

Providing care for children with type 1 diabetes in kindergartens and schools

Opieka nad dziećmi z cukrzycą typu 1 w przedszkolach i szkołach

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Abstract

Introduction: Type 1 diabetes in the paediatric population is becoming a serious social problem affecting an increasing number of families with small, dependent children. Polish educational institutions are not prepared to provide care for students with diabetes. There are no nurses who, by law, are responsible for taking care for diabetic children. Teachers are not trained to provide care for pupils with diabetes and there is no system of obligatory, standardized training in this field.

The aim of the study was to examine parents' opinions of the quality of care for diabetic students in educational institutions and compare the results obtained in 2013 and 2020.

Material and methods: The research, in the form of a questionnaire containing closed and open questions, was conducted in 2013 ($n = 602$) and 2020 ($n = 604$).

Results: There has been a slight positive change in providing the right care for children with type 1 diabetes in school facilities. In 2013 parents rated the quality of diabetic care as: bad – 13%, insufficient – 68%, sufficient – 14%, good – 5%, and in 2020 as: bad – 11%, insufficient – 54%, sufficient – 25.5%, good – 10.5%. However, the problem of the lack of appropriate legal regulations and absence of nurses in educational institutions has deepened. Systematic training of staff financed from public funds has still not been provided.

Conclusions: It is necessary to solve the problem systematically, introduce mandatory, standardized training, clarify the responsibilities of teachers taking care of children with diabetes, introduce appropriate legislative changes and regulate the currently omitted preschool children.

Key words:

school, type 1 diabetes, care, kindergarten.

Streszczenie

Wprowadzenie: Cukrzyca typu 1 w populacji pediatrycznej staje się poważnym problemem społecznym dotyczącym coraz większą liczbę rodzin z małymi, niesamodzielnymi dziećmi. Polskie placówki oświatowe nie są przygotowane do opieki nad diabetkami. Nie ma w nich pielęgniarek, a to one, według obowiązującego prawa, mają zająć się uczniami z cukrzycą. Nauczyciele nie są przygotowani do opieki na uczniami z cukrzycą, nie istnieje także system obowiązkowych, wystandaryzowanych szkoleń w ramach kształcenia zawodowego w tej tematyce.

Cel pracy: Zbadanie opinii rodziców na temat jakości opieki nad uczniami chorymi na cukrzycę w przedszkolach i szkołach oraz porównanie wyników uzyskanych w 2013 r. oraz 2020 r.

Materiał i metody: Badania w formie ankiety zawierającej pytania zamknięte oraz pytania otwarte przeprowadzono dwukrotnie w 2013 r. ($n = 602$) oraz w 2020 r. ($n = 604$).

Wyniki: Nastąpiła nieznaczna pozytywna zmiana w opiece nad dziećmi z cukrzycą. W 2013 r. rodzice oceniali jakość opieki nad dziećmi z cukrzycą jako: złą – 13%, jako niewystarczającą – 68%, wystarczającą – 14%, dobrą – 5%, a w 2020 r. jako: złą – 11%, niewystarczającą – 54%, wystarczającą – 25,5%, dobrą – 10,5%. Pogłębił się problem braku regulacji prawnych oraz nieobecności w placówkach pielęgniarek, nie zostały zapewnione systemowo szkolenia personelu.

Wnioski: Konieczne jest systemowe rozwiązanie problemu, wprowadzenie obowiązkowych, wystandaryzowanych szkoleń, doprecyzowanie zakresu odpowiedzialności nauczycieli podejmujących się opieki nad dzieckiem z cukrzycą, wprowadzenie odpowiednich zmian legislacyjnych oraz objęcie regulacją pominiętych obecnie dzieci przedszkolnych.

Słowa kluczowe:

opieka, szkoły, przedszkola, cukrzyca typu 1.

Introduction

Type 1 diabetes is a growing medical and social problem. Over a million (1 066 500) children and young people up to the age of 19 are already affected. Its prevalence is 0.02%, and over 130 000 cases are diagnosed annually. It is currently the most common chronic metabolic disease in the paediatric population, and in the light of current medical knowledge still incurable [1].

In Poland in the 1990s, the incidence rate of type 1 diabetes was about 15 cases per 100,000 inhabitants per year [2, 3]. Currently, there are 18–25 cases per 100,000 inhabitants per year and the incidence depends on the region. According to data from the EURODIAB project, the increasing dynamics of the morbidity rate of diabetes in the last two decades has led to a 300% increase in the incidence. By 2025, a fourfold increase in the morbidity rate is predicted, especially in the groups of 5–9 and 0–4 years old [4, 5]. Presently in Poland, according to estimates, there are around 180,000 patients with type 1 diabetes including several thousand in the age of 0–19 [1].

Due to the dramatic increase in morbidity and the shift in the age of diagnosis from adolescents to children aged 0–9 years, type 1 diabetes in the paediatric population is becoming a serious social problem affecting an increasing number of families with small, dependent children.

Thus, more and more diabetic children will attend educational institutions where they should be provided with appropriate care. According to national and foreign scientific organisations and societies [6, 7], children with diabetes should attend schools and kindergartens on the same basis as children without diabetes, and one of their fundamental rights is the right to a safe stay in school, which also implies the staff's need to understand diabetes and the ability to help [8].

Type 1 diabetes is one of the most burdensome chronic diseases. It can cause a decrease in self-esteem or emotional disorders [9, 10] and this aspect should also be taken into account by teachers caring for a student with diabetes. It can interfere with cognitive, executive and self-reliance functions [11]. The disease imposes a number of duties on the child and the child's guardians, requiring constant self-control and discipline, and is associated with the need for constant monitoring of the level of glycaemia, and compliance with the principles of insulin therapy and the calculation of meals.

Type 1 diabetes self-management is based on 4 basic principles: insulin therapy, measurement/monitoring of glycaemia, proper nutrition and regular physical activity [12]. Diabetic children must also manage their diabetes during their stay in the nursery or school. Due to the complexity of the matter, he needs the help of an adult – both in the technical/mechanical performance of many activities related to diabetes and in making a therapeutic decision. Those can be done by a school nurse or a teacher in an educational institution. According to the research, nurses are present more than once a week in only about 30% of schools and 6% of kindergartens. They usually are available three times a week for several hours.

A child with diabetes needs diabetes management support at all times while staying in an educational institution. Therefore, this support should be provided by a teacher who is adequately prepared to work with a diabetic [13].

A teacher, in order to ensure a safe stay in an educational institution, must have the knowledge and skills to do so. However, there is no systemic possibility for such competences to be obtained as the required knowledge and skills are not acquired either during studies or in the process of professional further training. In addition, some of the compulsory self-management diabetic activities go beyond the teacher's caring and educational role, which – in addition to the teaching function – is performed by the school.

The minimum scope of knowledge and skills a teacher should have in order to ensure a safe stay for a student with diabetes in an educational establishment includes the following aspects:

- the teacher understands the basic principles of diabetes self-management,
- the teacher can recognize the symptoms of hypoglycaemia and react to it,
- the teacher can read and interpret the glycaemic result from the glucometer and/or the CGM/FGM system,
- the teacher is able to help the student in the measurement of blood glucose – help will consist in reading and interpreting the result (parents decide on the further course),
- the teacher is able to help the student in using insulin with a pen or pump – help will consist in controlling the dose of insulin given by the student (the dose is decided by the parents),
- the teacher knows and understands the impact of physical exercise on the level of glycaemia,
- the teacher understands the limitations of perception and concentration or emotional problems related to hypo- and hyperglycaemia,
- the teacher understands the importance of diet and meal intake in type 1 diabetes,
- the teacher can prevent discrimination and stigmatization of a student with type 1 diabetes in a peer environment,
- the teacher supports the student, encourages him to become active, helps to overcome barriers and limitations related to the disease.

Additional skills that go beyond the caring and educational functions:

- the teacher is able to measure the pupil's level of blood glucose using a glucometer,
- the teacher can give the student insulin using a pen/insulin pump,
- the teacher can give the student a life-saving injection – glucagon.

It should be clearly emphasised that the decisions on the amount of insulin administration and therapeutic treatment are the sole responsibility of the parents/guardians of the child, and later the patient himself. The teacher's role is to help the student to perform the necessary activities or to follow the instructions of the parents.

Unfortunately, the lack of unambiguous legal regulations, the lack of nurses and the lack of trained staff raise a number of social problems. Also previous research of educational institutions from 2013 within the project 'Comprehensive support for the diabetics community through civic education and advocacy activities' [14], in which 891 schools and 124 kindergartens from the Malopolskie Voivodeship took part, shows that training in caring for a diabetic student took place in only 26% of institutions, despite the presence of a child with diabetes. The percentage of schools where a nurse was present at least three days a week was 27.8%, while in the case of kindergartens it was only 6%. Teachers in 67% of the institutions assessed their preparation for the care of children with diabetes as insufficient, and in 12% of the institutions reported a total lack of preparation.

According to the mentioned study it is evident that the matter of providing care for children with diabetes in educational institutions has remained unresolved for years and that the problem is growing as the number of cases increases, especially in younger children.

Aim of the study

The aim of the study was to present the opinions of parents of children with diabetes on the quality of care for diabetic students in kindergartens and schools.

Material and methods

The survey carried out in the form of a questionnaire with single-choice and multiple-choice closed questions and open questions allowing free expression was conducted in 2013 and 2020. Each time one of the parents/guardians of a child who has diabetes and attends a kindergarten or school took part in a nationwide survey.

Characteristics of the studied group in 2013: $n = 602$; average age of the respondent 37.6; sex: 91% women, 9% men, average age of the diabetic child, 9.1; average duration of the child's illness 3.5 years.

Characteristics of the studied group in 2020: $n = 604$; average age of the respondent 38.5; sex: 86% women, 14% men; average age of the diabetic child, 9.6; average duration of the child's illness 3.7 years.

Type and location of the facilities the children attended, as indicated by parents in the questionnaires:

2013: 27% kindergartens; 73% primary schools; city with more than 500 thousand inhabitants – 15%, city with 100 to 500 thousand inhabitants – 21%, city with 50 to 100 thousand inhabitants – 12%, city with 25 to 50 thousand inhabitants – 14%, city with less than 25 thousand inhabitants – 13%, village – 25%.

2020: 25% kindergarten; 75% primary school; city with more than 500 thousand inhabitants – 17%, city with 100 to 500 thousand inhabitants – 17%, city with 50 to 100 thousand inhabitants – 11%, city with 25 to 50 thousand inhabitants – 12%, city with less than 25 thousand inhabitants – 13%, village – 30%.

Results

The survey conducted in 2013 shows that 17.5% of the respondents had problems related to admission to kindergarten or school. Various difficulties were pointed out, including: refusal of admission, conditional admission with the parent's obligation to stay in the facility all the time during the child's stay and refusal to provide any assistance including reminding the child of the need to measure sugar levels. Every seventh of the respondents (14.9%) after informing the employees of a kindergarten/school about chronic illness of his child was suggested to transfer the child to another institution. The proposal of individual teaching for a child was received by 11.9% of the survey participants. When asked whether there was a person in the kindergarten/school who had been trained in dealing with a child with diabetes, 60.6% of respondents gave a negative answer. More than half of the respondents (51.5%) stated that in the educational institution their child attended no one was appointed to administer a life-saving injection of glucagon.

In May 2020, the study was repeated and the opinion of 604 parents of children with diabetes was examined. Difficulties related to admission to school were reported by 13.5% of respondents. Lack of a nurse, lack of procedures and knowledge about taking care of a chronically ill child and lack of trained staff were indicated as the main reasons for refusal. About 10% of the respondents (9.8%) after informing the staff of the kindergarten/school about the chronic disease of the child were suggested to move the child to another facility. More than half of the respondents (51%) stated that no person was designated to give a life-saving glucagon injection. There was still no person trained in diabetes in more than 54% of the centres. An important change is the greater willingness to help with glycaemia measurement. Only 19% of centres expressed a definite refusal. There has been no significant improvement in readiness to administer insulin as 39% of establishments have again refused to provide such assistance. Compared with the 2013 survey, there has been an improvement in the evaluation of the quality of care but still 54% of guardians rated support for a child with diabetes as insufficient and 11% rated it as bad. Tables I, II, III contain the most important collective data from the research in the compared years 2013 vs. 2020.

Discussion

A comparison of the 2013 and 2020 results shows that the improvement in diabetic childcare, although noticeable, is not significant and satisfactory. The biggest change has been noted in the willingness of teachers to help with glycaemia measurement. In 2013, 33% of establishments did not agree to such assistance, while in 2020, only 19% of establishments refused this type of care. It can be assumed that the reasons for this positive change may be related to the increased access to refunded, modern technologies of CGM systems (Continuous Glucose Monitoring, e.g. Dexcom, Medtronic) and FGM (Flash Glucose Monitoring, e.g. Free Style Libre), which measure the

Table I. Problems reported by parents related to their diabetic child's stay in an educational institution, comparison of results from 2013 and 2020. It was possible to indicate more than one answer

Problem reported by parents	2013 (%)	2020 (%)
Refusal to admit a child with type 1 diabetes to an educational institution	17.5	13.5
Suggesting the transfer of a child with type 1 diabetes to another institution	14.9	9.8
No proper training about providing care for a child with diabetes	60.6	54.0
No consent of the facility's staff to perform glycaemia measurement or assist in measuring glycaemia	33.0	19.0
No consent of the facility's staff to administer or assist in administering insulin	48.0	45.0
No designated person to administer the glucagon	51.5	50.5
Facility's expectation to have a parent/guardian present during the T1D child's stay	37.9	26.9
No consent for the child to participate in trips/camps without the presence of a parent	64.0	51.0
Restricting the child's participation in additional activities, e.g. interest circles	42.6	32.9
Restricting/obstructing participation in physical education classes, sports sections	26.2	17.9

Table II. Causes of inadequate care of children with diabetes in an educational institution, comparison of results for 2013 and 2020 as indicated by parents. It was possible to indicate more than one answer

Causes of inadequate care of children with diabetes	2013 (%)	2020 (%)
No appropriate legal regulations	78.0	83.9
No trained personnel	81.5	70.0
No nurses present at all times	67.5	68.0
No supporting teacher/assistant	45.2	39.7
Teachers' resentment, lack of empathy and no willingness to understand the problem	32.3	34.4
Fear of responsibility for a diabetic child	72.5	72.6

Table III. Evaluation of the quality of diabetic childcare in an educational institution, comparison of the results for 2013 and 2020 as indicated by parents

The quality of diabetic childcare in the educational institution that your child attends is:	2013 (%)	2020 (%)
Good	5.0	10.5
Sufficient	14.0	25.5
Insufficient	68.0	54.0
Bad	13.0	11.0

level of glycemia in real time, non-invasively and without the need to take a blood sample. These systems allow children with diabetes to better control and manage their illness [15] and make it significantly easier for teachers to care for pupils with diabetes preventing both hypo- and hyperglycaemia.

By identifying the barriers to the provision of proper care for diabetic students in 2020, the lack of proper regulation and the lack of nurses were considered to be as important as in 2013. The problem of the lack of training for staff in educational institutions and the lack of their knowledge and skills to ensure a safe stay for a child with diabetes is still significant.

The causes of inadequate care for chronically ill children should be seen in several aspects. One of them is the lack of teacher training, which starts with insufficient curricula at the beginning of obtaining professional education.

In the Regulation of the Minister of Science and Higher Education defining the educational standards preparing for the teaching profession there are regulations concerning students with chronic diseases [16]. A general psychological and pedagogical preparation is foreseen including issues related to chronic diseases.

However, the mentioned preparation remains only in the sphere of legal regulations – in fact, teachers do not have such preparation – there are no or only marginal aspects of this field of study [17]. In accordance with the Regulation of the Minister of National Education on the detailed qualifications required for teachers to perform the profession of teacher beyond their field of study, pedagogical preparation is necessary [18]. The programmes of pedagogical preparation, regardless of the course, treat the problem of chronically ill students very superficially, most often including it in the broader issue of students with special educational needs, for which a total of 6 to 9 didactic hours have been assigned. Teachers can improve their knowledge in post-graduate and further training courses, as part of ongoing education. Since 2018, under the Teacher's Charter Art. 6.3a, further development in line with the needs of the school is the responsibility of the teacher.

Training courses in which the Board of Teachers and teachers will take part are determined by the headmaster or the leading body. The limited resources for teacher training result in choosing additional training directly related to the subject being taught or related to pedagogical skills. There are usually only one or a few students with diabetes, so it is unlikely that training in this area will be treated with priority.

Since 2014, the Ministry of Health, with the participation of education departments, has organized one training session per year in each province. Only one representative of the institution is allowed to take part in it (most often it is a director, a school pedagogue, less often a class teacher). The training lasts about 5 hours and is carried out by a diabetologist. The training provides basic information about diabetes but in no way increases the skills of caring for a sick child. In the period of six years (2014–2019), a total of 8469 teachers from all over Poland participated in the training, which, with the total number of 587,936 teachers in Poland, accounts for 1.44%. Therefore, these initiatives are insufficient and do not allow everyone who needs such knowledge and skills to acquire them.

The second extremely important problem is the lack of appropriate regulations. In Poland, the legal aspect of children with diabetes attending to an educational institution has not been regulated in any way. There are no solutions dedicated to diabetics that would differentiate the status of a child with diabetes from a healthy child. On the one hand, these children have a disability certificate and after becoming 16 years old they get a degree of disability. On the other hand, they are not subject to adjudication by psychological and pedagogical counselling centres. Therefore, they are not subject to the Regulation of the Minister of National Education regarding the conditions of organizing education, upbringing and care for disabled children and young people who are socially maladjusted and threatened by social maladjustment [19]. The implementation of such a solution would allow, for example, provision of an educational subsidy from which it would be possible to pay for an assistant or teacher's help for a child with diabetes. Legal doubts are raised by the teacher's glycaemic measurements, insulin and a life-saving injection with glucagon.

Such a situation is unacceptable. It is in contradiction to the right of every person including a sick disabled child to have access to education and development. Also, the positions of Polish and foreign diabetological societies clearly indicate the need to ensure that children with diabetes have the right to education on an equal basis with healthy children and they exclude the need for individual learning apart from the absolute medical exceptions [20].

The currently in force Act on Health Care for Students of the 12th of April 2019, Journal of Laws 2019, item 1078, does not solve the problem of a chronically ill child in school. Article 20 of the Act entrusts the care of a pupil who is chronically ill or disabled at school (including a pupil with type 1 diabetes) to a school nurse or a school hygienist, who is de facto not present in the institutions. Article 21. § 3. s provides that the administration of medication or other medical activities during a student's stay may be performed by school staff only with their written consent. Thus, it may be interpreted that a teacher has the statutory possibility of not giving consent. Unfortunately, the Ministry does not specify what should be done if none of the employees of the school give such consent. The law imposes an obligation on the director of the educational institution, who is responsible for the proper organization of work and raising the competence of employees, to organize training for staff to ensure that they acquire knowledge and skills in the field of care of a child with chronic illness. The study shows that this obligation is not always properly respected.

Conclusions

Necessary intervention should include teacher training, legal changes, and increasing the presence of nurses in schools and kindergartens in which chronically ill children are taught. It is necessary to examine the needs and expectations of teachers with regard to the proper organisation of a child with diabetes in an educational institution and the provision of appropriate care. On

the basis of this study, a training programme should be created. It should be compulsory, standardised and subject to evaluation. It is absolutely essential that it be financed from public funds.

It is crucial to amend the current regulations or create a new regulation which will define the responsibility of teachers for a child with a chronic illness and enable the necessary procedures to be created. A reasonable solution would be to increase the duration of nurses' presence in educational estab-

lishments, at least where chronically ill children require constant assistance. Worth considering is the possibility of implementing another solutions in Poland – good practices that already exist in other countries, e.g. Sweden, where dealing with a chronically ill child is treated as self-care supported also in the school environment [21, 22].

It is also necessary to include pre-school children in the new regulations.

References

1. IDF Diabetes Atlas. 9th edition, 2019.
2. Chobot A, Polańska J, Deja G, Jarosz-Chobot P. Incidence of type 1 diabetes among Polish children ages 0-14 years from 1989-2012. *Acta Diabetol* 2015; 52: 483–488.
3. Patterson CC, Harjutsalo V, Rosenbauer J, et al. Trends and cyclical variation in the incidence of childhood type 1 diabetes in 26 European centres in the 25 year period 1989-2013: a multicentre prospective registration study. *Diabetologia* 2019; 62: 408–417. doi: 10.1007/s00125-018-4763-3
4. Chobot A, Polanska J, Brandt A, et al. Updated 24-year trend of Type 1 diabetes incidence in children in Poland reveals a sinusoidal pattern and sustained increase. *Diabet Med* 2017; 34: 1252–1258. doi: 10.1111/dme.13345
5. Jarosz-Chobot P, Polańska J, Szadkowska A, et al. Rapid increase in the incidence of type 1 diabetes in Polish children from 1989 to 2004, and predictions for 2010 to 2025. *Diabetologia* 2011; 54: 508–515.
6. Rights of children with diabetes in schools. March 2005. www.idf.org, "Diabetes at school: what a Child's Health Care Team needs to know about Federal Disability Law" *Diabetes Spectrum* 2002; 15: 63–64.
7. O'Sullivan T. Discrimination affecting people with diabetes in Europe – A survey of current status and initiatives; 2003.
8. Urbańska-Kosińska M, Marcinkowski JT. Edukacja nauczycieli uczących dziecko z cukrzycą typu 1 jako profilaktyka powikłań u tych dzieci. *Probl Hig Epidemiol* 2006; 87: 160–165.
9. Trojanowska A, Markut-Miotła E, Wojtalik M. Postawy wobec choroby u dzieci z cukrzycą typu 1. *Endokrynol Pediatr* 2014; 13: 49–56.
10. Stangierska I, Marcinkowska M, Horst-Sikorska W. Problemy psychologiczne pacjentów z cukrzycą typu 1. *Now Lek* 2002; 71: 212–216.
11. Łuczyński W, Łazarczyk I, Szlachcikowska I, et al. The Empowerment of Adolescents with Type 1 Diabetes Is Associated with Their Executive Functions. *BioMed Res Int* 2019; 2019: 5184682. doi: 10.1155/2019/5184682.
12. Myśliwiec M, Jarosz-Chobot P. *Diabetologia wieku rozwojowego*. Wydawnictwo Lekarskie PZWL, Warszawa 2018.
13. Woynarowska B. *Uczniowie z chorobami przewlekłymi. Jak wspierać ich rozwój, zdrowie i edukację*. Wydawnictwo Naukowe PWN. Warszawa; 2010.
14. Raport z badań Dziecko z cukrzycą w placówce oświatowej. www.diabetycy.eu/projekty/raport/3423pdf (accessed 11.02.2019)
15. Gaweł WB, Tabor A, Kaminska H, Deja G, Jarosz-Chobot P. How modern technologies improve daily diabetic control. *Pediatr Endocrinol Diabetes Metab* 2018; 2018: 140–144. doi: 10.5114/pedm.2018.80996
16. Rozporządzenie Ministra Nauki i Szkolnictwa Wyższego z dnia 17 stycznia 2012 r. w sprawie standardów kształcenia przygotowującego do wykonywania zawodu nauczyciela (Dz. U. z 2012 r., poz 131).
17. Działkowiak H, Gąsiorowska M. Edukacja diabetologiczna nauczycieli – „brakujące ogniwo” w szkolnej opiece nad dzieckiem chorym na cukrzycę. *Diabetol Pol* 2003; 10: 164.
18. Rozporządzenie Ministra Edukacji Narodowej z dnia 1 sierpnia 2017 r. w sprawie szczegółowych kwalifikacji wymaganych od nauczycieli (Dz. U. z 2017 r., poz. 1575).
19. Rozporządzenie Ministra Edukacji Narodowej z dnia 9 sierpnia 2017 r. w sprawie warunków organizowania kształcenia, wychowania i opieki dla dzieci i młodzieży niepełnosprawnych, niedostosowanych społecznie i zagrożonych niedostosowaniem społecznym (Dz. U. z 2017 r., poz 1578).
20. Delamater AM, de Wit M, McDarby V. ISPAD Clinical Practice Consensus Guidelines 2018: Psychological care of children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2018; 19 (Suppl. 27): 237–249.
21. Särnblad S, Åkesson K, Fernström L, et al. Improved diabetes management in Swedish schools: results from two national surveys. *Pediatr Diabetes* 2017; 18: 463–469.
22. Bixo Ottosson A, Åkesson K, Ilvered R, et al. Self-care management of type 1 diabetes has improved in Swedish schools according to children and adolescents. *Acta Paediatr* 2017; 106: 1987–1993.