
THE IMPORTANCE OF EDUCATION OF PARENTS OF CHILDREN WITH NEWLY DISCOVERED DIABETES MELLITUS TYPE 1

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Abstract: Introduction: Diabetes is a chronic disease with multiple causes, characterized primarily by constantly elevated blood sugar levels and disorders of fat, protein and carbohydrate metabolism. The goal of education is to teach the child to be informed as much as possible. The family should also be educated as a support team. With proper education and care, diabetes mellitus can be managed throughout an individual's life. Initial education is important for establishing successful diabetes self-regulation, long-term glycemic control, and complication-free survival. Objective: To show the importance of educating parents of children with newly diagnosed type 1 diabetes mellitus.

Methods and subjects: The study was conducted with children diagnosed with Type 1 DM, who are hospitalized in the Department of Endocrinology and children diagnosed with Type 1 DM, and who regularly come for check-ups at the Endocrinology Counseling Center. The research is descriptive on a representative sample.

Research results: Through the obtained results we confirm that the education of children with type 1 DM and their parents is important and significant.

Keywords: diabetes mellitus type 1, education, children, pediatrics, parents.

1. INTRODUCTION

Diabetes mellitus (DM) is a complex metabolic disorder accompanied by elevated blood glucose levels due to insufficient secretion of insulin, or its reduced action or complete lack of action. This leads to disorders in the metabolism of carbohydrates, fats and proteins, an increase in blood glucose levels and starvation of cells in the body. The main characteristic of DM in children is its dependence on insulin to control the disease and improve the quality of life. DM begins with genetically predisposed individuals experiencing autoimmune inflammation and the gradual destruction of pancreatic beta cells, and the whole process is driven by some of the environmental influences such as viruses, toxins, drugs, food ingredients and stress. The disease is not considered as an isolated glycemic disorder but as a heterogeneous group of metabolic disorders characterized by persistent hyperglycemia, while chronic hyperglycemia is associated with a disorder of carbohydrate, fat and protein metabolism, resulting in impaired insulin secretion, action or both. (1) Health education is the key to successful DM treatment. Getting to know and educating a sick child and his parents must be adapted to the patient's age. In younger children, education is focused on their parents, and in adolescents it is focused on themselves, but parents are still involved in education.

Children and their parents need to be educated about diet, physical activity and therapy to lower blood glucose. The purpose is to enable children and parents to achieve optimal regulation of the disease in order to avoid the development of chronic complications of the disease, and to motivate the patient to take independent, active care of their own health. (2) DM treatment is an integral part of everyday life, so treatment must be conducted by a person with diabetes with the help of an educator. The first realization that a person suffers from diabetes in many people with DM can cause surprise, disappointment, loss of self-confidence or even depression. Information about the disease at that time must consist of minimal instructions on diet, treatment and symptoms of the disease. (3) There are different approaches to education according to the child's age, lifestyle and needs. (4) An infant and young child are completely dependent on their parents for blood glucose control, nutrition and insulin administration. Due to feelings of helplessness towards the child. That is why it is very important in this age group to educate about

ways to prevent, treat and recognize the symptoms of hypoglycemia. Continuous monitoring of glycemia due to possibility of unrecognized hypoglycemia is also very important.

One of the most turbulent periods of growth and development of childhood is the period of puberty and adolescence. Understanding the physiological changes that are manifested primarily by changes in the hormonal milieu and their consequences on disease control is necessary to avoid or at least decrease the problems associated with achieving satisfactory glycemic control during this period of life. Hormonal status at puberty is responsible for the development of insulin resistance, which justifies significantly higher insulin requirements during this period. (5, 6) Among health professionals caring for children with DM 1 and among dietitians, the most common attitude is that the diet of sick children should not differ significantly from the diet of healthy children of the same age, weight and level of physical activity. In educating parents about proper nutrition, one should take into account financial possibilities, the level of education of individual family members and previous habits. (7) The dose of insulin must be adjusted for some form of physical activity where higher carbohydrate intake is required. The daily menu of children with DM must contain 50% of carbohydrates, 15-20% of protein and 25-30% of the fat of the total daily energy intake. (8)

Physical activity is an integral part of DM type 1 treatment and includes regular, planned and organized physical activity. Physical activity has multiple beneficial effects. Endurance exercises enhance insulin-mediated glucose utilization, and regular exercise maintains this effect at intervals between regular workouts. Strength exercises have a dominant effect on the increase of insulin sensitivity of tissues. (9, 10, 11). Physical activity in conditions of poor metabolic control leads to metabolic imbalance, ketosis and acidosis. (12, 13) Children should wear some form of medical identification, such as a warning bracelet or necklace. (14) The nurse-educator should try to gain the trust of the child and family, and then motivate and train them to take care of their own health and regulate the disease, which for the child means to achieve and maintain blood glucose levels as in a healthy person, without glycosuria and ketonuria. (15, 16)

2. MATERIAL AND METHODS

The research covered a period of 5 years. The material used for the research is medical documentation (medical histories, HbA1C findings, medical records of children of both sexes aged 0-18 who come regularly for check-ups at the Endocrinology Counseling Center).

The research was retrospective, conducted through analyzing medical documentation. The research was conducted in UKCS, Pediatric Clinic (with the written consent of the institution's management), in the Department of Endocrinology and Endocrinology counseling ambulance in the period from 01.01.2015 to 31.12.2020.

The statistical program SPSS for Windows (version 20.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excel (version 16 Microsoft Corporation, Redmond, WA, USA) were used for statistical analysis of the data. The obtained results are shown in tabular display.

3. RESULTS

Chart 1. Number of children with newly discovered DM type 1

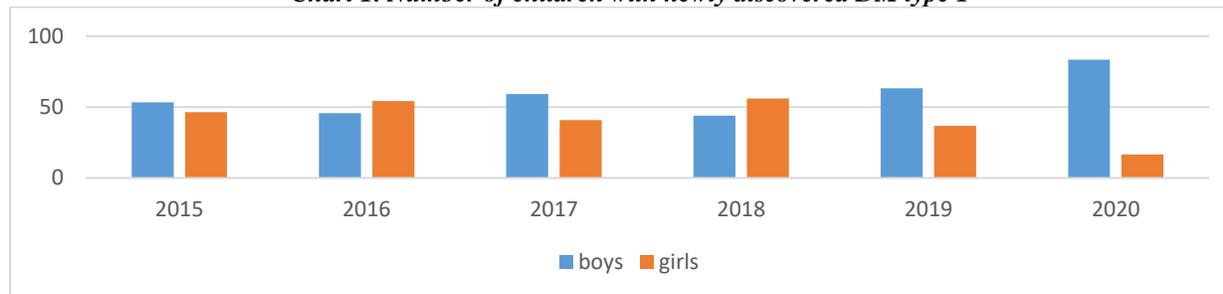


Chart 1 shows the number of children with newly diagnosed DM type 1 in the period from 2015 to 2020. The results were divided according to the gender. The total number of children with newly diagnosed DM type 1 in the observed period is 170. The highest percentage of sick boys is in 2020 and amounts to 83.33%, while the highest percentage of sick girls in 2018 is 56.00 %.

Chart 2. Number of children with newly diagnosed DM type 1 that were involved in sport

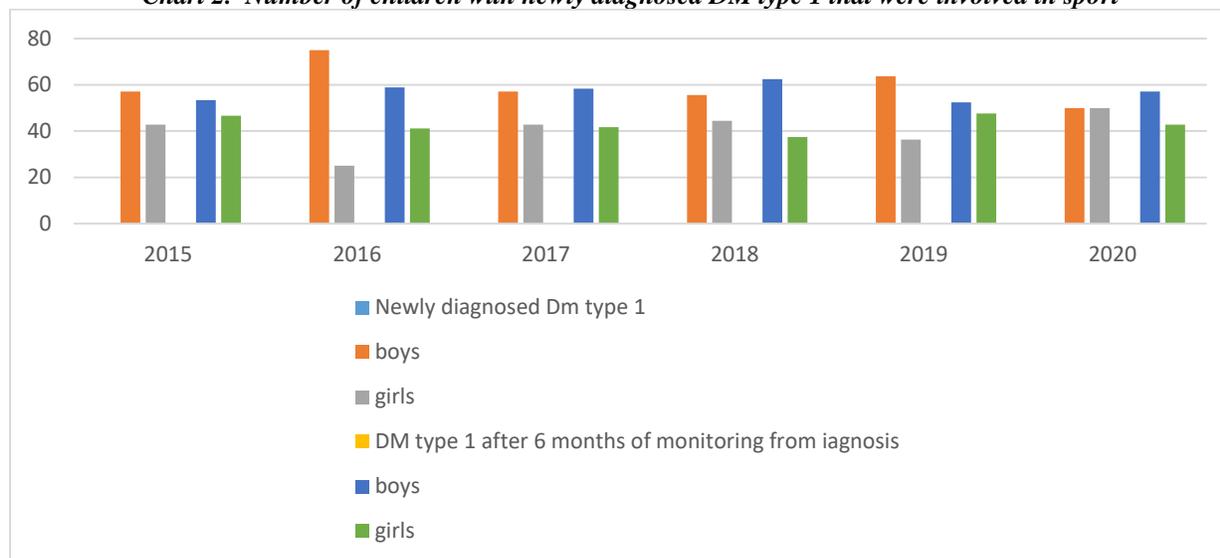


Chart 2 contains data on the number of children who played sports in the period when they were diagnosed with type 1 DM, and after 6 months of follow-up. The largest number of children were actively involved in sports in 2019 after being diagnosed with DM type 1, a total of 11 children. After 6 months of monitoring, the number of children actively involved in sports was also the highest in 2019.

Chart 3. Ostali komorbiditeti kod djece sa DM tipa 1

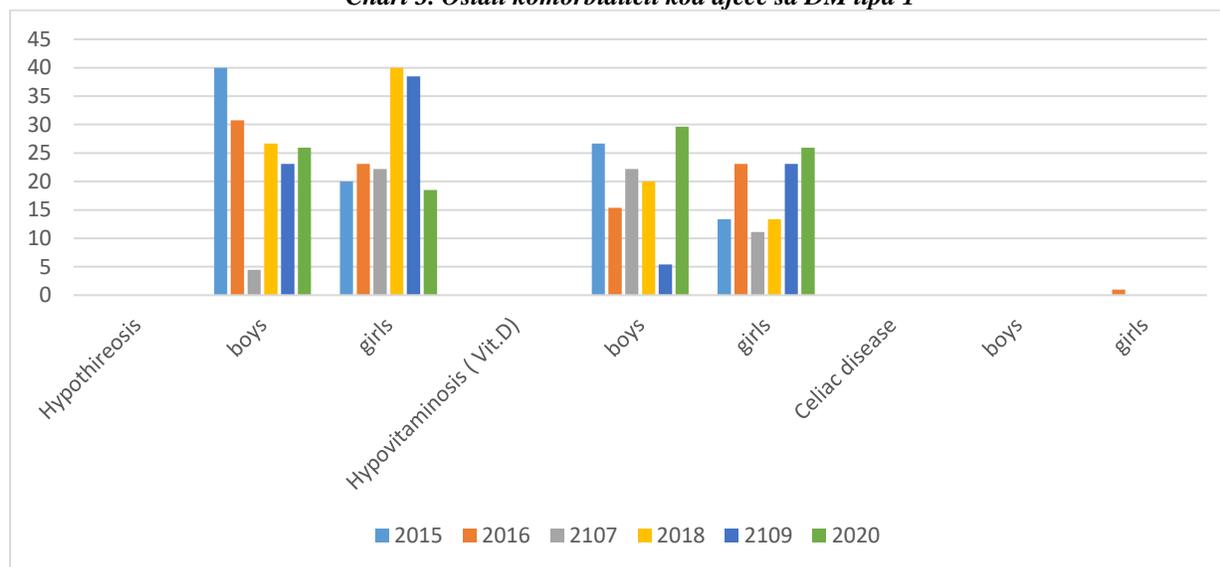


Chart 3 shows other comorbidities in children with DM type 1. The comorbidities that occurred in children were hypothyroidism and hypovitaminosis (vitamin D), while celiac disease occurred only in the case of one girl.

Table 1. Controls with average HbA1C after 3 months from detection of DM type 1

YEAR	2015	2016	2017	2018	2019	2020
NORMAL VALUE OF HbA1C	N 5 % 17,86	7 29,17	6 22,22	2 8	7 23,33	7 19,44
ELEVATED VALUE OF HbA1C	N 23 % 82,14	17 70,83	21 77,78	23 92	23 76,67	29 80,56

Table 1 shows the HbA1C average after 3 months from the detection of DM type 1 for the period from 2015 to 2020. It can be seen that a large number of children with newly diagnosed DM type 1 still have HbA1C values that are elevated.

Table 2. Controls with average HbA1C after 6 months from detection of DM type 1

YEAR	2015	2016	2017	2018	2019	2020
NORMAL VALUE OF HbA1C	N 11 % 39,29	10 41,67	13 48,15	8 32	9 30	19 52,78
ELEVATED VALUE OF HbA1C	N 17 % 60,71	14 58,33	14 51,58	17 68	21 70	17 47,22

After 6 months from the detection of type 1 DM, in the period from 2015 to 2020, the average HbA1C was higher compared to the normal value and a lower value in the elevated group compared to the previous table.

4. DISCUSSION

A retrospective analysis was carried out on 170 patients aged 0 to 18 years, who came to the Pediatric Clinic, University Clinical Center in Sarajevo, to the Department and Consultation Center for Endocrinology and Diabetes, who were followed from the moment of diagnosis of diabetes mellitus until the first months after diagnosis. It was observed that the number of children with newly diagnosed diabetes mellitus in the Federation of Bosnia and Herzegovina decreased in 2016 compared to 2015, but in 2017 it increased by 3, and in 2019 it increased by 5 more children compared to 2018. In 2016 and 2018, higher the number of affected children is female, while in other years male children predominate. When we look at the number of children who played sports after the discovery of type 1 DM, we see that the highest percentage is in 2019. The lowest percentage of children who play sports in the observed period is in 2020. The largest number of children who play sports in the observed period of 6 months is in 2019. The lowest number of children who are active in sports is in 2020, only 8% of them. It can also be noticed that physical activity significantly reduced the level of HbA1C. According to the results of our research, we see that DM type 1 is present in children at an early age, as well as in puberty.

Comorbidities that occurred in the examined children were hypothyroidism and hypovitaminosis (vitamin D), while celiac disease occurred only in the case of 1 girl.

5. CONCLUSION

- Education of children with type 1 DM and their parents is very important, as indicated by the results of our study.
- Endocrinology check-ups are of great importance for insight into the HbA1C average. In 28 children in 2020, the average HbA1C was found to be 6 to 8%, which is the highest value in the observed period. An average HbA1C of 12 to 15% was not found in any child in the observed period from 2015 to 2020, which is a result of the successful education of parents and children with DM type 1. The arrival of patients with parents in endocrinology counseling helps them in education and obtaining possible corrections in treatment and improving the quality of life.

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