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*The assessment of the diabetes knowledge
in patients with type 1 and type 2 diabetes
and the evaluation of the possibility of using new multimedia
technologies (video education) as a tool to improve patient knowledge*

SUMMARY

„Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia due to defective secretion and/or action of insulin. Chronic hyperglycemia is associated with damage, dysfunction, and failure of various organs, in particular eyes, kidneys, nerves, heart, and blood vessels”[1].

3 million people suffer from diabetes in Poland, 2 million of which are treated and about 1 million have not yet been diagnosed with the disease, according to the report from 2014[2], and the dynamics of the increase in diabetes in Poland is one of the highest in Europe.

The prevalence of diabetes in Poland is currently 9,3% while in Europe it is 6,7% [3].

The analyzes show that diabetes and its complications generate annual costs of at least 7 billion PLN [2].

In the 20-79 age group there are currently 537 million patients worldwide and approximately 240 million are not aware of the disease, according to the data of the International Diabetes Federation[4].

Diabetes is the only non-communicable disease recognized as an epidemic by WHO. The incidence of diabetes has increased significantly in almost all countries, over the past few decades, and now can be considered a growing epidemic [5]

The number of people with diabetes worldwide in 1989 was 153 million, it increased to 382 million in 2013 and it is estimated that the number of patients will exceed half a billion and will have reached 592 million by 2035 [6].

The recent studies show another increase in the incidence of diabetes in the following years, and the number of patients will be over 700 million in 2045. [4] Other sources say that since 1945 the number of diabetes has doubled every 20 years [7].

In addition to emergencies such as hypoglycemia, diabetic ketoacidosis, condition hyperglycemic-hypermolar or lactic acidosis, especially in the course of diabetes long duration and inadequate metabolic control may occur late complications.

The prevention of late diabetes complications involves a number of non-pharmacological measures and pharmacological activities aimed at improving the metabolic control of diabetes mellitus and elimination of unfavorable environmental factors.

Non-pharmacological treatment of all diabetic patients is an essential part of treatment and includes:

1. therapeutic education;
2. dietary treatment;
3. physical activity;
4. combating tobacco smoking.

The principles of education are systematically updated in Poland by PTD and the Polish Federation of Education in Diabetology (PFED). It is extremely important that the education program is structured and adapted to individual possibilities and needs of a patient and enabled them to participate in making decisions in matters of their health [59].

Interactive teaching methods have been developing dynamically in the last 10 years using the Internet to transfer knowledge (e.g. DSMP; Diabetes Self-Management Program) and applications for mobile devices (e.g. Diabetes Pal, VitaScale or Calculator Exchangers) [70]. It is also recommended to use short, electronic communication text messages (SMS), teleeducation, webinars and individual and group teleconferences. The undoubted advantages of online /mobile education are easy access, individual interactivity, any date training, possibility of multiple training playback [1].

Diabetic foot as a complication of diabetes mellitus is a health and economic problem also in wealthy countries. Foot ulcers are the most common reason for hospitalization of diabetic patients in the UK. 2-3% of patients have active ulcers, and 25% of them will develop diabetic foot syndrome. In a review summary article the main risk factors for the development of the diabetic foot as well as key strategies to prevent foot ulceration, the authors attribute the role of prevention to therapeutic education to delay the onset or recurrence of foot ulcers [75].

Polish studies show that patients on average remember only 10-15% of the content provided

by the educator, every second of them does not fully understand, and every fourth misinterprets the information obtained during the training [77-79]. To overcome the communication barrier scientists in Indonesia have prepared an educational video with a transcultural approach, the video was recorded in Buginese and Makasar. In the research, the presented film increased the knowledge of patients about the care of the diabetic foot, detection of risk factors and thus the acquired knowledge may translate into prevention of diabetic foot [80]Tab. 7.

There is no literature on self-assessment of knowledge about the disease among patients with diabetes. Such research could be useful for education teams to deepen their learning in areas where patients themselves feel under-educated.

In connection with the above, the following goals have been set:

1. Assessment of the knowledge and educational needs of patients with diabetes
2. Assessment of the effectiveness of short- and long-term video-education conducted with the use of a specially prepared educational film on the prevention of diabetic foot syndrome, by determining the impact of this training method on the health behavior of patients.

In the first part of the study, knowledge and educational needs of adults with diabetes in

Poland were assessed. The study was carried out by the method of a diagnostic survey using a self-constructed questionnaire consisting of 25 questions.

Patients could also indicate topics of interest in terms of their knowledge extension in education and indicate the form in which they want to be educated.

The first study group consisted of 275 diabetics, whereby 266 questionnaires were qualified to analyze, 9 were rejected by persons under 18 years of age. Most of the survey was carried out in the traditional way using paper questionnaires, while 21% answered questions via the Internet portal. The subjects most often had type 2 diabetes, and the average duration of the disease was 14 years, most often 10 years (8.6%). More than half of the patients were treated with insulin, including combination with oral hypoglycaemic drugs. The most commonly used model was traditional intensive insulin therapy with more than 3 injections a day. A small percentage of patients (11%) were treated with an insulin pump. More than half of the patients assessed their knowledge about diabetes as insufficient, despite the fact that 60% of the respondents had previously participated in thematic trainings. Most often, these were group

training during hospitalization in the internal ward and individual training with a doctor, dietitian, nurse or educator. In rare cases, patients were trained under the Young Leaders in Diabetes Program, during a stay in a sanatorium, summer camp or training school for employees, or during the implementation of insulin pump treatment. As many as 84% of the respondents declared their willingness to participate in further diabetes training, regardless of whether they had been educated before. According to the respondents opinion, the greatest interest would be a training in the prevention of complications, diet and social assistance for diabetics, while the least interested in – problems related to starting a family, professional work and psychological aspects of the disease. The survey data show that patients most expect training in the form of practical classes or lectures conducted by a doctor, followed by a dietitian and a nurse. Interestingly, only 5 people indicated the need for education from a psychologist, while as many as 49% expect training by patients with diabetes with long duration of the disease. Overall, 65% of patients rated their knowledge of diabetes as very good or good, and only 1% as definitely bad. On the other hand, almost 15% could not assess the level of their diabetes education.

Among the people who participated in the training, 50.3% declared adherence to the recommended diet and compliance with the hours of taking medication and having meals, while remaining ones - only 36.3% ($p = 0.035$). The participation in trainings also had an impact on the frequency of calculating the amount of carbohydrate exchangers in meals (40.4% in trainees vs 10.8% in non-trainees; $p = 0.0001$), and the frequency of trainings was important here: among patients who had one training only 10.3% calculated carbohydrate exchangers, after two trainings 20.9%, while after several trainings 60.5% ($p = 0.001$). Similar relationships were also found in relation to the declared physical activity (45.3% of patients participating in training and 31.4% of patients who were not trained at all; $p = 0.034$) and regular self-monitoring of glycaemia with a glucometer (83.8 % and 48.0% of respondents; $p = 0.0001$).

The second part of the work is to prepare and record an educational film "Diabetes complications - a modern approach, proper foot care in diabetes". The film was made as a follow-up visit of a patient with a diabetes complication, that is a diabetic foot (patient undergoing treatment).

The importance of achieving good blood glucose control was emphasized, followed by the importance of proper care. When discussing individual issues, the boards featured inscriptions enhancing the verbal message:

1. "Wear the right socks"
2. "Check the inside of your shoes in the morning and evening"
3. "Watch your feet every day"
4. "Nail care"
5. "How to wash your feet"
6. "Choosing the right footwear"

At the end of the film, six charts with a summary appear, the subtitles are read by a voiceover.

The last study was carried out by the method of diagnostic survey, with the help of questionnaire, consisting of a total of 45 questions.

The survey was conducted at three time points

1. before watching the movie
2. right after watching the movie
3. 3 months after watching the movie

The study group consisted of 296 diabetic patients, 204 of whom did not complete the questionnaire after three months, so 92 remaining respondents completed the task in 3 time points. However, 82 people from this group were included in the analysis. 9 respondents, when asked, were unaware of their type of diabetes, were excluded.

Additionally, one of the respondents marked the type diabetes 1 and treatment with oral medications.

The results of the survey carried out 15 minutes after watching the video showed an increase in the number of correct answers regarding the knowledge of foot self-care, and this level was maintained after 3 months.

The film increased the sense of importance of the following parameters:

- Maintain glucose at an appropriate level
- Good blood pressure control
- Maintain a healthy body weight

This effect persisted after 3 months.

There was no significant change in approach to smoking cessation and proper foot care. Before watching the film, the patients rated the importance of these items very high. In the case

of smoking cigarettes, this is consistent with a basic_characteristics observation where the majority of patients joining the survey declared no addiction or quitting smoking in the past.

Based on the research, the following conclusions were drawn:

Most (about 2/3) of diabetic patients consider their level of knowledge about their disease as good or very good, while every fifth diabetic patient assesses their knowledge of diabetes as bad or very bad.

The majority (55-71%) of patients with diabetes are interested in expanding their knowledge about the disease, most of all, in the field of preventing chronic complications, nutrition in diabetes and obtaining social assistance, subsequently in the field of hypoglycaemia, setting insulin doses, and managing atypical situation (travel, special events), diabetes self-control, physical activity and coping with stress. Topics concerning the psychological problems of a diabetic patient, professional work or starting a family were of interest to a significantly smaller group of patients.

Education conducted with the use of an educational film on the prevention of diabetic foot syndrome is an effective educational tool, under the influence of which patients change their health behavior in the desired direction.