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## Diabetes Mellitus Type-1 and Psychosocial Intervention to Improve Quality of Life

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### ABSTRACT

Systemic abnormalities of type-1 diabetes mellitus cause impaired glucose metabolism characterized by chronic hyperglycemia. This literature review aimed to describe the psychosocial intervention in type-1 diabetes mellitus. Responsibility for the care of children with diabetes implies the impact of a psychosocial dimension on children and their families. This chronic disease affects different stages of the life of the people who suffer from it. Adolescence is considered to be one of the most complicated stages due to all the changes that are experienced, both physiological and psychosocial, with young people with diabetes being susceptible to higher levels of stress and psychological illness. In addition, stress management and training in coping skills have reduced diabetes-related stress and increased adolescent social interaction. In conclusion, family relationships, better knowledge and understanding, greater self-confidence, and greater motivation encourage patients with T1DM to control their diabetes.

### 1. Introduction

Type-1 diabetes mellitus (T1DM), known as insulin-dependent diabetes mellitus (IDDM), is one of the types of diabetes mellitus (DM) with a classification of dependence on insulin to regulate glucose metabolism in the blood.<sup>1</sup> Systemic abnormalities of T1DM cause impaired glucose metabolism characterized by chronic hyperglycemia. This situation is caused by damage to pancreatic cells both by autoimmune and idiopathic processes. Hence, insulin production decreases and even stops or lowers insulin secretion, resulting in disturbances in carbohydrate, fat, and protein metabolism.<sup>2,3</sup>

However, DM can also occur in children and adolescents, especially in type-1 diabetes. Although

the cases of type-1 diabetes are primarily in children, there is a tendency to increase cases of type-2 diabetes in children with risk factors for obesity, genetics, ethnicity, and a family history of type-2 diabetes. Data from the Indonesian Pediatric Association (IDAI) states that the incidence of DM in children aged 0-18 has increased by 700% over ten years. The number of new cases of type-1 and type-2 DM differs between populations with varying age and ethnic distributions. From September 2009 to September 2018, there were 1213 cases of type-1 DM, most of which were found in big cities such as DKI Jakarta, West Java, East Java, and South Sumatra. Data collection on the number of cases of type 2 DM in children has yet to be widely carried out.<sup>3,4</sup> This literature review aimed to describe

the psychosocial intervention in type-1 diabetes mellitus.

### **Diabetes mellitus type-1**

Diabetes mellitus type-1 is one of the chronic diseases that most often affects children and is complex and invasive. Treatment should include a nutritional diet, regulation of daily physical activity, appropriate insulin therapy, and glycemic control. Inadequate control can affect development, increase comorbidities, decrease life expectancy and increase the risk of acute and chronic complications associated with diabetes. Responsibility for the care of children with diabetes implies the impact of a psychosocial dimension on children and their families. This chronic disease affects different stages of the life of the people who suffer from it. Adolescence is considered to be one of the most complicated stages due to all the changes that are experienced, both physiological and psychosocial, with young people with diabetes being susceptible to higher levels of stress and psychological illness. It is necessary for psychological monitoring, especially at this stage, to adopt a more biopsychosocial and environmental approach.<sup>5,6</sup>

T1DM occurs in genetically susceptible individuals, activated by unknown environmental agents. The autoimmune process is believed to occur months to years before clinical symptoms (polyuria, polydipsia, polyphagia, weight loss) occur and hyperglycemia is diagnosed<sup>1</sup>. It is a complex and invasive childhood disease, difficult to control because, for the affected individual, it presents a variety of physical, clinical, and psychosocial complications. The incidence of T1DM is increasing worldwide, making it the third most common chronic condition in childhood. This is why in 2006, the United Nations focused on diabetes and named it one of the significant threats to global health. It is said that this increase is a reflection of the modern lifestyle. Self-management of T1DM is critical to reduce risks and complications in the short and long term. There must be a balance between diet planning, regulation of daily physical activity, appropriate insulin therapy, and optimal glycemic

control, but self-control is challenging.<sup>7,8</sup>

The main goal is maintaining reasonable glycemic control and quality of life. For this, the patient must self-inject several times daily, receive basal insulin, or give subcutaneous insulin continuously throughout the day, using an infusion pump. When children start with the disease, most require hospitalization with intravenous therapy to treat diabetic ketoacidosis and dehydration problems. In addition to compensating patients, insulin therapy should be initiated, for this comprehensive education is provided on the practical and theoretical aspects of self-control that they should carry.

The test of choice to see which treatment a patient has is HbA<sub>1c</sub>, the goal for a diabetic patient is 7.5% or less.<sup>9</sup> High HbA<sub>1c</sub> values are associated with cardiovascular problems, neuropathy, nephropathy, retinopathy, periodontal problems, and erectile dysfunction, among others Adherence to glucose control, insulin administration, and careful diet evaluation is essential, which is why doctors, nurses, and nutritionists regularly evaluate these patients. Unlike other pathologies, where treatment decisions are made exclusively by medical specialists, much of the responsibility for daily self-care of T1DM rests with young people and their families, even soon after diagnosis. These patients have low family well-being, high impact on social life, and family conflicts, elements often not evaluated by professionals. A study showed that, despite recommendations for providing appropriate mental health assessment and treatment, only 28% of young people with increasing symptoms of depression reported receiving psychological treatment. Positive health outcomes come from effective communication between professionals and parents, but this communication in practice is not ideal. When professionals' communication skills are poor, they can cause parents to stop attending examinations. Healthcare teams must be trained to attend to the emotional needs of children, youth, and caregivers, increasing their treatment adherence.<sup>10,11</sup>

### **Psychosocial impact of T1DM**

The diagnosis of T1DM has a profound impact, even causing significant trauma. This leads to a state of shock with feelings of pain, anger, and isolation due to the complex, violent, and invasive nature of the disease and confrontation with the reconstruction of a new normal of life. In addition to changes in family habits and lifestyle, uncertainty about a child's future, myths, and thoughts about acute and chronic complications pose various psychosocial problems for the child or adolescent being diagnosed and their immediate environment. The support offered to parents during diagnosis is critical to their long-term coping skills. If adequate psychosocial support is available, knowledge and self-confidence can be built, leading to greater adherence to medication, better glycemic control, a better general perception of quality of life, and a reduction in complications.<sup>12</sup>

During the pediatric period, parents assume responsibility for blood glucose monitoring, insulin administration, and meal planning, being the patient as well. This places significant demands on family members, facing different challenges at each stage of growth and development. These parental responsibilities can cause stress, producing symptoms of burnout, especially in mothers. Parents bear the burden of raising a child with diabetes, often experiencing guilt and worries about hypoglycemia and future complications. Some families can handle the new responsibilities of having a member with T1DM well. However, it becomes a heavy burden for other families if they face other problems such as poverty, unemployment, lack of time, or having other members with chronic diseases. Impact on family life is recognized as a factor influencing the treatment of T1DM, either by interfering with parents' ability to monitor or by creating a hostile environment. Families with young children can become socially isolated because of fear, especially hypoglycemia.<sup>13</sup>

For this reason, appropriate psychosocial support for families and communities in which children develop is critical. It often affects not only the parents or guardians of a child with T1DM, but there are

behavioral problems, low self-esteem, and emotional disturbances in the siblings. However, some can increase their maturity and gain strength with the situation. As children get older, the responsibility for this excellent control is partly shared by their peers and teachers in their schools, who play an essential role. This transfer of responsibility can cause such a level of anxiety that parents can cause symptoms of burnout.

Research shows that type 1 diabetes is a risk factor for developing psychiatric disorders in children and adolescents.<sup>12</sup> Many children experience adjustment problems soon after a diabetes diagnosis. Although most children resolve these problems within the first year, children who do not are at risk of poor adaptation to diabetes, including problems with regimen adherence, poor metabolic control, and advanced psychosocial difficulties. In addition, many mothers of newly diagnosed children are at risk for adjustment problems. Significant depressive symptoms in about one-third of mothers mostly subside within the first year after their child's diagnosis. Research has also shown that diabetic adolescents, especially girls, have an increased risk of eating disorders. Both eating disorders and subclinically disorganized eating attitudes and behaviors have been observed in adolescent girls with diabetes and are associated with poorer metabolic control. At least 10% of adolescent girls with type 1 diabetes meet the diagnostic criteria for an eating disorder, a rate twice as high in girls without diabetes. Without intervention, eating disorders and insulin manipulation can worsen over time and increase the risk of health complications.

### **Neurocognitive function**

Studies show that children with diabetes before age five and with frequent episodes of hypoglycemia are at risk for neurocognitive deficits, especially in visual-spatial function. In addition, research findings suggest that children with diabetes miss school more than their non-diabetic peers and that lower reading achievement is associated with more absenteeism from school. Research also shows that children with

diabetes, especially boys, are more likely to have learning problems. Other studies have found poorer attention function and lower verbal intelligence in children with a history of significant hypoglycemia. A longitudinal study of newly diagnosed children revealed decreased verbal intelligence and school grades, partly predicted by memory dysfunction. Another study showed that two years after diagnosis, children showed mild neuropsychological deficits, including decreased speed of information processing and decreased conceptual reasoning and acquisition of new knowledge, which was predicted by recurrent hypoglycemia and hyperglycemia, as well as early onset diabetes (before age five years).<sup>10-13</sup>

### **Quality of life**

Few studies have specifically examined the quality of life in children and adolescents with diabetes. Quality of life in individuals with diabetes can be reliably measured by self-report. Research findings suggest that a better quality of life in young people is associated with increased self-efficacy and reduced depression, as well as improved metabolic control. Psychosocial factors were associated with regimen adherence and metabolic control. Studies have shown that regimen adherence declines over time and is particularly poor among some adolescents. Metabolic control has been worse in single-parent, low-income, African-American youth. Family factors significantly influence regimen adherence and metabolic control in children and adolescents. For example, low levels of family conflict and stress, high levels of cohesion and organization, good communication skills, and appropriate involvement of both parents and children in diabetes management have been associated with higher rates of regimen adherence and better metabolism control. When parents allow adolescents to have self-care autonomy without adequate cognitive and social maturity, they tend to have more problems with diabetes management.<sup>14</sup>

Research has also examined the role of stress and coping in diabetes management. Children with less life stress and who cope well with diabetes management

are more likely to have fewer problems with regimen adherence and metabolic control. Adolescent health beliefs are related to regimen adherence and glycemic control. In particular, high self-efficacy and learned helplessness levels have been associated with reasonable glycemic control. Certain health beliefs related to the seriousness of diabetes, personal susceptibility to complications, costs of regimen adherence, and beliefs in treatment efficacy have also been associated with regimen adherence and glycemic control. Similarly, studies with young children have shown that their health beliefs are related to adherence and glycemic control.<sup>15</sup>

### **Psychosocial therapy**

Several controlled studies have examined the efficacy of psychosocial interventions for diabetic adolescents. Most have included the family as an integral part of treatment. Research findings suggest that family-based behavioral procedures such as goal setting, self-monitoring, positive reinforcement, behavioral contracts, supportive parental communication, and appropriately shared responsibility for diabetes management have improved regimen adherence and glycemic control. In addition, these interventions can improve parent-adolescent relationships. Psychoeducational interventions with children and their families that promote problem-solving skills and increase parental support early in the disease course have improved children's long-term glycemic control. The efficacy of group interventions for diabetic adolescents has also been systematically evaluated. For example, research findings suggest peer group support and problem-solving have improved short-term glycemic control. Group coping skills training has been shown to help optimize glycemic control and the quality of life of adolescents involved in intensive insulin regimens. In addition, stress management and training in coping skills have reduced diabetes-related stress and increased adolescent social interaction.<sup>13-15</sup>

## 2. Conclusion

Family relationships, better knowledge and understanding, greater self-confidence, and greater motivation encourage patients with T1DM to control their diabetes.

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