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Therapeutic education for diabetic and hypertensive patients in primary care

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Abstract
Introduction: Therapeutic patient education (TPE) is an important part of hypertensive and diabetic patients care. It allows them to acquire and maintain the skills they need to live better with chronic disease.
Objectives: This study investigates the patients' knowledge of their chronic diseases and assesses the development of their awareness after TPE.
Methods: This is a quasi-experimental study using a pre-post evaluation method on hypertensive and/or diabetic patients. It was carried in two primary healthcare centers in Monastir in 2019. The educational program took place in three stages: first individual session for each patient, a group session and a second individual session performed after one month.
Results: We included 152 hypertensive and/or diabetic patients. The average age of these patients was 62.8 years (SE = 9.8), the sex ratio was 0.34. We have shown that their knowledge on the matters related to diabetic diseases was limited. The assessment of knowledge before and one month after TPE showed that TPE was associated with a significant improvement in knowledge ($P \leq 0.05$). This multivariate analysis also showed that patients with isolated hypertension are three times more likely to improve their knowledge during TPE sessions. The percentage of the patients that were satisfied with the TPE sessions was as high as 90.8%.
Conclusion: These results will encourage primary healthcare managers to promote these sessions and to improve the health professionals' skills in this field.

Keywords: type 2 diabetes; high blood pressure; therapeutic education

Introduction

Cardiovascular diseases represent a frequent reason for consultation in general medicine. According to estimates by the World Health Organization, more than 80% of these consultations concern chronic diseases including High Blood Pressure and diabetes [1-3]. These pathologies are responsible for 63% of deaths worldwide. Tunisia, like the other Maghreb countries, which are in epidemiological transition, is experiencing an explosion of chronic diseases that represent a major public health problem given the continued growth in their prevalence [4]. Rigorous medical monitoring and a change in behavior guarantee control of the disease, hence the need for the involvement of both health professionals and the patient. Therapeutic Patient Education (TPE) is an integral and permanent part of the management of chronically ill patients, and enables them to acquire and maintain the skills they need to manage their life with chronic disease as well as possible [5]. Improved knowledge through TPE seems to be effective in adopting healthy behavior allowing better self-management, reduction of complications, and reduction of costs inherent in management [5]. This study was aimed to compare the knowledge of patients with hypertension and / or diabetes regarding their illnesses before and after TPE sessions, and to assess patient satisfaction with the educational program.

Methods

Study Design

This is a quasi-experimental standard before / after study, carried out during the period from 1 September 2019 to 30 November 2019, involving hypertensive and type 2 diabetic patients followed for chronic diseases, at the Primary Health Center "C2" and "Stah Jabeur" in Monastir region.

Study sitting

The "C2" and "Stah Jabeur" are part of Monastir health unit respectively serving a population of 14,000 and 13,200 inhabitants. These centers offer curative, preventive and promotional care, divided into general medical consultations, and an individualized consultation once a week dedicated to chronicles diseases, diabetic and / or hypertensive patients, with an appointment every three months according to the recommendations of the National Program of Chronic Disease Management System set up in 1998 by the Ministry of Health in Tunisia.

The main objective of this program is to ensure correct, standardized and regular management of hypertensive and diabetic patients in primary care facilities in order to reduce chronic complications.

The education program

The ETP sessions were facilitated by the doctors in charge of the 2 centers, on the days of consultation of the chronicles one hour before the interview. The TPE took place in three steps:

The first step consisted of an individual meeting with the patient before the therapeutic education session to explain the course of the session and ask him to answer a questionnaire. It included socioeconomic data (age, gender, level of education and personal and family history), and data related to diabetic and / or hypertensive disease (duration of the disease, circumstance of discovery). Knowledge was assessed by 9 questions, 4 of which assessed knowledge about diabetes and 5 about hypertension.

The second step consisted of carrying out collective TPE sessions spread over three months. Each patient received one session. Each session involved 10 to 12 patients. The teaching technique used was a transmissive technique with as teaching aids a picture booklet produced by the doctor in charge of the study.

Each session lasted 30 to 40 minutes, the theme was information on the pathophysiological mechanisms of diabetes and hypertension. The course of the session included an explanation of the objectives of the session, then an exhibition of images to explain the definition and pathophysiology of diabetes and hypertension by responding to questions asked by participants.

The third step consisted of a 2nd individual meeting with each participant one month after the TPE session. During this meeting the participants answered the same questions of the first interview, and the 4th part of the questionnaire concerning the evaluation of the satisfaction of the patients of the educational program.

For each question asked, the answers were classified into correct answer, partially correct answer and wrong answer.

Data analysis: The entry and analysis of statistical data was performed on SPSS 22.0 hardware. For the qualitative variables, the results were expressed in numbers and in percentages. Gaussian quantitative variables were expressed as mean (M) and Standard Deviation (SD). Appropriate tests were performed at the 5% significance level. Mac Nemar's chi-square test was applied to determine whether TPE improved questionnaire response for each subject and for each question. To determine the factors associated with improved knowledge, we performed a multivariate analysis (binary logistic regression).

Results

Study population

We included 152 Type2 diabetic and / or hypertensive patients. The mean age was 62.8 years (SD = 9.9), with extremes ranging from 38 to 92 years. We noted a female predominance, the sex ratio was 0.34. The association of hypertension and diabetes was noted in 70 patients (46.1%). The mean duration of diabetes was 5.9 years (SD = 6.9) with extremes ranging from 1 to 35 years. Hypertension lasted an average of 6.4 years (SD = 6.8) with extremes ranging from 1 to 40 years (Table 1).

Assessment of knowledge before and after therapeutic education

The definition of diabetes was not known by 39.5% of patients, this rate increased to 13.8% after the TPE session. Knowledge of hypertension and diabetes as chronic diseases has increased from less than 50% before the TPE sessions, to more than 80% after the sessions. TPE was associated with a significant improvement in knowledge on the 4 questions concerning diabetes and the 5 concerning hypertension at one month ($p \leq 0.05$) (Table 2).

Table 1: Characteristics of the study population

Charcateristics	N	%
Gender		
▪ Male	39	25.7
▪ Female	113	74.3
Age classes (years)		
▪ 35 - 64 years	92	60.50
▪ 65 - 74 years	40	26.30
▪ ≥ 75 years	20	13.20
Educational level		
▪ Illiterate	41	27
▪ Primary	81	53.30
▪ Secondary	27	17.80
▪ University	3	2
Nature of the disease		
▪ Hypertension	48	31.60
▪ Diabetes	34	22.40
▪ Hypertension + Diabetes	70	46.10
Duration of Diabetes		
▪ 1-10 years	74	48.70
▪ 11-20 years	28	18.40
▪ 21-30 years	1	0.70
Durée de l'Hypertension		
▪ 1-10 years	85	55.90
▪ 11-20 years	28	18.40
▪ 21-30 years	2	1.30
Other comorbidities		
▪ Dyslipidemia	37	24.30
▪ Cardiopathie	5	3.30
▪ Others	24	15.80
Family History		
▪ Diabetes	30	19.70
▪ Hypertension	36	23.70
▪ Hypertension + Diabetes	52	34.20

Table 2: Assessment of knowledge before and after therapeutic education

Answer considered correct	Before TPE		After TPE		P
	PK : N (%)	NK : N (%)	PK : N (%)	NK : N (%)	
Diabetes is an increase in the level of glucose in the blood	92(60.5)	60 (39.5)	145 (95.3)	7 (4.7)	0,015
Diabetes is chronic hyperglycemia	63 (41.4)	89 (58.6)	129 (84.9)	23 (15.1)	0,000
Diagnosis of diabetes: Fasting blood sugar more than 1.26g / l twice	92 (60.5)	60 (39.5)	131 (86.2)	21 (13.8)	0,000
Diabetes cannot be cured, but can be controlled	115 (75.6)	37 (24.4)	143 (94)	9 (6)	0,000
Hypertension is chronically elevated blood pressure	74 (48.7)	78 (51.3)	134 (88.2)	18 (11.8)	0,000
Hypertension definition: BP≥140 / 90 mmHg	120 (78.9)	32 (21.1)	142 (94.1)	9 (5.9)	0,000
Diagnosis of hypertension : BP ≥ 140/90 mmHg on several occasions spaced in time	124 (81.5)	28 (18.5)	150 (98.7)	2 (1,3)	0,000

Salt and hypertension relationship: salt increases BP	148 (97.4)	4 (2,6)	152 (100)	0 (0)	0,000
BP varies throughout the day	129 (84.9)	23 (15.1)	148 (97.4)	4 (2,6)	0,000

PK: Positive Knowledege = correct answer and partially correct answer; NK: No knowledge = wrong answer and dont know

Predictors of knowledge acquisition

In univariate analysis, the nature of the disease (isolated hypertension), the duration of the diabetes and the absence of another comorbidity were the factors associated with an improvement in knowledge in the study population (P≤0.05) (Table 3).

In multivariate analysis, compared to patients combining hypertension and diabetes, subjects with isolated hypertension were three times more likely to improve their knowledge during the TPE sessions. The presence of a comorbidity other than hypertension and diabetes, decreases the chances of improving their knowledge (Table 4).

Table 3: Criteria influencing the improvement of patient knowledge

Criteria	Patients with improved knowledge (N=91)	Patients with no improvement in knowledge (N=61)	P
Age	63,6 (9,9)	61,7 (9,8)	0,767
▪ 35 - 64 years	53 (57,6)	39 (42,4)	
▪ 65 - 74 years	25 (62,5)	15 (37,5)	
▪ ≥ 75 years	13 (65,0)	7 (35,0)	
Gender			0,532
▪ Male	25 (35,9)	14 (64,1)	
▪ Female	66 (58,4)	47 (41,6)	
Educational level			0,295
▪ Illiterate	28 (68,3)	13 (31,7)	
▪ Primary	48 (59,3)	33 (40,7)	
▪ Secondary, universitary	15 (50,0)	15 (50,0)	
Nature de la maladie			0,004
▪ Diabetes	18 (52,9)	16 (47,1)	
▪ Hypertension	38 (79,2)	10 (20,8)	
▪ Diabetes + Hypertension	35 (50,0)	35 (50,0)	
Duration of Diabetes: M (SD)	4,9 (6,6)	7,4 (7,0)	0,034
Duration of Hypertension: M (SD)	7,0 (7,6)	5,6 (5,4)	0,212
Other Comorbidities			0,012
▪ Yes	59 (68,6)	27 (31,4)	
▪ No	32 (48,5)	34 (51,5)	
Family History of Hypertension or Diabetes			0,798
▪ Yes	21 (61,8)	13 (38,2)	
▪ No	70 (59,3)	48 (40,7)	

Table 4: Multivariate analysis of factors predicting improvement in knowledge

	OR (IC 95%)	p
Type of chronic disease		
Patient with diabetes and hypertension	1	
Patient with isolates diabetes	1,09 (0,47; 2,53)	0,84
Patient with isolated hypertension	3,43 (1,30; 9,07)	0,01
Comorbidity		
No	1	
Yes	0,43 (0,22; 0,86)	0,02
Duration of diabetes	0,99 (0,93-1,05)	0,71

Assessment of patient satisfaction with therapeutic education sessions

Among our patients, 138 (90.8%) were satisfied with the TPE sessions. Nine patients stated that they would not attend future therapy education sessions either for difficulty in understanding, lack of documentation provided or for the time allocated for the TPE sessions.

Discussion

The concept of ETP has been developed for many years. It is the set of educational activities designed to help the patient acquire skills concerning his health, combining his information and therefore, the adoption and voluntary maintenance of positive attitudes and favorable behaviors. This active patient involvement helps in successful control of their chronic disease and delays the onset of complications [6].

In our study, we insisted on the knowledge component to assess the TPE since the knowledge of a disease and its management by the patient contributes, within the framework of the PTE, to reducing the morbidity and mortality linked to this disease due to a stronger adherence by the patient who becomes an actor of his disease [7, 8]. Indeed, Atallah A. *et al* [7] had shown that normalization of blood pressure was significantly linked to the

patient's level of knowledge concerning his hypertension and its treatment with p <0.001 and p <0.003.

Lack of knowledge of the definition of diabetes before TPE was found in 58.6% of the study population, which is lower than the results of Ben Abdelaziz A. *et al* [6] and Sahli A. *et al* [9] who reported respective rates of 62.6% and 62%. The definition of diabetes and the origin of diabetes were the two main knowledge gaps among the patients surveyed. The ideal Blood Pressure numbers were experienced by 78.9% of our patients, a rate higher than that reported by Attallah A. *et al* [7] (70%) and by Oliveria SA. *et al* [10] (39%). Almost all of our population had, already before TPE, the notion that eating salty food is among the causes of hypertension, which agrees with the results of Faye K. *et al* [11]. Our study concluded that patients' knowledge of the definition and mechanisms of diabetes and hypertension improved after the TPE sessions, with a significant difference in the response to each question before and after the TPE (p <0.005), which matches the data in the literature [12-14]. Monsnier-Pudar H. *et al* [13] reported the results of published studies, with improved responses to knowledge questionnaires after TPE; the improvement was statistically significant. In the study by J. Jose. G. *et al* [14], all parameters measured significantly improved after the TPE (p = 0.001). Jenhani M. *et al* [12], in a pre-experimental before / after study, also argued in favor of the effectiveness of the administration of an insulin-treated diabetic TPE program and followed in outpatient in primary care.

According to the literature, all the studies evaluating TPE confirm its effectiveness in the management and monitoring of chronic patients, especially diabetics, through the improvement of both knowledge and bioclinical results [12-15]. Basic knowledge is needed to be able to change skills and ameliorate the effects of the disease. Several authors have used glycated hemoglobin as the primary endpoint for TPE in diabetics, which has found a significant improvement in glycated hemoglobin levels in diabetics after TPE [13-15]. In the literature, the main criterion for evaluating the educational intervention most often used is the acquisition of cognitive knowledge. Much more rarely, quality of life, empowerment, level of patient satisfaction and acquired skills are analyzed. However, the complexity of the phenomena implemented in educational interventions is now taken into account, with the evaluation of the subjective factors linking the intervention itself and the improvement of glycemic control, but also of motivation. and educator skills, organizational and financial aspects [16].

The isolated hypertension, the duration of the diabetes and the absence of another comorbidity were the factors correlated with this improvement of knowledge with p≤0.05. In multivariate analysis, patients with isolated hypertension and those without other comorbidities have a better chance of improving their knowledge during the TPE sessions. Our results join those of Heisler M. *et al* in the United States [17] and Ozcelic F. *et al* in Turkey [18] who found a correlation between the level of knowledge, diabetic disease in general and seniority diabetes. Jenhani M. *et al* [12] concluded that the stratification of the effects of administering an FTE program (glycemic control and anxiety reduction), according to gender, age, educational level and socioeconomic level, showed that they were statistically significant in all categories except, male for glycemic control, and age above 60 years and illiteracy for anxiety.

In our study, we judged the patient satisfaction to be very good since 90.8% had appreciated the educational sessions. Nine patients said they will not attend future education sessions either because of comprehension difficulties, lack of materials or the schedule of the TTE sessions. Similar results were found in the Entred study [19]; patient satisfaction and motivation were perceived in almost all cases. On the other hand, patients wishing in the future for additional education in the monitoring of their diabetes would have preferred in-depth individual interviews rather than group sessions [19].

The main features of our study are on the one hand a simple educational intervention, in a group, proximity, outpatient and integrated into the usual consultations for chronic diseases and on the other hand, primary care workers including the primary care physician and multi-skilled nurses, working in public basic health structures. Our study focused on a varied population with diabetes and hypertension, of all ages, educated and illiterate, and of modest or even low socio-economic and cultural level.

Our study has some limitations; linked to a patient selection bias. Although multicentric, our study concerned only a small sample of the Tunisian diabetic population. It did not take into consideration type 1 diabetic patients, and those consulting other family physicians in the public or private sector or specialists from EPS Fattouma Bourguiba from Monastir. Another limitation of this study lies in the questionnaire used; the absence of a consensus questionnaire in Tunisia on the knowledge of diabetic patients impacts both on the internal and external validity of our study. In the literature, there are other questionnaires in the English language, widely used and validated by research teams, but specifically designed for type 1 diabetics.

Conclusion

Our study showed a lack of knowledge of diabetics and hypertensive patients followed in the first line in the health region of Monastir with regard to their health problem, and that TPE participated in improving their knowledge of their diseases. The beneficial results of this educational model reinforce the value of TPE as an essential component of chronic disease. This is an interesting result for the practice of TPE in the broad sense, and confirms the importance of the role of the primary care physician in the healthcare system. In Tunisia, primary health care decision-makers must establish TPE programs, specifying in particular the objectives, the population concerned, the organizational methods, the skills of the professionals who carry out a TPE, the evaluation of the program and the projected sources of funding.

Conflict of interest

The authors declare no conflict of interest.

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