

## **THERAPEUTIC EDUCATION – NECESSARY MEASURE FOR ACHIEVING GOALS IN DIABETES MELLITUS**

**Vesa Cosmin Mihai<sup>\*\*\*</sup>, Maghiar Adrian<sup>\*\*</sup>, Maghiar Octavian<sup>\*\*</sup>, Zaha Carmen Dana<sup>\*\*\*</sup>, Daina Lucia<sup>\*\*\*</sup>, Moisi Mădălina<sup>\*\*\*</sup>, Popoviciu Mihaela<sup>\*\*\*</sup>, Popa Loredana<sup>\*</sup>, Țica Otilia<sup>\*\*</sup>, Popescu Mircea<sup>\*\*</sup>, Popa Amarin<sup>\*\*</sup>**

\*Clinical County Emergency Hospital of Oradea, Street Gheorghe Doja, nr.65, Oradea, Bihor, email: [v\\_cosmin\\_15@yahoo.com](mailto:v_cosmin_15@yahoo.com)

\*\*Faculty of Medicine and Pharmacy, University of Oradea, Street Piața 1 Decembrie, nr. 10, Oradea, Bihor

### **Abstract**

*Patients with diabetes mellitus rarely achieve glycaemic targets, generally defined as HbA1c < 7% despite adequate medication and advances made in the past decades regarding diabetes mellitus treatment. It is estimated that about 50% of diabetes mellitus patients achieve glucose control and that makes this category of population prone to microvascular and macrovascular complications such as diabetic retinopathy, diabetic retinopathy, myocardial infarction or stroke that have a debilitating impact on patients quality of life. Therapeutic education is defined as the measures taken by diabetes specialist in order that the patient gains the ability to understand his illness, the importance of a healthy lifestyle and acquires the skills necessary to adjust his diet, monitor his treatment and adjust it in order to prevent complications. The present paper explores the evidence from literature regarding the role therapeutic structured education for achieving the glycaemic, blood pressure and lipid target in diabetes mellitus patients.*

**Key words:** diabetes mellitus, structured therapeutic education.

### **INTRODUCTION**

Diabetes mellitus complications are highly prevalent, the UKPDS study demonstrating that at the moment of diagnosis approximately 50% of patients have at least one microvascular or macrovascular complication (Liu et.al, 2010). Moreover the mortality of diabetic patients is usually determined by cardiovascular events, such as acute coronary syndromes, stroke, peripheral artery disease in approximately 80% of cases (Liu et.al, 2010). In the context of such disease burden much attention has been given to preventive measures. A good glycaemic control defined as HbA1c < 7%, adequate blood pressure generally defined as < 140/90 mmHg and a good control of blood pressure, LDL-cholesterol < 100 mg/dL (American Diabetes Association, Standards Of Medical Care In Diabetes-2018), are the goals that generally must be achieved by diabetes mellitus patients in order to reduce the risk of apparition and progression of complications.

However few patients achieve the goals in diabetes mellitus despite the discovery and general availability of new medications such as: GLP-1

agonists, SGLT-2 inhibitors, long acting insulins such as glargine and very short acting insulin. A study realized in USA in demonstrated that in fact of all these new therapeutic options the prevalence of patients that achieve glucose control is declining from 52.2% during the interval 2003-2010 to 50.9% during the interval 2011-2014 ( Carls G. et al, 2017). Therefore if the pharmaceuticals measures are not enough for achieving the targets in diabetes mellitus, non-pharmaceutical measures need to be taken and the patient's education is one of them.

#### **MATERIAL AND METHOD**

In our paper we analyse different studies that explore the impact on improving the diabetes mellitus patients education on the achievement of glycaemic, lipid and blood pressure targets, the analysed research is of high quality, review articles or meta-analysis indexed in PUBMED database.

The purpose of this paper is to define structured therapeutic education in diabetes mellitus, to explore its components, to determine how it can be provided to patients and to determine its efficiency. Also the purpose of the paper is to draw attention to the local administration to elaborate programmes for improving therapeutic education of diabetes patients in order to increase their quality of life, to reduce the costs associated with healthcare, to increase their productivity and decrease work absenteeism generated by diabetes complications.

In the study we also assessed the prevalence of glucose, blood pressure and lipid control in a cohort of patients with diabetes mellitus evaluated in the Clinical County Emergency Hospital of Oradea. 218 patients were retrospectively evaluated. For each patient were determined HbA1c, systolic blood pressure, diastolic blood pressure and LDL-cholesterol. Good glycaemic control was defined as HbA1c<7%, good blood pressure control was defined as blood pressure<140/90mmHg and ideal value of LDL-cholesterol<100mg/dL.

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#### **RESULTS AND DISCUSSIONS**

Structured therapeutic education is a key components of diabetes management and represents the measures and actions done by a specialist or a team of specialist trained in diabetes education addressed to the diabetic

patients that has the purpose to make them capable to manage their own disease and to make to necessary adjustment to achieve the therapeutic goals in order prevent or delay the apparition of complications.

This type of education is called structured because is follows a curriculum, the information is structured in a way that the patient gains knowledge and skills step by step and can adapt and apply in his life the principles that he learns. Every diabetes educational programme should be comprehensive, flexible, should respond to the patient needs both the clinical ones and the psychological ones (Yorke E. et.al, 2018). The curriculum of a structured education programme generally includes gaining information and knowledge regarding the fallowing aspects of diabetes management:

- theoretical information – what is diabetes mellitus; what is hypertension and dyslipidaemia; what are the complications of diabetes mellitus and how they will impact the patient's life.
- information and skills regarding a healthy nutrition – what are the daily nutritional requirements; what is the proportion between carbohydrates, lipids and proteins in the diet; what are the categories of food that need to be weighted (bread, cereals, pasta, potatoes) and the ones that can be consumed in any quantity (vegetables); which are the healthy carbohydrates with low glycaemic index; which categories of lipids are recommended; how to calculate the quantity of carbohydrates consumed in a day; how to calculate the quantity of carbohydrates consumed at a meal and adapt the dose of rapid insulin to it.
- information and skills regarding physical activity – howmany minutes of physical activity are recommended in a day; what kind of physical activity is recommended according to the patients cardiovascular comorbidities; how to adapt the intake of carbohydrates to doing physical effort; how to adapt the doses of insulin to physical activity.
- information and skills regarding self- monitoring of glucose values – how many times a day should the glycaemia be measured if the patient is on long-acting insulin; how many times a day should the glycaemia be measured if the patient is on long-acting insulin and short-acting insulin; how to adjust the basal insulin dose according to basal glycaemia; what is the frequency of determination of HbA1c; how to utilize the insulin pump, how to adjust the basal rate, how to adjust the prandial bolus.
- information and skills regarding recognition of hypoglycaemia.
- information of skills regarding recognition of diabetes complications and diabetic foot prevention and care.

The complexity of such of a diabetic educational programme is illustrated in the above examples. However the benefits are undoubtable, the patient learns to manage his own disease in many directions such as nutritional therapy, exercise, foot care, lifestyle behaviour (Mokabel, F. M, 2017).

Therefore structured education is an activity centred around the patient and allows the patients to be active participants in their treatment (Golay, A et. al, 2008).

The efficacy of structured therapeutic education has been confirmed in many studies, but the most important evidence comes from metaanalysis. The educational programme can be individual or addressed to a group of patients, it can be done in ambulatory conditions or in the hospital. One study involved 998 patients diagnosed with diabetes mellitus divided in two groups, one group, 498 patients, were assigned to a systematic health education model while 500 were assigned to a conventional model (Zhang, Y et.al, 2018). It is interesting in this study the modalities by which the education programme has been put in practice. Patients were educated monthly for two years, which means that the information can be adequately understood and by being reinforced it becomes part of the behaviour. The quality of the provided information in the study and the complexity of it make the study a model for such further educational studies. In the study (Zhang, Y et.al, 2018) patients benefited of: 1) image education – they were provided videos about diabetes mellitus and hypertension; 2) dissemination of informative materials; 3) nutritional therapy advice made easy with the help of a simplified plate composed of  $\frac{1}{2}$  vegetables,  $\frac{1}{2}$  meat and  $\frac{1}{2}$  carbohydrates; 4) face to face lectures; 5) self-monitoring of glucose values; 6) screening for complications; 7) monthly evaluation of the therapeutic interventions; 8) improvement of the past measures according to the results of permanent monitoring. Compared with the group that received conventional education, the group that benefited from systematic health education had a value of HbA1c lower with 0.67%, LDL-cholesterol lower with 9.6mg/dL, systolic blood pressure lower with 10.83 mmHg and body-mass index lower with 0.23 kg/m<sup>2</sup>. The differences regarding HbA1c, blood pressure, LDL-cholesterol were all statistically significant. Therefore the results confirmed the efficacy of a structured diabetes educational programme.

One meta-analysis (Yorke E. et.al, 2018) concluded, after analysing 36 studies that explore the efficacy of structured education in diabetes mellitus most of them including population of Caucasian origin, that structured therapeutic education is effective in improving glucose control and in reducing the risk of hypoglycaemia.

In our study 218 patients were evaluated regarding glucose, blood pressure and LDL-cholesterol control. Their mean age was 58.27 years, 51.38% were female, 68.26% lived in urban environment and 61.01% were obese. Regarding the glucose, blood pressure and lipid control in diabetes mellitus patients from Bihor County (Figure 1) it can be observed that the control of these risk factors is poor, but in accordance to the worldwide situation, as shown above even in USA only 50.9% of patients achieve glucose control.

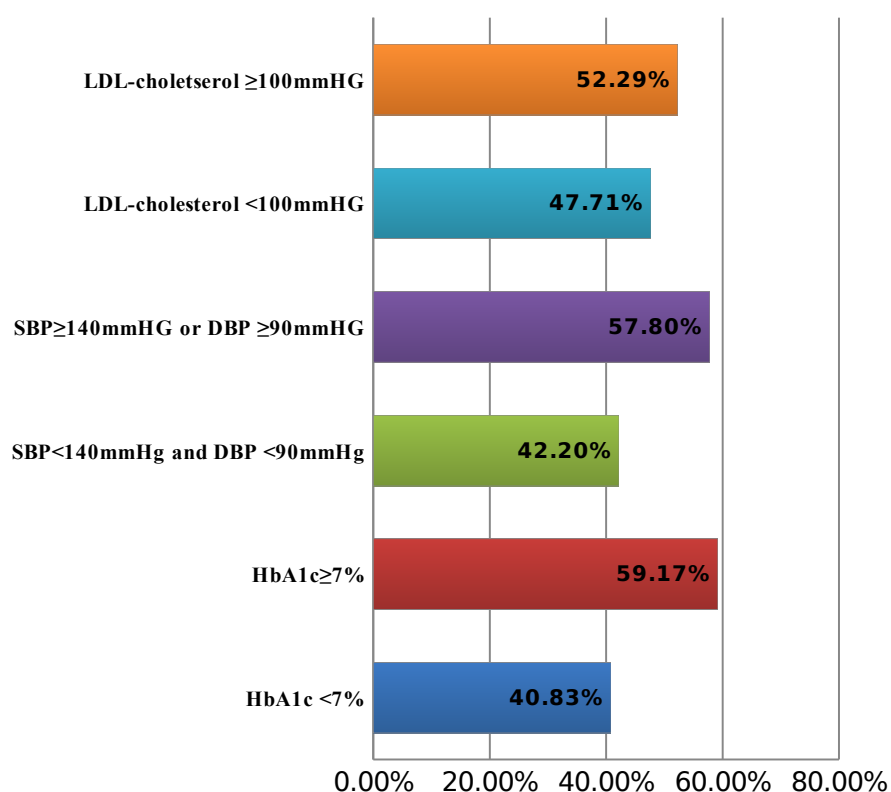


Figure 1. Prevalence of glucose, blood pressure and LDL-cholesterol control in patients from Bihor County

## CONCLUSION

Structured therapeutic education is a complex process that involves development of numerous abilities by the diabetic patient, it can be realized either individual or in a group, but most important is an effective measure for improving glycaemic control, blood pressure values and lipid parameters reducing this way the risk of apparition and progression of diabetic complications. In Bihor county prevalence of cardiovascular risk factors control in diabetes mellitus patients is reduced, but comparable to the global

situation, which demonstrates the need of local implementation of educational programmes for diabetes mellitus patients. Pharmacotherapy of diabetes mellitus is not sufficient for glucose control, it appears that against all innovations diet and physical effort remain as important for a good prognosis.

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