Health education in the management of diabetes at the primary health care level: is there a gender difference?

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التثقيف الصحي في التدبير العلاجي للسكري على مستوى الرعاية الصحية الأولية، هل هناك فرق بين الجنسين؟

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الخلاصة: تمت دراسة الفروق بين الذكور والإناث من السكريين الذين يتلقون الرسالات الصحية التثقيفية في مواقع الرعاية الصحية الأولية، وتأثير تلك الرسالات على السيطرة على السكري ومكافحته. تم تحليل ملفات 198 من السكريين الذين يراجعون عيادة السكري في أبها في المملكة العربية السعودية، وبيّنت النتائج أن منسب كتلة الجسم وسكر الدم على الريق لدى السيدات مرتفعان ارتفاعاً يُعدّ به إحصائياً عما هما عليه لدى الرجال، مع تلقي عدد أقل بكثير من حصص التثقيف الصحي التي تلقاها الرجال في الأشهر الاثني عشر الماضية، وقد أوضح عدد من نماذج التحوّف regression اللوجستي أن الأنوثة من المنبئات الهامة على سوء السيطرة على سكر الدم. وقد أوضحت هذه النماذج أن السيطرة على السكري في النساء تكون أقل عندما يكون عدد حصص التثقيف الصحي التي يتلقينها أقل.

ABSTRACT We examined differences between male and female diabetic patients, as recipients of health education messages provided in a primary health care setting and its implications on the control of the disease. The files of 198 diabetic patients attending a diabetes clinic in Abha, Saudi Arabia were analysed. The results showed that females had significantly higher body mass index and fasting blood sugar levels than men with significantly fewer mean number of health education sessions in the last 12 months. Multiple logistic regression model pointed to the female sex as a significant predictor of poor glycaemic control. The model for females alone showed significantly poorer diabetes control when the number of health education sessions received was less.

L'éducation sanitaire dans la prise en charge du diabète au niveau des soins de santé primaires : existe-t-il une sexospécificité ?
RESUME Nous avons examiné les différences entre les patients diabétiques de sexe masculin et féminin en tant que destinataires des messages d'éducation sanitaire fournis par un établissement de soins de santé primaires, et leurs implications pour le contrôle de la maladie. Les dossiers de 198 patients diabétiques qui consultaient dans une clinique du diabète à Abha (Arabie saoudite) ont été analysés. Les résultats ont montré que les femmes avaient un indice de masse corporelle et une glycémie à jeun considérablement plus élevés que les hommes, pour un nombre moyen de sessions d'éducation sanitaire significativement moindre au cours des 12 derniers mois. Le modèle de régression logistique multiple a mis en évidence le sexe féminin comme prédicteur important de mauvais contrôle de la glycémie. Les modèles pour les femmes seulement montraient que le contrôle du diabète était significativement plus faible lorsque le nombre de sessions d'éducation sanitaire dispensées était moindre.

Introduction

Health education is a corner-stone of diabetes management. In fact, it is not an addition to treatment, it is a treatment. While diabetes mellitus prevalence is rising in many developing countries in the Eastern Mediterranean region [1], it has reached alarming levels in Saudi Arabia. In most parts of Saudi Arabia, and according to a recent national study [2], the prevalence exceeded 25% in the population above the age of 40 years and 50% in the population above the age of 50 years in some areas. There was a higher prevalence of diabetes mellitus among women than men above the age of 40 years in all the regions. Further, glycaemic control is only achieved in 21%–25% of diabetic patients registered in primary health care (PHC) centres in Riyadh [3].

Some studies have indicated that fasting blood sugar (FBS), glycosylated haemoglobin values, body weight and blood pressure are all improved by a diabetic education programme especially when appropriate to the cultural context of the population [4,5]. Apart from the direct control of a patient's diabetes during hospitalization, a knowledgeable patient should carry out the day-to-day management of diabetes: a requisite that is assumed by the PHC centres in Saudi Arabia.

The aim of this study was to examine the impact of health education delivered in PHC setting on the control of diabetes and to investigate any gender difference affecting the validity of the health education message.

Methods

At the PHC level, each registered diabetic patient is supposed to visit the clinic at least once every month, to be followed up by the caring physician, examined for any complaint or complication, tested for blood sugar, receive their drugs or be referred to the secondary level hospital for the annual check-up. Further, a health education checklist is covered by the physician who chooses the most relevant topic every visit. The checklist comprises 16 topics, covering explanation of the disease, diet regimen, drug usage, foot care, skin infections and the beneficial role of exercise. Some information is also given on the complications of diabetes, namely eye, nervous, kidney or vascular complications, as well as care needed during especially stressful conditions. The elements to be elaborated on under each of these topics are not pre-indicated and they are left to the physicians to develop according to their perception of the patients' needs.

This study was conducted in the PHC centre of Shamasan in Abha City where 475 diabetic patients are registered and followed up. The files of 198 diabetic patients (108 women and 90 men) fulfilled the inclusion criteria set for this study. These were: patients suffering from type 2 diabetes mellitus, registered for at least one year, appeared in the clinic at least once during the last 12 months and had a follow-up sheet with complete records of data for every visit. The inclusion of patients appearing once in the preceding 12 months, although infrequent as a followup regimen, was decided upon because the appointment compliance in itself was considered as an effect of the health education process.

The following data were collected for each patient: age, sex, family history of in the parents, diabetes duration, body mass index, last FBS level, last cholesterol level, complications if any, number of health education sessions received and crowding index (number of family members/number of rooms in dwelling). The biochemical tests were made in the PHC centre using

the conventional colorimetric methods prior to clinical examination of the patient.

Lastly the subjective opinion of the treating physician concerning diet, drug and appointment compliance as good, fair or poor was included. It was decided to use the subjective opinion for compliance, as well as last blood sugar and cholesterol levels, to represent reasonable indicators as the number of visits per patient was not equal, a condition that might affect the averages.

Bivariate analysis, comparing men and women, was performed and multiple logistic regression models were designed for the whole population, followed by models for men and women separately. The dependent factor was the dichotomized last FBS result, considered as good or poor control taking the cut-off point of 180 mg/dL (10 mmol/L) as the upper limit of acceptable control. The independent factors included were those revealed significant in the bivariate analysis, i.e. family history of diabetes, body mass index, age, number of health education sessions received, drug compliance and sex of the patient.

Results

Table 1 shows some characteristics of the males and females included in the study. Males were significantly older than females (59.4 + 8.9 years compared to 53.8 + 8.1 years) ($P < 0.01$), they showed a significantly lower mean FBS level (201.8 ± 64.2 mg/dL compared to 230.0 ± 75.2 mg/dL) ($P < 0.01$). They had also received significantly more health education sessions (4.2 ± 1.9 versus 1.8 + 1.3) ($P < 0.01$). Females, on the other hand, were mostly overweight as they had a significantly higher body mass index (32.1 ± 6.1 kg/m² versus 28.5 ± 4.4 kg/m²) ($P < 0.01$).

Table 1 **Characteristics of the male ($n = 90$) and female ($n = 108$) diabetic patients**

Characteristic	Males (Mean ± s)	Females (Mean ± s)
Age (years)	59.5 + 8.9	53.8 + 8.1**
Duration of diabetes (years)	10.0 ± 5.1	9.2 ± 4.3
Body mass index (kg/m²)	28.5 ± 4.4	32.1 ± 6.1**
Fasting blood sugar (mg/dL)	201.8 ± 64.2	230 ± 75.2**
Blood cholesterol level (mg/dL)	227.3 ± 48.2	238.6 ± 59.7
Crowding index	1.4 ± 0.6	1.3 ± 0.9
Number of complications	0.3 ± 0.5	0.4 ± 0.6
Number of visits in 12 months	3.9 ± 2.3	4.4 ± 2.6
Number of health education sessions in 12 months	4.2 ± 1.9	1.8 ± 1.3**

*Significant at $P < 0.01$.
s = standard deviation

Table 2 depicts the different levels and types of compliance and the family history of diabetes mellitus between males and females. It shows that females had significantly poorer diet compliance than males ($\chi^2 = 8.78$, $P < 0.05$). Both drug and appointment compliance scores were not significantly different. Males however had significantly more positive family history of diabetes than females (53.3% versus 29.6%), ($\chi^2 = 6.55$, $P < 0.05$).

Table 3 describes the results of the three models of multiple logistic regression. In the first model, involving both sexes, the only significant factor predicting poor glycaemic control was the sex of the patient showing that females are more prone

Table 2 Diet, drug and appointment compliance and family history of male and female diabetic patients

Variable	Males ($n = 90$)		Females ($n = 108$)		Signifi-cance
	No.	%	No.	%	
Diet compliance					
Poor	15	16.7	39	36.1	$\chi^2 = 8.78^*$
Fair	36	40.0	46	42.6	
Good	39	43.3	23	21.3	
Appointment compliance					
Poor	72	80.0	88	81.5	$\chi^2 = 3.76$
Fair	15	16.7	17	15.7	
Good	3	3.3	3	2.8	
Drug compliance					
Poor	12	13.3	24	22.2	$\chi^2 = 3.34$
Fair	24	26.7	21	19.5	
Good	54	60.0	63	58.3	
Diabetes family history					
Positive	48	53.3	32	29.6	$\chi^2 = 6.55^*$
Negative	42	46.7	76	70.4	

*Significant at P < 0.05.

to hyperglycaemia and poor control of their diabetic state than males (OR = 2.84, CI: 1.26–6.40). The model for females pointed to the significant effect of the number of health education sessions in controlling the disease (OR = 0.28, CI: 0.15–0.54). In the model for males, the significant factor was the number of health education sessions which, astonishingly, increased with poor glycaemic control (OR = 1.39, CI: 1.05–1.85).

Discussion

Without adequate diabetes education, physicians are in effect providing substandard treatment. Diabetes care requires that each

Table 3 Results of the multiple logistic regression models showing odds ratios (confidence intervals) of the different independent factors predicting poor glycaemic control

Model	Family history	Body mass index	Age	Health education	Drug compliance	Sex
Both sexes model: $R^2 = 62.42\%$	0.63 (0.34–1.17)	1.02 (0.96–1.08)	1.01 (0.98–1.05)	0.96 (0.79–1.17)	0.40 (0.15–1.08)	2.84* (1.25–6.40)
Female model: $R^2 = 89.83\%$	0.89 (0.28–2.80)	1.15 (1.02–1.30)	1.01 (0.93–1.10)	0.28* (0.15–0.54)	0.01 (0.0–0.0)	–
Male model: $R^2 = 63.33\%$	0.70 (0.29–1.68)	0.98 (0.89–1.09)	0.98 (0.93–1.03)	1.39* (1.05–1.85)	0.55 (0.13–2.38)	–

*Significant at P < 0.05.

patient participate in his or her treatment programme, depending on the knowledge gained through health education regarding diabetes management. In Saudi Arabia it is the responsibility of the health education programme at the level of the PHC centre to convey that knowledge to patients. Our study addressed the health education issue at the PHC level and its impact on the glycaemic control of patients with type 2 diabetes mellitus.

FBS levels were significantly higher in females than in males, denoting poorer control of the diabetic state. Also, females were significantly more obese than males correlating with the significantly poorer diet compliance. The male and female populations of the study were essentially matched concerning disease duration, crowding index, number of complications, cholesterol level and number of visits in the previous year. Thus it was considered that the difference in the mean FBS would be minimally affected by any of these factors.

The number of education sessions attended in the previous year was significantly higher for males; however, this number was far lower than expected once monthly sessions accompanying the regular visits were taken into account. This might raise the question of the management of diabetes in the PHC centre, whether it is oriented more towards treatment or prevention [6]. The appointment compliance for both sexes did not differ significantly and was poor in the majority of patients. As suggested in other studies [7], this might be one of the factors for poor control. This could also be compounded by the significant non-compliance of women with diet regimen as reported in other studies [8].

The hypothesis set for this study was that education is a key factor in diabetes control. The results of the multiple logistic regression models showed that gender was a determinant factor; women were about three times more prone to poor control. Health education, on the other hand, was significantly related to diabetes control in both sexes. For women, where this relationship was negative, we might think that many factors deserve consideration. The diabetes education message might not be effectively given in the few sessions they attended [9]. Managed by mainly male physicians, with different cultural backgrounds, their dietary habits and customs are probably not adequately taken into account and addressed properly. The effect of illiteracy and culture on the effectiveness of health education in the control of diabetes has been described elsewhere, in Pakistani women living in Britain [10], in a Mexican population [11] and an Egyptian population [12]. In Saudi Arabia, the nature of interfamily roles and relations and the corresponding influence of its members in determining the type of food eaten and the possibility of performing many activities such as exercise, deserves more comprehensive sociocultural studies.

The analysis of the male population revealed that poor glycaemic control was not affected by increased number of health education sessions. Beside the above-mentioned factors, this raises the following additional issues. Physicians might not be addressing the real concerns of their diabetic patients [13], or taking into account the extent of patient's knowledge of diabetes [14,15]. Other possible potential factors include financial barriers to providing adequate diabetes care in PHC (e.g. drug availability), organizational inconvenience, or care quality not meeting evidence-based standards [16].

Recommendations

Most of the issues discussed have relevance to the health education process at the PHC level and this study points to the need for revising it thoroughly. Female patients should to be taken into account when designing health education messages as in our prevailing culture women's health and integrity are an important insurance for the health of the whole family.

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