

Comparison of two approaches to nutrition education in the management of diabetic patients

Abstract

Introduction: Nutrition education is one of the fundamental axes in the management of diabetes.

Objective: study the impact of two types of nutrition education (personalized and collective) on the glycemic control of diabetics in the province of Kenitra.

Material and methods: The population was composed of 184 patients (86 men, 98 women) with an average age of (51.7±14.0) and an age range of [20 to 88.5]. Data collection was carried out using a questionnaire containing socio-demographic and anthropometric information. Glycemic control was based on fasting glucose (GAJ), postprandial glucose (GPP), and glycated hemoglobin (HbA1c). These analyzes were taken in three separate phases with a duration of 3 months; T₀ represents the initial state (before our intervention), t₁ and t₂ which represent the values of the three analyzes after our intervention. Participants were randomized into two groups: a group that received collective nutrition education (n=105) and another group (n=79) had a personalized (individual) education. BMI was the only anthropometric measure used.

Results: The whole population is overweight (BMI>25) for either women or men, also the results of glycemic control are superior to the norms in the three stages (t₀, t₁ or t₂). Nutrition education Personalized shows statistically significant differences in the variables studied as a function of time more than those studied in collective nutrition education (p=0.00 <0.05). Also the difference is significant between collective nutrition education and personalized nutritional education (P=0.00 <0.05) for the means of HBA1C (%) at t₁ and at t₂; Fasting glucose (g / l) at t₁ and t₂ and post-prandial glucose (g / l) at t₁ and t₂.

Conclusion: The results of this study show that collective nutrition education yields significant results in terms of impact on glycemic control of these diabetics. The number of studies on this aspect (nutrition education) remains modest, another study is desirable on a larger sample to better confirm our results.

Keywords: nutrition education, glycemic control, diabetes, diabetic patients

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Introduction

Diabetes is a challenging public health problem¹ because of the complications associated with the disease and In Morocco, diabetes costs reached 206 million US dollars in 2010.² Studies have shown that therapeutic education can reduce mortality and morbidity, and reduce the care costs.³⁻⁴ Generally, nutrition education is a necessary and essential tool for a good health management⁵⁻⁷ by allowing individuals to acquire the necessary skills to be in charge of their wellbeing⁸ and adjusting dietary behaviour to the individual needs of the patient which requires a basic knowledge in good nutrition.⁹ In this study, our objective was to study the impact of two approaches to nutrition education (personalised and collective) on the management of blood glycaemia in patients with type-2 diabetes.

Methods

We recruited adult participants who attend the Reference Centre of Diabetes of Kenitra, Morocco – between February 2015 and September 2016. Participants were recruited on the basis of their glycaemic profile: fasting glucose (FG), post-prandial glucose (PPG) and glycated haemoglobin (Hb1Ac). Only patients with a

glycaemic disequilibrium were eligible for the study. A total of 200 participants were assigned to two groups: a group which received collective nutrition education sessions (n=105) and another group whose members received personalised nutrition education (n=79), the remaining 16 participants dropped out of the study for personal reasons. Anthropometric measurements were collected by a trained staff in accordance with World Health Organization standards. Weight was measured while patients were wearing light clothing and no shoe. Height was measured using a stadiometer graduated in centimetres. Body mass index (BMI) was calculated as weight divided by the square of height (kg/m²). WHO cut-off points for overweight (BMI≥25) and obesity (BMI≥30) were used as measures of adiposity. A standardized questionnaire was used to collect socio-demographic and personal information about the participants. The glycaemic profile was assessed based on FG, PPG and Hb1Ac. Blood analyses were conducted at T₀, T₁ and T₂, at intervals of three months each. T₀ was at the baseline before our intervention. T₁ and T₂ were respectively after 3 months and 6 months of the beginning of our intervention.

Collective sessions consisted of workshops, at a frequency of two workshops per month, with the participation of a maximum of

15 patients that were coached by a dietician using information cards in the case of roundtables and focus groups or using presentation in the case of educational trainings. This group received a total of 18 sessions during this study. Individual sessions consisted of individual consultations of 20 minutes (two sessions per week) with a dietician who provides personalized counselling based on the condition of the patient and their glycaemic profile. At the end of the session, the dietician provides the patient with a dietary programme to be followed until the following session. Statistical analysis was conducted using SPSS statistical package (version 18).

Results

Participants were aged between 20 and 89 years old (51.7±14.0). Table 1 represents the different parameters of the participants at the study baseline for both groups. All study participants were overweight (BMI >25). Personalized nutritional education had a more significant impact on the studied parameters than the collective sessions (Table 2). The difference between PNE and GNE is significant for Hb1Ac (%), fasting glucose and post-prandial glucose between t₁ and t₂ (Table 3).

Table 1 Anthropometric and biologic parameters of the study participants at baseline (N = 184)

		N	Weight	Height	Age	BMI	HbA1c	FG	PPG
CNE	Total	105	77,89±14,5	164±10	54,2±14	28,81±5,90	10,10±1,74	2,83±0,73	3,40±0,88
	M	58	77,32±13,7	170±7	51.3±15,8	26,55±4,82	10.13 ± 1.78	2.84 ± 0.79	3.35 ± 0.72
	F	47	78,6±15,55	157±8	57.7±10,7	31,61±4,96	10.07 ± 1.70	2.80 ± 0.65	3.47 ± 1.05
PNE	Total	79	71,09±15,5	166±7	48,3±13,3	27,05±4,96	11,15±2,14	3,07±0,81	3,82±0,88
	M	28	70,36±12,9	171±5	46.4±12,1	24,47±4,15	11.27 ± 2.16	3.21 ± 0.77	3.92 ± 0.88
	F	51	71,49±16,9	163±6	49.4±13,9	28,46±4,82	11.09 ± 2.14	2.99 ± 0.82	3.77 ± 0.88
Total		184	74,97±15,3	165±9	51,7±14	28,05±5,57	10,55±1,98	2,93±0,77	3,58±0,90

CNE, Collective nutritional education group; PNE, Personalized nutritional education group.

Table 2 The impact of personalized and collective nutritional education on HbA1c, fasting glucose (FG) and post-prandial glucose (PPG) of a group of patients with type-2 diabetes (N = 184)

		Value as a function of t	(M; σ)	Matched Differences(M; σ)	T test
Collective nutrition education(N=105)	Pair 1	HBA1C (%) à t ₀	(10,10;1,7)	(0,49;1,6)	(t=3,1;p=0,002<0,05;DS) ¹
		HBA1C (%) à t ₁	(9,62;1,6)		
	Pair 2	HBA1C (%) à t ₁	(9,62;1,6)	(0,64;1,5)	(t=4,4;p=0,00<0,05;DS)
		HBA1C (%) à t ₂	(8,98;1,7)		
	Pair 3	FG (g/l) à t ₀	(2,83;0,7)	(0,01;1,1)	(t=0,1;p=0,89 <0,05;NS) ²
		FG (g/l) à t ₁	(2,81;0,9)		
	Pair 4	FG (g/l) à t ₁	(2,81;0,9)	(0,21;0,5)	(t=4,5;p=0,00<0,05;DS)
		FG (g/l) à t ₂	(2,60;0,9)		
	Pair 5	PPG (g/l) à t ₀	(3,40;0,9)	(0,09;1,1)	(t=-0,8;p=0,43<0,05;NS)
		PPG (g/l) à t ₁	(3,49;0,7)		
	Pair 6	PPG (g/l) à t ₁	(3,49;0,7)	(0,37;0,5)	(t=7,3;p=0,00<0,05;DS)
		PPG (g/l) à t ₂	(3,12;0,5)		
Personalized nutrition education (N=79)	Pair 1	HBA1C (%) à t ₀	(11,15;2,1)	(2,49;2,2)	(t=9,8;p=0,00<0,05;DS)
		HBA1C (%) à t ₁	(8,66;1,1)		
	Pair 2	HBA1C (%) à t ₁	(8,66;1,1)	(1,3;1,1)	(t=9,8;p= 0,00<0,05;DS)
		HBA1C (%) à t ₂	(7,40;0,6)		
	Pair 1	FG(g/l) à t ₀	(3,07;0,8)	(1;0,7)	(t=12,8;p= 0,00<0,05;DS)
		FG(g/l) à t ₁	(2,10;0,7)		
	Pair 2	FG(g/l) à t ₁	(2,10;0,7)	(0,6;0,4)	(t=13,5;p=0,00<0,05;DS)
		FG(g/l) à t ₂	(1,52;0,5)		
	Pair 1	PPG (g/l) à t ₀	(3,82;0,8)	(1;0,6)	(t=-14,3;p=0,00<0,05;DS)
		PPG (g/l) à t ₁	(2,83;0,7)		
	Pair 2	PPG (g/l) à t ₁	(2,83;0,7)	(0,7;0,5)	(t=14,2;p=0,00<0,05;DS)
		PPG (g/l) à t ₂	(2,83;0,7)		

FG, fasting glucose; PPG, post-prandial glucose.

Table 3 The difference between GNE and PNE at t_0 , t_1 and t_2 in a group of patients with type-2 diabetes (N = 184)

Values as a function of time	Collective nutrition education(N=105) (M ; σ)	Personalized nutrition education(N=79) (M ; σ)	Z test
L'HBA1C (%) à t_0	(11,10;1,7)	(11,15;2,1)	(z=-3,6;p=0,06>0,05;NS)*
L'HBA1C (%) à t_1	(9,62;1,6)	(8,66;1,1)	(z=4,4;p=0,00<0,05 ;DS)
L'HBA1C (%) à t_2	(8,98;1,7)	(7,40;0,6)	(z=7,7;p=0,00<0,05 ;DS)
FG (g/l) à t_0	(2,83;0,7)	(3,07;0,8)	(z=-2,1;p=0,36<0,05 ;NS)*
FG (g/l) à t_1	(2,81;0,9)	(2,10;0,7)	(z=5,7;p=0,00<0,05 ;DS)
FG (g/l) à t_2	(2,60;0,8)	(1,52;0,5)	(z=10,6;p=0,00<0,05 ;DS)
PPG (g/l) à t_0	(3,76;0,8)	(3,82;0,8)	(z=-3,2;p=0,07>0,05 ;NS)
PPG (g/l) à t_1	(3,49;0,7)	(2,83;0,6)	(z=6,4;p=0,00<0,05 ;DS)
PPG (g/l) à t_2	(3,12;0,53)	(2,08;0,40)	(z=14,3;p=0,00<0,05 ;DS)

DS, The difference is significant; NS, The difference is not significant.

Discussion

Current dietary habits are associated to 4 among the 10 most frequent causes of mortality in the world, including diabetes.¹⁰ According to the WHO estimates, non-communicable diseases are accountable for 75% of the mortality rates in Morocco in 2008, diabetes alone is accountable for 12% of these rates.¹¹ In 2008, the prevalence of individuals with a raised blood glycaemia was 9.9%.¹² Nutritional education aims to assist individuals on voluntarily improve their dietary habits and adopting healthier nutritional choices.¹³ Educating a diabetic patient is an essential component in the management of diabetes and which benefits include a more comprehensive management and care of the disease.¹⁴ However, very few people benefit from counselling and dietary recommendations to be able to take care of themselves. In this study, we compared to approaches to nutrition education in adult diabetic patients; a collective approach and a personalized approach. Participants of both groups showed an improvement in their glycaemic profile (Hb1Ac, FG and PPG) during the intervention (T_0 , T_1 and T_2). However, the improvement that the PNE has showcased was more significant in all of the three studied parameters.

These results are consistent with previous similar studies conducted among diabetic patients in other countries¹⁵⁻¹⁹ and suggest that nutrition education can be effective in helping these patients with their condition. Several studies have explored the efficiency of different interventions aiming at improving the management of diabetes, especially in vulnerable populations^{20,21} and despite the difference in the approaches, they observed a decreasing Hb1Ac.²⁰⁻²² In addition to the demonstrated advantages of nutritional counselling in improving the biologic parameters of diabetic patients in Morocco, our study compared two approaches to nutrition education and revealed a higher efficiency of an individual approach which has the advantages of being personalized and specific to the patient's profile, which consistent with previous findings.²³ The management of diabetes in Morocco is rare and very costly. Thus, it is important to

equip patients with the specific knowledge to correctly manage their disease and avoid further complications, especially in a society with many economic challenges. The relatively easy reproducibility of the intervention and its minimal cost are two major factors that would allow its implementation in the standard care of type-2 diabetes in vulnerable communities.

Conclusion

Collective and individual nutrition education are both efficient in improving the glycaemic profile of patients with type-2 diabetes in vulnerable individuals with a low level of education and lacking knowledge of nutritional recommendations to properly manage their condition. Individual and personalized nutrition education has proven to be the most efficient approach and should be recommended for critical and advanced cases, while collective sessions can be very helpful to support new diabetic patients and offer the very much needed psychological support.

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Conflict of interest

The authors declare that they have no conflicts of interest in relation to Article.

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