by a dietician, where the plan included details about daily and weekly meal frequencies, meal size and meal alternatives<sup>8</sup>.

The aim of this study is to evaluate the effectiveness of a detailed educational session on nutrition and exercise, adherence to the prescribed medicines.

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\* Consultant Family Physician  
\*\* Resident  
Department of Medicine  
Bahrain Defence Force Hospital – Royal Medical Services  
\*\*\* Resident  
Department of Internal Medicine  
King Hamad University Hospital  
\*\*\*\* Resident  
Department of Cardiology  
Shaikh Mohammed Bin Khalifa Bin Salman Cardiac Center  
Kingdom of Bahrain  
E-mail: halakeem@gmail.com

## METHOD

The patients were divided into two groups, both had type 2 diabetes mellitus. One group was assigned as the control (n=86) and the other as an intervention (n=83) group. The inclusion criteria were as follows: patients with diabetes, aged 35 years and above, compliant to their medication regimes, compliant to diet and lifestyle instructions, negative concurrent active illnesses such as infections and non-changed diabetic medications. The levels of HbA1c in patients tested before and after the educational intervention, patients were followed for 6 months.

HbA1c level was determined in the two groups BEFORE and AFTER giving them diet and lifestyle advice. The change in HbA1c levels after 6 months of the educational session was determined and the average change in percentages for both groups was calculated.

The adherence of the patient to their medicine regimen was checked by asking them and documenting all the medicines that they take daily. Almost all compliant patients were able to recall their medication names/packet color/tablet shape correctly. In addition, their lifestyle patterns (diet and exercise) were documented.

The patients were educated on diet and physical activity and given 'Nutrition and Diabetes' brochure. Dietary advice included the choice and amount of food per day and physical activity that was included in the brochure. Educational sessions included a focus on physical activity.

Most patients' source of nutrition were carbohydrates (rice, pasta), protein (chicken, beef, eggs) and fat (cooking oil). Patients were advised to have balanced meals by estimating the amount and type of food suitable for them. The recommended exercise regimen was brisk walking of 25-30 minutes a day for 3-5 days per week. Patients were screened for HbA1c levels, after 6 months of the educational sessions.

The patients in the controlled group received standard session which included a review of the patients' HbA1c, their medications and general physical examination. However, the session does not allow for an in-depth explanation of the 'Nutrition and Diabetes' brochure. The levels of HbA1c were also reviewed after 6 months of the educational session.

## RESULT

The HbA1c levels of patients were tested before and after giving them diet and lifestyle advice. The control group had 86 patients and the intervention group had 83 patients, see table 1. Personal characteristics of the intervention and control groups were documented. The collected data were analyzed using SPSS 25.0.

The Wilcoxon signed-rank test confirmed the statistically significant reduction in the level of HbA1c ( $p < 0.001$ ), in the intervention group. In the same time, there was a noticeable increase in the level of HbA1c in the control group ( $p = 0.003$ ), see table 2.

**Table 1: Personal Characteristics of the Two Groups**

Variable	Intervention (n=83)	Control (n=86)
Gender n (%)		
Female	39 (47.0%)	41 (47.7%)
Male	44 (53.0%)	45 (52.3%)
<b>Total</b>	<b>83 (100%)</b>	<b>86 (100%)</b>
Age (years) (mean±SD)	56.82±9.14	54.10±8.91
Duration of diabetes (years)	15.15±9.75	12.8±6.69
BMI (mean)	30.18	30.65

SD; standard deviation, BMI; body mass index, n; number, \* $p < 0.05$  statistically significant difference

**Table 2: Changes in HbA1c in the Two Groups**

Variable	Intervention (n=83)	Control (n=86)
<b>Before (HbA1c)</b>	8.84±1.95	9.66±1.63
<b>After (HbA1c)</b>	7.82±1.51	10.28±1.24
<b>P value</b>	<0.001*	0.003*

\* $p < 0.05$  is statistically significant

## DISCUSSION

In our study, there was a significant correlation between the detailed session and HbA1c levels. Patients' HbA1c levels in the intervention group reduced from 8.84±1.95 to 7.82±1.51,  $P$ -value<0.001. At the same time, a considerable increase in the level of HbA1c was reported in the control group from 9.66±1.63 to 10.28±1.24,  $P$ -value= 0.003. This signifies that the duration of the session of creating awareness in patients had a positive influence on the level of HbA1c.

A similar study on the effect of self-management education on the HbA1c level of diabetics suggests that educational intervention was successful in achieving a remarkable change in the lifestyle of participants. They were more involved in physical activities like biking, aerobics, and walking for at least 30 minutes and following the suggested diet. That resulted in an improved HbA1c condition in the intervention group when compared to the control group<sup>7</sup>.

A study revealed that 35.1% were implementing lifestyle modifications; they concluded that it is important to establish a special diabetic educational program that would ultimately enhance patient education and knowledge, thereby improving the control of HbA1c levels and reducing future complications<sup>9</sup>. Such studies finding were similar to our result.

Several limitations have been noted. Firstly, a lack of follow-up visits in between the two HbA1c tests to check the patients' compliance with the advice provided. Secondly, it was difficult to be certain whether the patients were properly compliant with their medications. Lastly, it is expected that the implementation of advice by patients may be short-lived, which may also influence HbA1c.

## CONCLUSION

**A detailed educational session of lifestyle and non-pharmacological strategies decreased the HbA1c to an acceptable level.**

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**Competing Interest:** None.

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