

## A structured therapeutic education program for patients with type 1 diabetes

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### Abstract

Type 1 diabetes is a chronic disease that represents a global health problem that its incidence is constantly increasing, hence the need for an effective management approach to control the disease and its complications. The main objective of this work is to share the experience of our service in the therapeutic education of the type 1 diabetic patient, from a study spread over 16 months involving 142 patients, including a 1st phase during the collection of data was made during patient hospitalization for therapeutic education, and a 2nd phase during which an evaluation was made after 6 months of intervention. The average age of our patients was 17 years. Among our recruited patients, 54% were able to benefit from the educational program for the initiation of functional insulin therapy. The evaluation after the educational intervention at 6 months was carried out in 78, 8% of our patients, having objectified a significant glycemic evolution by a 1.7% drop in HbA1c and an increase in the percentage of adherence to lifestyle and dietary measures and the practice of regular self-monitoring of the glycaemia as well as an improvement in the mean of the overall treatment satisfaction score was noted after the educational intervention. Our results underline the importance of therapeutic education in the management of diabetic patients, the main objective of which is to improve their quality of life, which was highlighted by the patient testimonial sessions and their entourage, which remain a novelty of the educational program called "Type One.. Number One", whose objective is to serve to motivation for type 1 diabetics, their entourage and also the medical team.

**Keywords:** Diabetes; Education; Program; Quality of life

### 1. Introduction

Diabetes as a chronic disease is known to be a cause of school or professional dropout and several teams have pointed out this reality. But many type 1 diabetics have been able to excel in several areas and this deserves to be presented and shared, hence the idea of sharing the experience of our department in the therapeutic education of the type 1 diabetic patient with a novelty of the educational program that are the sessions of testimonies of patients and their entourage.

The expected objective of these positive testimonies is to serve as a motivational spark for type 1 diabetics, their entourage and also the health care team. And the general objective is to try to optimize the management of the patient at the different stages of his journey.

### 2. Materials & Methods

#### 2.1. Type of study

This is a prospective interventional study spread over 16 months from January 2021 to April 2022

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## 2.2. Collection Methods

Data collection was done in two stages:

- During the intervention: it was done during the hospitalization for therapeutic education by an initial evaluation which included: the socio-clinical data, the biological result of HbA1c before the program and by the DTSQ questionnaire (Diabetes Treatment Satisfaction Questionnaire)
- Six months after the intervention: the final evaluation included 3 components: the DTSQ questionnaire, the socio-clinical data, and the biological assessment: HbA1c at 6 months.
- The software used for statistical analyses was SPSS (Statistical Package for the Social Sciences) version 15.0; and Microsoft Excel 2016.
- The statistical analyses, essentially of a descriptive type, used the :
  - Calculation of numbers and percentages, for qualitative variables
  - Computes measures of central tendency (means and medians) and measures of dispersion (standard deviation) for quantitative variables.

For comparisons of categorical variables, the statistical threshold ( $\alpha$ ) was set at 0.05

P values <0.05 were considered significant

## 2.3. Tools used

- Information tools (PPT, brochures, posters, games, Quiz)
- Applications (carbohydrate calculation)
- The DTSQ consists of 8 items. Six items are related to satisfaction with diabetes treatment, and 2 items correspond to the frequency of perception of hyperglycemia and hypoglycemia
- Tools used in the making of the video annex of the educational program :
  - Recording tool: video camera and microphone
  - Editing tool used: Filmora application, Adobe Photoshop

## 2.4. Educational Program Flow

The program is spread out over 4 days of hospitalization in the therapeutic education unit, following a planned structuring from educational diagnosis to learning and evaluation in the form of various interactive workshops:

- Workshops of knowledge on DT1 by treating several aspects: Definition, Insulin therapy, complications ...
- Workshop on carbohydrate counting: for patients who will benefit from the initiation of functional insulin therapy
- Psychology workshop: Round table discussion on the diabetic experience led by the psychologist in the form of a group and individual session
- Dietetics workshop: animated by the dietician of the service: theoretical phase of learning passing by the food survey to the learning to evaluate the carbohydrate load, to adapt its treatment to the variations of food.
- And the practical phase in the form of a collective educational cooking workshop
- Group workshop on physical activity: Influence of physical activity on glycemia and adaptation of doses with sharing of different situations encountered during physical activity
- New in the program: Testimonial session of our diabetics and their entourage

All participating patients and/or their parents have already presented their consent and willingness to participate in sharing and testimonial sessions

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## 3. Results

Since the foundation of the Therapeutic Education Unit in our department in March 2015, it offers several educational programs for the benefit of patients followed for chronic diseases such as diabetes, obesity, stunted growth, acromegaly, Sheehan syndrome.

T1DM represents the most concerned pathology, about 60% of the Unit's activity

- 142 patients were recruited over a 16-month period from January 2021 to April 2022. Each educational program group consists of 6 patients.

- The mean age of our patients was 17 years with extremes of 6 to 38 years. With a mean diabetes duration in our patients of  $8.11 \pm 3.23$  years.
- We noted a 64% female predominance in our patients.
- We noted a school dropout in 15% of our patients
- Among our recruited patients, 54% were able to benefit from the educational program for the initiation of functional insulin therapy while 46% remained on conventional insulin therapy.
- The average follow-up time of our patients is 6 months
- The evaluation after the educational intervention at 6 months was performed in 112 patients, we noted a significant glycemic control with a mean HbA1c that was  $9.2 \pm 3.1$  with extremes ranging from 6.1% to 12.3% at baseline to  $7.5 \pm 1.6$  at 6 months with extremes ranging from 5.9% to 9.1% ( $p=0.001$ ).
- There was also an increase in the percentage of adherence to the hygienic-dietary measures (HDM), from 40.17% to 82.14% of patients adhering to the HDM after the educational intervention.
- Regarding the practice of regular self-monitoring of blood glucose and self-monitoring, the percentage increased after the educational intervention from 41% to 70.53%.
- According to the initial DTSQs, patients were overall quite satisfied with their treatment with a mean global score of  $22/36 \pm 4$ . An improvement in the mean global treatment satisfaction score was noted between the initial assessment and the 6-month assessment, with a mean score of  $25/36 \pm 5.4$
- The frequency of the perception of initial hyperglycemia was evaluated at a mean of 4.2, which is relatively frequent. The perception of initial hypoglycemia was evaluated at a mean of 3. There was a decrease in the average perception of hyperglycemia to 2.9 and hypoglycemia to 2.2 at 6 months of evaluation.

#### 4. Discussion

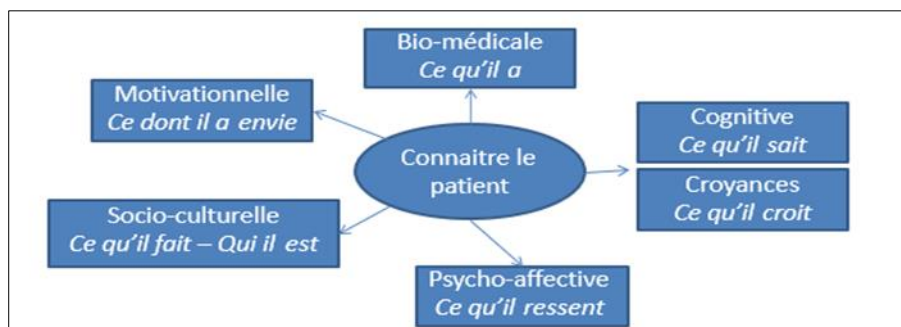
Type 1 diabetes (T1DM) represents a global health problem with a marked increase in prevalence worldwide over the past decades, with an annual incidence of 128900 new cases of T1DM in children aged 0-19 years in 2019, according to the International Diabetes Federation (IDF) [1].

Therapeutic education is the cornerstone of diabetes management, improving glycemic control and consequently reducing healthcare costs.

This decrease is linked, on the one hand, to the decrease in the number of hospitalizations for acute complications and, on the other hand, to the decrease in long-term complications (the most important way of spending money in diabetes) [2-4].

A therapeutic education program must follow four steps: individual educational diagnosis, organization of a personalized program, planning and implementation, and lastly, evaluation of the skills acquired and the progress of the program.

A dialogue between the different health professionals involved in the patient's care is essential. For this purpose, a summary of the educational diagnosis with its different dimensions is provided (Figure 1). [4-7].



**Figure 1** Therapeutic education approach with the different dimensions of educational diagnosis [6]

Adolescence is a crucial period in the construction of an individual, marked by profound transformations, both biological and psychological. For young people with a chronic disease such as diabetes, the period of choice and orientation can be experienced as anxiety-provoking, due to the repercussions of the disease on their lives, and in particular on the

choices of orientation that they will have to make. Hence the importance of having a much more attentive look at this category of the population by proposing a more regular and personalized educational follow-up scheme with psychological support guaranteeing a better acceptance of their disease and a better integration in school and professional life [8-10]. Hence the idea of integrating into our educational program "Type one ..Number one" sessions with positive testimonies of young diabetics who have been able to adapt with the disease of diabetes and succeed in their school and professional life.

All the studies show a statistically significant improvement in the parameters studied in the educational intervention group. The analysis of the literature shows that group therapeutic education in type 1 diabetes is effective, particularly on glycemetic control.

In fact, learning for the chronically ill patient requires the use of many techniques and teaching aids. One of them is based on the alternation of individual and group sessions with the addition of remote interviews. The individual sessions allow for the initiation of education, for assessments, and for the preservation of the singularity of the care. The group sessions encourage exchanges between peers, which are known to be important for the process of appropriation of skills and their perceived usefulness. Both types of educational intervention have been proven to be useful.

Other studies have also demonstrated the effectiveness of these two types of intervention and their complementarity over time in the management of a chronic disease. This suggests that the two types of intervention are complementary and can be sequenced over time to increase the benefit on health status. [11-17]

In clinical research, the evaluation of quality of life has become almost systematic in order to document the benefit of therapeutic interventions, the legitimacy of this approach resulting from the observation that health cannot be reduced to a biomedical dimension. Many measurement tools have therefore been developed. The methodological difficulty is major, since it is a question of obtaining a quantitative measure of a purely qualitative, subjective and very personal concept [18,19].

#### *Abbreviations*

- T1DM: Type 1 diabetes
- DTSQ: Diabetes Treatment Satisfaction Questionnaire
- ETP: Therapeutic education; IF: Functional Insulin therapy

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## **5. Conclusion**

Finally, high-quality research should lead to "official" recognition of therapeutic education. But even if this is achieved, the practice of therapeutic education on a large scale, as required by the sharp increase in the number of patients with type 1 diabetes, still comes up against problems of organization of care and training of caregivers in our country. The success of a therapeutic education program is therefore intimately linked to its adaptation to the context in which it takes place.

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## **Compliance with ethical standards**

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### *Disclosure of conflict of interest*

No conflict of interest.

### *Statement of ethical approval*

The present research work does not contain any studies performed on animals/humans subjects by any of the authors

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study

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