TRAINING OF NURSING AND MIDWIFERY STUDENTS IN MEDICAL CARE OF DIABETIC PATIENTS

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Abstract

Diabetes mellitus is a wide spread disease all over the world, with a constantly increasing number of people affected. The patients with diabetes are exposed to higher risk of micro- and macro-vascular complications. The strict control of the metabolic indicators and the good compensation of the disease can reduce the risk complications and improve significantly the quality of life of the patients. The medical specialists, nurses and midwives, take an important role in fulfilling this task. For the purpose they need to be well prepared to give structural medical care, leading to effective communication and education of the patients, control and regulation of their medical condition, psychological support etc. In this sense, it is important the nurses and midwives to receive stable knowledge for the specific needs of diabetic patients during their training course – it will help them to meet the requirements of their job later and to be effective support to the medical doctors in their diagnostic, therapeutic and prophylactic activities.

Key words: *diabetes mellitus, nursing diabetic care, student training*

1. INTRODUCTION

Diabetes mellitus is a chronic disease caused by absolute or relative insulin deficiency, characterized by abnormalities in carbohydrate, fat and protein metabolism and accompanied by the development of specific cardiovascular and neurological complications. The disease is widespread worldwide. In the last decades of the twentieth century has seen an explosive increase in the incidence of this disease, mainly due to type 2 diabetes in the world of diabetes affected 285 million people, is expected this figure in 2030 to grow to 438miliona. In Bulgaria to 2009 the incidence of diabetes in the age 20-70 is 9%, and the total number of patients 519 500. The number of registered patients is continuously increasing due to the aging population, the change in lifestyle and improved diagnostics. In view of the widespread, severe vascular complications and hence the early development of coronary heart disease and cerebrovascular disease, costly treatment, diabetes is defined as an important social diseases. Strict control of metabolic indicators and good compensation of the disease can reduce the risks of complications and improve the quality of life of patients. This is a task that occupies an important role in the lives of health professionals, nurses and midwives.

Patients with diabetes mellitus could not succeed in the control of their disease without the assistance of health professionals, whose task is to support and facilitate the achievement of the objectives of the patients. This role requires communication skills, provide structured care and a wide range of organizational and educational interventions aimed at improving disease control.

To deal successfully with this task early, health professionals should be trained in communication skills with patients. This also includes training to carefully gain the faith of the patients. This is necessary to allow the patient to feel that he or she receives emotional support, which helps overcome the stress of the disease and contribute to faster recovery.

2. ASPECTS OF STUDENT TRAINING

Training students to provide quality health care to diabetic patients includes obtaining the necessary knowledge in several areas:

2.1. Training in the evaluation of a diabetic's diet

The purpose of the dietary treatment of diabetes is to improve metabolic control with changes in dietary habits, and the composition of the food intake. Dietary treatment should help reach and maintain a normal lipid profile, to ensure the attainment and maintenance of normal body weight, and to comply with any accompanying diabetes diseases and / or complications. Modern strategy for nutrition in diabetes is based on the idea that dietary treatment should not be distinguished from healthy eating in the general population. In this connection, students must obtain knowledge about the proper distribution of essential nutrients in the diet for the day. They need to know that the total amount of carbohydrates taken by diabetic patient should be 55-60% of daily intake. Prevalence of complex carbohydrates (polysaccharides, fiber contained in fruits, vegetables, whole grains) and fast-acting carbohydrates (sugar and confectionery) in patients with insulin is necessary to ensure coherence between the injection of insulin and carbohydrate intake in order to avoid hypoglycemia and prevent postprandial hyperglycemia. Students should know that fat, as the highest source of calories in the diet should be limited to 30% of daily calorie needs, with a preponderance of polyunsaturated fatty acids (vegetable, fish) and restriction of saturated (animal) fat.

The recommendations for the proteins are: to cover 10% of the total amount of calories, which represents 50-60 gr. of pure protein daily. Students must be familiar with the recommended diet for people with diabetes, namely graded 4-5 times food intake with correct distribution of essential nutrients and depending on the weight and the treatment of diabetic patients.

Students should gain knowledge on how to recognize the presence of unbalanced diet in patients and to know that in diabetic patients with obesity, diet must be low calorie for maximum weight normalisation. They need to be trained in how to identify issues that have an impact on diet and possible solutions to these problems and to be able to give basic guidelines for proper food behavior. It is necessary to be aware of the importance of individualized meal plans of the patient (determined after consultation with the patient's nutritionist) to ensure proper implementation and to encourage the efforts of diabetic patient to comply with a rational diet.

2.2. Training for monitoring of diabetic patients

Health professionals need to acquire knowledge about the basic parameters of monitoring in diabetics - monitoring of glucose by conducting blood glucose profiles, analysis of urine for sugar and ketones, blood pressure monitoring, monitoring and care of the feet, monitoring of renal function, monitoring of occurrence of acute or chronic complications of diabetes, etc.

2.3. Training students to work with an insulin pen, insulin preparations and meter

Insulin treatment is replacement therapy designed to prevent diabetes in the hyper- and hypoglycemia, to defer vascular complications and to provide a life as close as possible to that of a healthy person. In this regard, students should be familiar with indications for insulin therapy:

- Diabetes mellitus - type 1,
- Diabetic ketoacidosis, lactic acidosis, hyperosmolar coma;
- Diabetes mellitus and pregnancy;
- Temporarily in patients with type 2 diabetes mellitus in acute conditions - surgery, trauma, severe infections, etc .;
- After exhausting the possibilities of oral antidiabetic agents.

All students should be able to recognize the most common complications with insulin - hypoglycemia and insulin allergy.

More often than not, doctors lack the necessary time to educate patients on how to work with an insulin pen and meter. This task is then delegated to the health specialists, who, to be able to deal successfully, is necessary to know how to handle these tools, know insulin preparations and techniques of application. The nurse is one that demonstrates and explains to the patient the self-injection procedure, which teaches the patient the correct technical implementation and application of insulin which helps to cope with the fear of injection. In this regard, students should be trained for the correct dosage of insulin, where to inject and how to care for these places. Most often nurses train the patients on how to work with the meter in order to self-control blood sugar levels. Students need to be informed in this regard. All those activities require students to learn them at an early stage and to master their implementation.

2.4. Training students for early detection of diabetic emergency conditions

Diabetes mellitus ranks third in costs among all other diseases after cancer and cardiovascular diseases. The significant costs associated with the treatment of diabetes, are due to its widespread chronic and severe complications. Statistics from the USA have shown that 65% of the costs associated with diabetes are for hospitalized patients, most often in connection with the treatment of complications.

This requires health professionals to have good knowledge of the adverse effects of diabetes, with a view to timely prevention, prompt recognition and adequate behavior and care of any complications thatarise.

Important medico - social problem are potentially life-threatening acute complications of diabetes, which is often difficult medical professionals and lead to delayed diagnosis and late treatment initiation - factors contributing to increased mortality among these patients.

Diabetic ketoacidosis is one of the most serious acute hyperglycemic complications of diabetes. A serious metabolic complication of diabetes caused by the growing shortage of insulin and an increase in stress hormones. As a result, develop hyperglycemia, osmotic diuresis, dehydration and overproduction of ketone bodies with subsequent metabolic acidosis. The condition usually is associated with type 1 diabetes mellitus, but may also occur in patients with type 2 diabetes mellitus, 20-30% of patients with newly diagnosed diabetic ketoacidosis are. Life-threatening nature of diabetic ketoacidosis need more in the process of training health professionals to be aware of the reasons for this complication, which include:

- Diabetes mellitus type 1;
- Gaps in insulin therapy - willful stopping or reducing insulin dose, omitted or insufficient insulin doses;
- Treatment with oral antidiabetic medication, when is necessary insulin therapy;
- Inflammatory diseases, infections, trauma, gastrointestinal diseases associated with vomiting and diarrhea, acute vascular events (myocardial infarction, stroke etc.), thyrotoxicosis, surgery and other stress conditions;
- Pregnancy and childbirth in women with diabetes mellitus;
- Serious dietary mistakes - overfeeding with fat and carbohydrates, alcohol abuse, starvation, most often in conjunction with dieting;
- Suspension of oral antidiabetic agents - most often willfully
- Taking medication worsening metabolic control - salidiuretitsi, corticosteroids, thyroid hormones, etc.;

Students should be familiar with the main clinical manifestations of diabetic ketoacidosis and be trained to recognize signs of this complication -poliuriya, polydipsia, polyphagia, weight loss, dry skin and mucous membranes, decreased skin turgor, soft eyeballs, tachycardia, hypotension, acetone breath, decreased appetite, vomiting, fatigue, blurred vision, drowsiness, more significant obtundation, coma.

Students should acquire knowledge about the main directions of nursing care in patients with diabetic ketoacidosis:

- Complete blood count, biochemistry, general urine, urine culture, chest X-ray – at the hospitalization of the patient.
- Provide a venous drip and monitoring passability and the occurrence of complications;
- Bladder catheterisation - in patients who are not producing urine for more than three hours or with depressed consciousness;
- ECG;
- Active surveillance and monitoring of heart rate, respiratory rate, blood pressure, consciousness - every hour;
- Monitoring of the temperature - for 8 hours;
- Monitoring of fluid balance / fluid intake, diuresis / - every two hours;
- Monitoring of electrolytes, glucose, acid-base status - every 2-4 hours;
- Monitoring of ketone bodies in urine - each urination;
- Scarification test for antibiotics - at evidence of infection;
- Hygiene care /partial, full toilet if needed of the patient, care of the bed if needed - toilet against decubitus etc./;
- Care for proper supply of patient intake and adequate food;
- Mandatory record-keeping for continuous clinical monitoring, intravenous and oral fluids, insulin dosing and laboratory results.

Students should also know the prevention measures associated with diabetic ketoacidosis morbidity and mortality, some of which are:

- Raising awareness of the signs and consequences of untreated diabetes.
- Training of patients with diabetes mellitus for the right food, exercise regim and proper dosing and administration of drug therapy.
- Training of diabetics and their close family on initial signs of diabetic ketoacidosis.
- Timely identification of the reasons for omission of insulin dose.
- Training for monitoring of blood glucose at home (work with meter).
- Possibility for quick contact with the medical team in the occurrence of high levels of blood glucose, acetonuria, especially during intercurrent infection.

Hypoglycaemia is another life-threatening condition in diabetes, which requires prompt recognition and emergency measures. The frequency of light hypoglycaemic episodes in patients with type 1 diabetes mellitus is about 30 episodes per patient per year, taking into account that the frequency of severe hypoglycemic episodes (i.e., those that require assistance of a third party) may be higher than

3.2 episodes per patient per year. Deep physiological effects that has hypoglycaemia on the cardiovascular and nervous system can lead to serious or even fatal vascular events. All this requires the students to be aware of the main clinical manifestations of hypoglycemia and be trained to recognize signs of this complication - sweating, tremor, nervousness, palpitations, dizziness, confusion, and the emergency measures for taking out the patient of this condition.

Another serious complication, which students should be familiar, is nocturnal hypoglycemia. It is more anxious than daytime hypoglycaemia, because simpatikoadrenalnite responses to hypoglycemia, subjective symptoms, which provide warning and cognitive functions are suppressed during sleep. Students should be familiar with the basic strategies to reduce the risk of nocturnal hypoglycemia, which include:

- Patient Education
  Patients should be trained and encouraged to plan proper nutrition, moderate alcohol intake and exercise, adhere to the instructions for dosage of antidiabetic therapy, and to know that any change in routine mode may increase the risk of nocturnal hypoglycaemia.
- Monitoring blood sugar before bedtime.
  Blood glucose levels at bedtime can be a predictor of nocturnal hypoglycaemia. Therefore, patients are required to be trained and encouraged to self-control glucose levels, as this is the easiest way to evaluate the risk and precaution. In high risk patients / young children, the elderly, patients with frequent daytime hypoglycaemia or with reduced awareness of hypoglycemia capture / can be also used systems for continuous monitoring of glucose, which provide information on blood glucose levels in real time and have built-in alarm warning system for low values.
- Taking appropriate snack before bedtime.
  Mild to moderate nocturnal hypoglycaemia can be easily corrected by having a snack containing about 5 grams fast-acting carbohydrates (eg glucose-containing drinks or glucose tablets). It is recommended to avoid foods with high fat / eg. chocolate / because they slow down the absorption of glucose. When blood sugar level before bedtime is low, the suitable snacks are those containing slow absorbing carbohydrates (biscuits, sandwich) or protein snacks. The need for and the composition of the snack depend on the glucose levels, which is not necessary, when glucose levels are above 10 mmol / l.
- Use of glucagon
  In severe nocturnal hypoglycaemic episodes is recommended subcutaneous injection of glucagon, which produces a rapid increase in blood sugar, in case the glucagon reserves in the liver have been exhausted. Students should be trained for application of glucagon, as nausea and vomiting are common side effects of glucagon and it is recommended that the patient to be placed in a lateral position to avoid the risk of aspiration.
- Use of appropriate insulin regimens and insulin medicines - Long-acting insulin analogues, which have physiological and predictable action profile of human basal insulin, may reduce the risk of nocturnal hypoglycaemia without resulting in compromising glycemic control.

Another serious complication of diabetes, which student- nurses and midwives should be aware of is the diabetic foot. It is a common cause for hospitalization of patients with diabetes and one of the serious problems of the health system. Health officials devote a considerable amount of time for prevention and diagnosis of diabetic foot complications. In this regard, nurses as part of a multidisciplinary team for diabetic care should play their role in the field of health care for the patients and improving their quality of life. They should receive special training on the latest requirements for diabetic foot care in order to provide effective services to facilitate and encourage the health of diabetics. With the aim of early prevention of diabetic foot, future nurses need to know how to

examine the legs and what daily care needed to be provided, in order to properly train patients in this direction. They must inform and encourage diabetics to carry out a complex of elementary activities to prevent foot ulcers, such as appropriate selection and regular inspection of shoes, good hygiene and proper care for the skin and the nails. During the process of training future nurse must acquire skills to make an independent inspection of the patient's legs - to study the movement of the limbs, their type, presence of swelling, painfulness and surface sensitivity of feet, moisture, color, skin temperature. Another aspect of the training involves the acquisition of knowledge to assist the patient in additional care for feet - the selection of appropriate dressing depending on the type of diabetic ulcers. The nurse must be able to provide specialized care as selective toilet feet, depending on the type of wound - wet or dry, with antibacterial wound dressing supporting clean and adequate humidity. One of the duties of a nurse is helping patients with diabetic foot ulcers to keep up their motive condition. This is particularly crucial for those with amputated limbs. Future health professionals should be trained to identify the different types of assistive devices and their applications (canes, walkers and wheelchairs, special shoes, boots, etc.) To be able to pass on their knowledge to patients and encourage them to use assistive devices in order to maintain their mobility.

2.5. Training students for proper management of antidiabetic drugs

Diabetes is a disease in which the intake of antidiabetic medication (insulin or oral antidiabetic medicaments) is strictly dependent on the intake and the amount of food and physical activity. Any error in this direction may lead to quick and even fatal incidents. Therefore, it is necessary for students in health care to be familiar with the most important requirements for medical treatment of diabetics - eg. intake of antidiabetic drug (whether oral or insulin) must be followed by food intake, and be in accordance with the quantity and quality of food, the upcoming exercise etc. Nurses and midwives must have a good understanding of the types of insulin medicines, their specificity of action and ways of administration. It is necessary to know the disadvantages of NPH insulin - variability in absorption onset, maximum activity, duration of action, the presence of pronounced peak occurring on average in about 4.9 hours at the evening application, which coincides with the time of increased risk of nocturnal hypoglycaemia. To avoid these side effects, to reduce the risk of hypoglycemia, incl. at night, and to provide greater flexibility in application, are especially developed new insulin medicaments - and fast-acting insulin analogues. Their characteristics resemble the more accurate physiological insulin secretion compared to human insulin and students need to know the new representatives of this group and the advantages that they provide - reduced frequency of hypoglycemic episodes and better glycemic control.

3. CONCLUSION

All these aspects emphasize on the importance of training student- nurses and midwives in developing a comprehensive program for quality care for diabetic patients. Specialized knowledge that they would have acquired during their studies, will allow them to play an important and key role in the multidisciplinary team for diabetic care to achieve the ultimate goal - effective treatment and keeping the patient's health.

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