

The Improving Effects of Diabetes Education on Diabetes Awareness and Management in Children and Adolescents with T1DM

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Abstract

Background: Diabetes education is crucial in empowering persons with Type 1 diabetes (T1DM) and their families to properly manage the condition by providing comprehensive knowledge, tools, and support. It boosts one's belief in their ability to succeed, encourages following medical advice, and adds to the general enhancement of health. **Objective:** This study is to investigate the effectiveness of diabetes education in empowering individuals with Type 1 Diabetes Mellitus (T1DM) and their families to effectively manage the condition. Furthermore, it strives to improve nursing care for families whose children have been diagnosed with Type 1 Diabetes Mellitus (T1DM). **Design:** This research study investigates the efficacy of diabetes education in empowering individuals with Type 1 Diabetes Mellitus (T1DM) and their families to effectively handle the condition. **Materials and Methods:** A systematic search was conducted between the years 2000 and 2022, utilizing the Medline and Google Scholar databases. The purpose of the search was to uncover relevant papers pertaining to diabetes education, management of Type 1 Diabetes Mellitus (T1DM), nurse care, and empowerment. The search focused on peer-reviewed research, clinical trials, and scholarly articles that evaluated the efficacy of diabetes education in empowering individuals and families. **Results:** Diabetes education is crucial for understanding and controlling T1DM. It includes personalized sessions, webinars, group classes, and clinics that provide customized therapies. Comprehensive education enhances glycemic control and family dynamics. Nevertheless, the implementation of diabetes education for families requires specific standards, especially in the field of nursing. **Conclusion:** Diabetes education is essential for effectively managing Type 1 Diabetes Mellitus (T1DM), providing patients and families with crucial knowledge, resources, and confidence. It encourages in-

dependence in-home care and provides explicit guidelines for diabetic nurses to improve nursing care.

Keywords

Diabetes Education, Family-Centered Empowerment Model, Self-Care Management, Self-Efficacy, Type 1 Diabetes (T1D)

1. Introduction

Diabetes is a chronic illness that requires ongoing medical attention to reduce the risk of both acute and long-term consequences. We also need to educate patients on self-management [1]. Type 1 diabetes mellitus (T1DM) is one of the most common chronic diseases in childhood, and medical research has shown that its incidence is gradually increasing in recent years. T1DM, which affects 22 million children and teens under the age of 19, is the third most common chronic childhood disease. Its peak start occurs between the ages of 10 and 14 years, and its incidence is rising by 3% annually worldwide [2].

Adolescents with diabetes have to manage their perception of themselves, their degree of independence, and their individuality while taking into consideration their personality, their familial relationships, their social support system, and the negative perceptions associated with their condition [3] [4] (Figure 1). Learning how to manage diabetes is challenging at any age, but it can be especially difficult for adolescents and their families. However, adherence to diabetes management strategies tends to decline during adolescence [5].

Developing knowledge, confidence, problem-solving techniques, and management skills is what diabetes education is all about—working together to help people with the disease and their families achieve optimal outcomes [6]. Effective management of diabetes necessitates ongoing, individualized education for kids, teens, parents, and other caregivers, taking into account factors including age, life stage, and diagnosis [7]. Access to ongoing, targeted training in the most recent insulin therapy theories, cutting-edge diabetic devices, and cutting-edge diabetes education methodologies should be available to educators [8]. Effective management of type 1 diabetes requires diabetes education, which also helps diabetic nurses improve nursing care by encouraging self-sufficiency in at-home care [9]. Diabetes self-management techniques enhance health outcomes and minimize complications, with medication and lifestyle changes facilitating efficient T1D control [9]. To promote good retention, diabetes education should be a continual process that evaluates each learner's assertiveness, beliefs, learning preferences, skills, and desire to pick up new knowledge [10]. In addition to diet, lifestyle, and blood sugar monitoring, modern diabetes treatments emphasize changeable habits through nutrition, physical education, diabetes prevention, illness awareness, self-esteem, and technological training [11]. Children and teenagers have learned to feel different from other teenagers, fear needles and

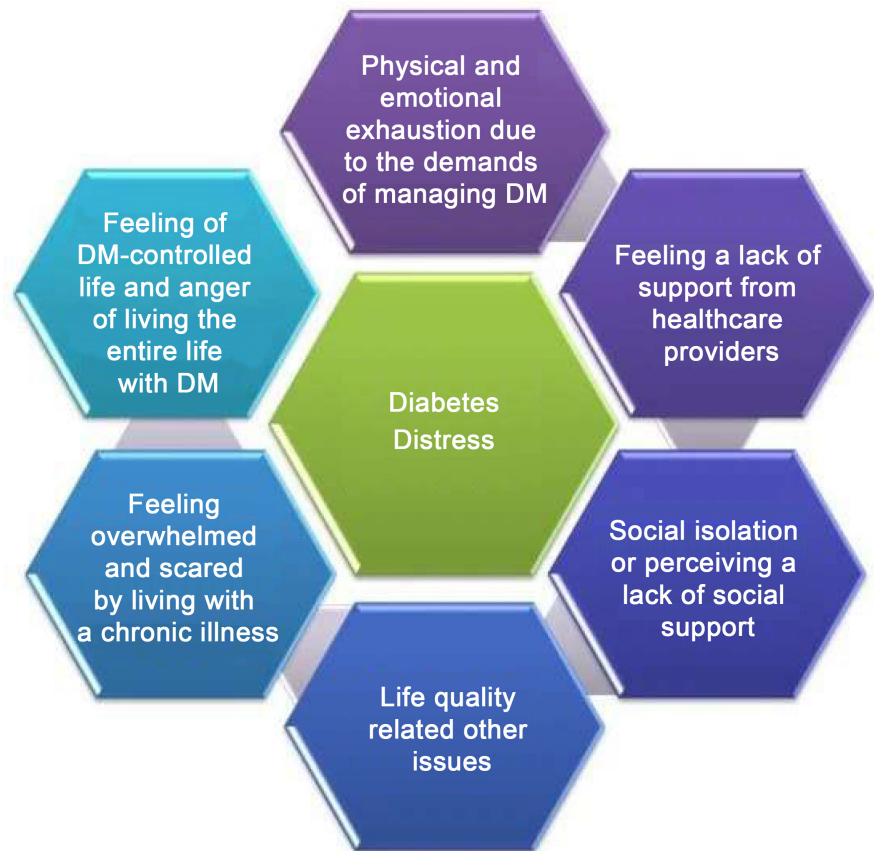


Figure 1. A visual description of diabetes distress, taken from [4].

insulin self-injection, hope for a long-term recovery, and fear their diagnosis [12]. With the help of the diabetic team, which includes a pediatric nurse specialist, families should feel more confident and capable while handling diseases at home [13]. The family should receive comprehensive instruction on the disorder's basic causes, monitoring plasma sugar levels, medication administration, and diet changes [12].

2. Materials and Methods

This study performed an extensive search from 2000 to 2022, using the Medline and Google Scholar databases. The search aimed to discover papers related to diabetes education, management of Type 1 Diabetes Mellitus (T1DM), nurse care, and empowerment. The main goal was to find peer-reviewed articles, clinical trials, and scholarly publications that evaluate the efficacy of diabetes education in empowering individuals and families impacted by T1DM. We utilized a five-step study assessment and selection process. The first step entailed precisely delineating the subjects and goals of the inquiry. We developed a thorough search strategy during Step 2 to locate relevant studies in relevant databases. In Step 3, we methodically extracted pertinent information from the included studies. Step 4 involved the gathering of data and subsequent examination of the findings. Later, in Step 5, evidence was documented.

3. Objectives of the Diabetes Education Program

3.1. Enhancing Knowledge about T1DM and Managing Type 1 Diabetes

Continuous education provides safe, patient-focused instruction in clinics, schools, and ambulatory settings. Peer groups and school relationships can improve possibilities for learning while lowering costs [13]. Instructional strategies' effectiveness in promoting information acquisition, self-efficacy, goal setting, and glycemic management in young kids is a contentious issue, with diabetes' impact on scientific and psychological outcomes still under debate [14]. Community-based programs encourage better lifestyles through knowledge sharing, peer support, and assessing outside groups [15]. Community activities are strengthened by drawing people together and utilizing common cultural experiences [15].

3.2. Promoting Self-Management Skills

Because every child has different requirements and abilities it is essential to provide each graduate program student with a personalized diabetes treatment plan [16]. Given that every child has different requirements and skills, it is essential to provide modified, specific diabetes treatment regimens for each graduate program student [17].

School significantly enhances children's sociability and diabetes treatment by teaching them crucial facts, effective communication, and involvement in medical teams [16]. Schools have to set up safe places for insulin injections, keep insulin and meters on hand, incorporate exercise changes, and assist with age-appropriate therapeutic therapy for kids [18]. We should train teachers to promote diabetes control in the classroom by understanding food patterns, medication dosages, and blood sugar levels, and providing contact information for well-being programs and parents [19]. Children, teenagers, and older children should have their blood glucose levels monitored, and teachers should receive comprehensive training and a school plan to handle sensor data [13]. ISPAD participants recommend educating school personnel on hypoglycemia symptoms, management, and severe cases, emphasizing the necessity of emergency glucagon availability [20]. International guidelines provide reliable guidance for T1D treatment strategies, with national diabetes societies and organizations providing suggestions for school care in specific countries [10].

3.3. Improving Quality of Life

Diabetes control greatly impacts quality of life, with men, those with longer histories of diabetes, and people from higher socioeconomic backgrounds exhibiting higher quality of life [21]. Diabetes, psychiatric issues, anxiety, and toxic household environments negatively impact quality of life, while improved glycemic control can improve natural life quality [22]. A study found that continuous glucose monitoring doesn't negatively impact natural life, but insulin

pumps may shorten life expectancy, and less frequent blood glucose testing suggests glycemic control deprivation [23]. Studies on children and teenagers validate a diabetes quality of life measure and suggest that treatment may reduce the link between general health and diabetic indicators [22]. Behavioral family systems treatment addresses diabetes-specific behavioral issues, reducing conflict, increasing medication compliance, promoting parent-teen communication, and improving glucose control in controlled research [22]. Psychoeducational therapies enhance children's problem-solving and caring skills, but may not improve glucose regulation. Parents should provide daily attention without overbearing [24]. Family-centered therapies, motivational interviewing techniques, and group therapy for young diabetes patients have shown positive outcomes in daily routines, diabetes management, and family ties [25].

4. Strategies for Effective Diabetes Education

For better diabetes control strategies, insulin dosages must be adjusted in accordance with dietary consumption and physical activity levels. This calls for training, experience, and consistent dosages for intricate treatment plans [7]. Diabetes education emphasizes self-care as the primary method for managing diabetes, incorporating scientific, academic, and social factors to prevent severe complications [6]. Insulin staff in closed-loop systems must undergo comprehensive training to accurately track caloric intake, work properly, and integrate these concepts into routine activities for children or adolescents [8]. The team must possess high levels of knowledge, proficiency, and dedication in using this technology for diabetes interventions to ensure its effectiveness [26]. A team of experienced instructors will implement comprehensive diabetes technology education programs, covering glucose management, treatment, lifestyle goals, obstacles, and the special needs of diabetics [27].

4.1. Individualized Education Plans

At four important points in a person's life—diagnosis every year, treatment goal failure, difficulty emergence, and a change in caregiver responsibilities—the ADA advises receiving education and support [28]. Diabetes education emphasizes self-care as the primary method for managing diabetes, incorporating scientific, academic, and social factors to prevent severe complications [29]. Due to the emotional impact families may experience after receiving a diagnosis, education platforms should concentrate on imparting life skills and highlighting urgent challenges [30]. Families should receive a comprehensive education plan that allows them to allocate time for learning, and key caregivers should guide and encourage patients during the diagnosis process [31]. Using policies and curricula, high-quality, appropriate, and easily understood educational materials are used to support early learning in young children and adolescents [32] [33].

4.2. Engaging and Interactive Teaching Methods

Type 1 diabetes is increasing among preschoolers, requiring careful management

and education. Effective teaching strategies significantly impact learning and information preservation in clinical and educational settings [34]. Modern teaching methodologies can effectively address issues faced by T1DM students, contributing to improved health outcomes [35]. Interactive games and smartphone apps help manage diabetes by tracking blood sugar, carbs, exercise, and diet; they also offer real-time patient progress tracking for efficient treatment and encourage medication compliance [24]. Digital diabetes coaching programs offer personalized training, enabling users to review key diabetes education concepts, set long-term objectives, and receive daily reminders [36]. Technology enhances diabetes education, improving patients' quality of life, self-esteem, and glucose management [25].

4.3. Involvement of Parents and Caregivers

High-quality care for a child with Type 1 Diabetes Mellitus requires family involvement, balancing privacy and independence, and ensuring treatment plan compliance [37]. Clinical teams must collaborate with children or young people to ensure daily illness treatment and balance insulin dosages with meals and activities [38]. T1DM is a chronic condition that requires daily management, with less involved parents showing lower HbA1c levels and improved treatment adherence, according to a study on 100 children [39]. Parents provide primary care for children with diabetes, encouraging responsibility and self-sufficiency. Active parent and caregiver involvement in type 1 diabetes treatment leads to appropriate glycemic control, reduced hypoglycemia risk, and improved quality of life [39].

4.4. Continuous Support and Follow-Up Care

A multidisciplinary team of nurses, social workers, ophthalmologists, nutritionists, and diabetes specialists enhances glucose control and patient care for type 1 diabetes [40]. A team can efficiently manage adjustments and improvements to diabetes monitoring and treatment with regular guidance [10]. Collaborative working between the patient, family members, and healthcare team can enhance a patient's psychological/emotional state, a concept further explored in the essay [20]. Romero-Castillo *et al.*'s study revealed that specialized diabetes patients with better access to multi-disciplinary care teams, specialized training, and the latest treatment techniques tend to have lower blood glucose levels [41]. Healthcare providers significantly reduce diabetes risks by offering patients self-assurance, comfort, and support, which can enhance their quality of life and potentially prevent hospital stays [20].

5. Discussion

Diabetes education increases self-efficacy and raises awareness among children and adolescents with type 1 diabetes, giving them the tools, they need to manage the condition and comprehend ideas like insulin delivery and blood glucose

monitoring.

Effective teaching programs address safety, caregivers, and diabetic patients. Organizing learning through initial evaluations, developments, and annual assessments should be available to all diabetics [10]. The program's components should include a planned, approved, documented, and evaluated curriculum, certified instructors, quality assurance, and auditing [26]. In order to improve diabetes control outcomes, long-term education initiatives are necessary for diabetic individuals through a multidisciplinary team [11]. In developed countries, diabetes educators frequently provide self-management programs on exercise, a balanced diet, medicine, foot care, and blood sugar regulation [26]. Every diabetic needs care that includes instruction and encouragement to self-manage their disease, giving them the knowledge, abilities, and assurance to keep exercising their right to self-management [21]. Structured diabetes self-management training programs teach participants healthy habits, enabling them to integrate program elements into their daily lives, promoting active disease management [28]. Community-based diabetes self-management programs are crucial due to rising disease incidence and financial strain, as they can improve health, reduce complications, and lower healthcare costs [42]. Diabetes education and care specialists work together as an integral part of the care team to provide comprehensive, person-centered care and training for diabetics [43]. Individuals with diabetes should receive personalized, patient-centered instruction, especially for children or teenagers, based on their unique needs, preferences, and regional care models [43]. Psycho-education is more effective when it promotes self-efficacy, goal-setting strategies, and problem-solving concepts [44]. The new term emphasizes specialist skills, technology use, and clinical management abilities, highlighting the effectiveness of self-efficacy-focused instruction in improving diabetes health outcomes and patient quality of life [27]. Despite the rise of effective corporations in public, academic, and well-being care, barriers persist in creating these organizations, particularly in marginalized areas with systemic racism and a lack of trust [45] [46].

There are some limitations to this review. First, potential publication bias could distort the effectiveness of the review by underrepresenting research with negative or null results. Second, the subjective and interpretable evaluation of the risk of bias in the included studies by the review could have an impact on the overall results derived from all of the information.

6. Conclusions

Diabetes education for kids and teenagers is a formidable tool that has the potential to significantly increase diabetes knowledge and control. A multidisciplinary team of healthcare professionals must work together to provide diabetes education to children and teenagers. Professionals from a variety of specializations who complement each other's knowledge and experience should make up this team. The statements presented here underscore the significance of a multi-

disciplinary healthcare team providing age-appropriate, superior education. Diabetes education enables young people and the people who care for them to successfully manage their condition and to encourage self-management by giving them the knowledge and abilities they need.

The kid and family are emphasized as essential members of the diabetes care team, highlighting the significance of effective and consistent communication when disseminating treatment plans and instructions. Incorporating modern technology into the educational process enhances tailored care and empowers patients to embrace new innovations. The guidelines also emphasize the importance of cultural awareness and interaction with specific communities to ensure that diabetes education meets their unique needs and preferences. Researchers have found that visual aids and cultural and linguistic adaptations of diabetes education have been found to dramatically increase comprehension of diabetic self-management and support long-term memory. Community-led projects have demonstrated the effectiveness of involving promoters and utilizing community resources to improve diabetes management, yielding encouraging outcomes. Additionally, the implementation of national quality standards and ongoing program reviews ensure the provision of consistent, high-quality diabetes services across the nation. These assessments help identify successful educational activities and present chances for future development.

Overall, diabetes education for kids and teenagers is an essential part of diabetes care because it fosters self-efficacy, better blood sugar regulation, and long-term beneficial effects. We can provide children and their families with the skills they need to deal with the problems of diabetes and live healthier lives by investing in comprehensive, culturally appropriate, and ongoing education. Continuous program assessment in diabetes education is crucial for identifying treatments that result in desired outcomes, setting higher standards for quality, and ensuring continual development.

Authors' Contributions

The manuscript's conception, design, and writing were equally contributed to by Salah Alzawahreh and Candan Öztürk. They worked closely together to develop the essay and critically edited it to add significant thought-provoking ideas. Both authors approved the final version before submitting it for publication. Their teamwork and cooperation guaranteed the manuscript's quality and integrity, demonstrating a common dedication to the study and its sharing.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

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