Screening For Emotional and Psychosocial Disorders in Children with Type 1 Diabetes Mellitus

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Abstract:
Background: *Patients with Type 1 Diabetes Mellitus (T1DM) are at greater risk of developing mental and psychosocial disorders, especially in late adolescence and early adulthood.*
Objective: *Screening for emotional and psychosocial disorders in children and adolescents with Type 1 Diabetes Mellitus by applying the Pediatric Symptoms Checklist.*
Methods: *Cross-sectional epidemiological study of children and adolescents, aged between 6 and 16 years old, assisted at a pediatric endocrinology outpatient clinic of a university hospital and in a private clinic. The variables analyzed were: age, sex, school grade, time since diagnosis, and their relationship with the Pediatric Symptoms Checklist's score. The non-parametric Mann-Whitney and Kruskal-Wallis tests were used for data analysis. To assess the association between two quantitative variables, the estimation of Pearson's and Spearman's correlation coefficient were considered, p-value < 0.05 indicated statistical significance.*
Results: *The questionnaire was answered by the parents or guardians of 36 children and adolescents, all full filled up. Among the participants, 17 (47.2%) were girls and 19 (52.8%) were boys, three (8.3%) were preschoolers, 13 (36.1%) were schoolchildren, and 20 (55.6%) teenagers. A score ≥ 28 was the cutoff value to suggest emotional and psychosocial disorders. Four (11.1%) scored ≥ 28 and 32 (88.9%) scored below 28. There was no statistical significance between age, sex, school grade, time since diagnosis, and the Pediatric Symptoms Checklist score.*
Conclusion: *This study found no statistical correlation between Pediatric Symptoms Checklist score and Type 1 Diabetes Mellitus patients. The percentage of the tendency to mental disorders was similar to that found in the general population.*
Keywords: *Type 1 Diabetes Mellitus, Mental disorders, Child, Adolescent, Screening*

I.   Introduction

Type 1 Diabetes Mellitus (T1DM) is the most common metabolic disease in children and adolescents [1,3]. The condition starts after the autoimmune insult to the pancreatic beta cells, clinically manifesting as polyuria, polydipsia, polyphagia, weight loss, and hyperglycemia [2,3].

Patients with T1DM are at greater risk of developing mental and psychosocial disorders, especially in late adolescence and early adulthood. Early recognition of psycho-emotional symptoms that suggest mental disorders should be done through follow-up with a multidisciplinary team and can be facilitated through the use of questionnaires directed towards this aim [3, 4].

There are several validated instruments for screening emotional problems, such as the Pediatric Symptoms Checklist (PSC), Child Behavior Checklist (CBCL), and the Child Depression Inventory (Children's Depression Inventory 2 - CDI 2). These questionnaires are not able to make a diagnostic but they are helpful to screening for mental health problems in childhood and adolescence [5, 6, 7].

The objective of this study was to apply the Pediatric Symptoms Checklist (PSC) in children and adolescents with T1DM to screening for emotional and psychosocial disorders.

II.   Method

This was a cross-sectional epidemiological study of children and adolescents aged between 6 and 16 years old with T1DM for at least six months. Those who underwent follow-up at a pediatric endocrinology outpatient clinic of a university hospital and in a private clinic were invited to participate.

The participants and their parents or guardians signed the Assent Informed (for those over 7 years old) and Parental Consent Informed, respectively, before the research was started.

The PSC questionnaire was filled up by the participants' parents or guardians. The PSC consists of 35 items that are scored according to the frequency of the proposed situation, where zero scores for "never", one for "sometimes" and two for "often". The cutoff point to this research was ≥ 28 points, situation in which the result was considered positive, and that child or adolescent should be referred to mental health assessment.

The questionnaire was applied by an interviewer during a routine visit to the specialized clinic, or via video call, due to the restrictive measures of the covid-19 pandemic during the study.

Other variables analyzed were: age, sex, school grade, and time since diagnosis of T1DM more or less than 3 years old. Participants had their weight and height measured barefoot and using light clothing, on a leader brand digital scale (model P-300C, series 31403, year of manufacture: 2014; Brazil) and a wall stadiometer (model E150 A, Tonelli Equipamentos Médicos Ltda., 2014, Brazil), respectively.

The diagnostic criteria for T1DM were used according to the 2021 Brazilian Society of Diabetes' Guideline [8]. The time of diagnosis was considered the first evaluation by an endocrinologist.

Data were analyzed using the software Stata/SE v.14.1. StataCorpLP, USA, 2020 to describe the quantitative variables mean, median, minimum, and maximum values, 1st and 3rd quartiles, and standard deviation. The Mann-Whitney non-parametric test was used to compare the PSC score of the two groups. The Kruskal-Wallis non-parametric test was used to compare the variables of three different groups: preschool, school, and adolescent. The Pearson's correlation and the Spearman's correlation coefficient were used to evaluating the association of two quantitative variables using p-value < 0.05 as significance.

This research was approved by the Ethics Committee in Research of Assis Gurgacz College, Cascavel, PR, Brazil, under opinion n° 4.046.840/2020.

III.   Results

The questionnaire was answered by the parents or guardians of 36 children and adolescents, all full filled up. Among the participants, 17 (47.2%) were girls and 19 (52.8%) were boys, three (8.3%) were preschoolers, 13 (36.1%) were schoolchildren, and 20 (55.6%) teenagers. Four (11.1%) scored ≥ 28 and the remaining 32 (88.9%) scored less than 28. The epidemiological variables analyzed are shown in table 1, and in table 2 the correlation between PSC and the variables. The percentage of diabetic children and adolescents with positive PSC scores was 11% (n=4).

Table 1: Mean, median, and standard deviation of epidemiological variables.

| Variable	n	Mean	Median	Minimum	Maximum	Standard deviation
Age (years)	36	10.8	11	6	16	2.7
Weight (Kg)	36	44.2	44,3	22	94.5	15.7
Height (cm) Change to Height (m)	36	1.5	1,51	1.2	1.7	0.1
Age of diagnosis	36	6.3	7	1	11	2.8
T1DM time (years)	36	4.7	4	0.7	13	3.4
Score PSC	36	15.8	15	5	31	7.5

Table 2: Correlation between PSC and mean, median, standard deviation, and p-value of the studied epidemiological variables.

	n	Mean	Minimum	1° quartile	Median	3° quartile	Maximum	Standard deviation	p-value
Sex									
Male	19	16.5	5	11.5	15	20.5	31	7.9	
Female	17	15	5	9	14	19	30	7.2	0.657*
School Age									
Preschool	3	9	5	8	11	11	11	3.5	
School	13	18	5	14	16	23	31	7.5	0.080§
Adolescent	20	15.4	5	8.8	14.5	19.3	30	7.5	
Adaptation period to T1DM									
Up to 3 years	19	16.5	5	11.5	15	20.5	31	7.9	0.657*
More than 3 years	17	15	5	9	14	19	30	7.2	

(*) Mann-Whitney non-parametric test; $p<0.05$

(§) Kruskal-Wallis non-parametric test; $p<0.05$

Graphic 1 shows the Pearson Linear Correlation Coefficient estimated at 0.48 to PSC and age, providing evidence for rejecting the null hypothesis ($p=0.003$).
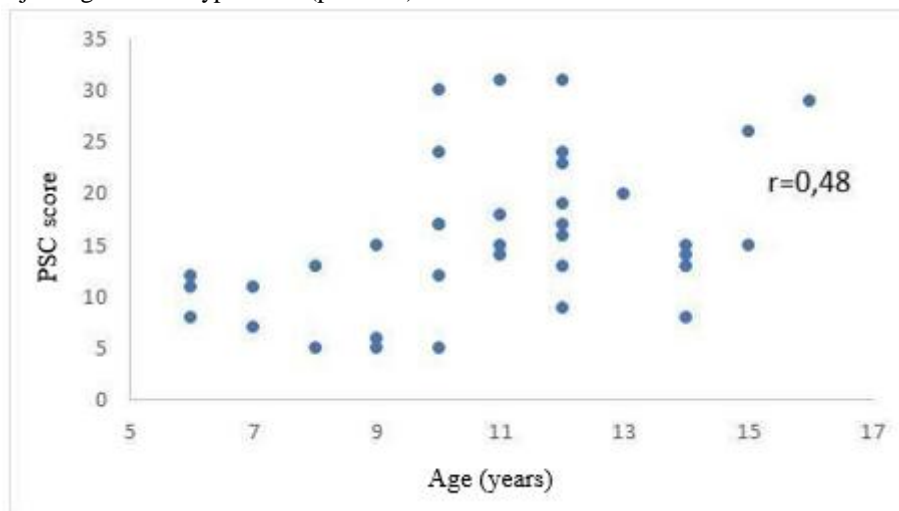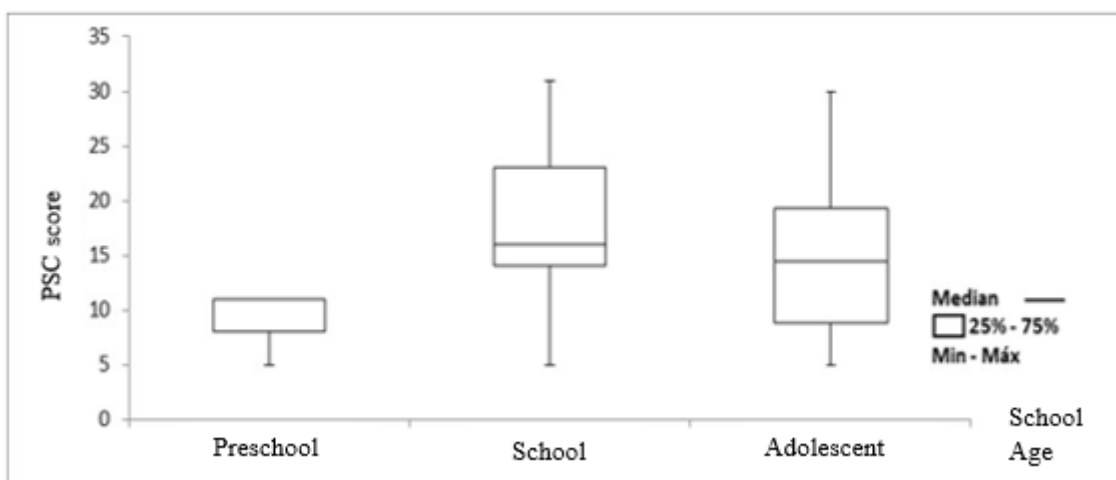

Graphic 1: Relationship between PSC score and age

Thus, although a correlation is not observed, there is evidence that older patients are associated with higher scores on the PSC score.

Graphic 2 shows the relationship between PSC score and sex and graphic 3 shows the relationship between PSC score and school grade.
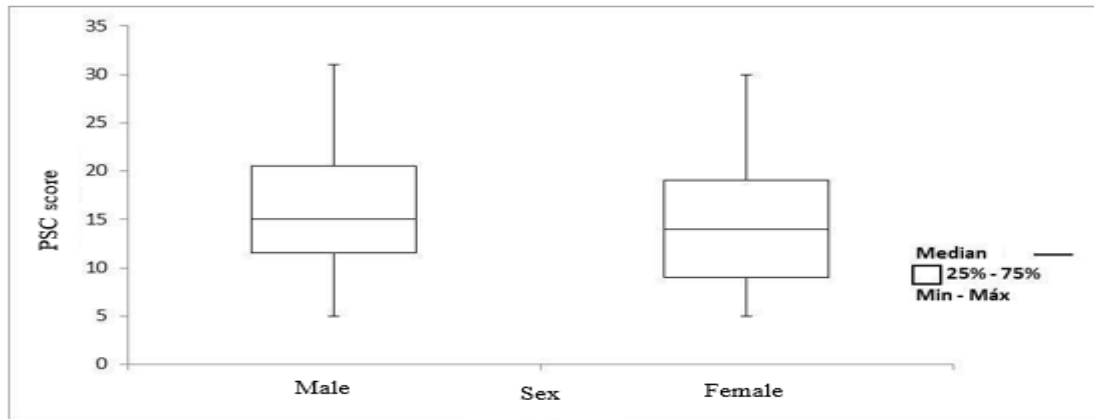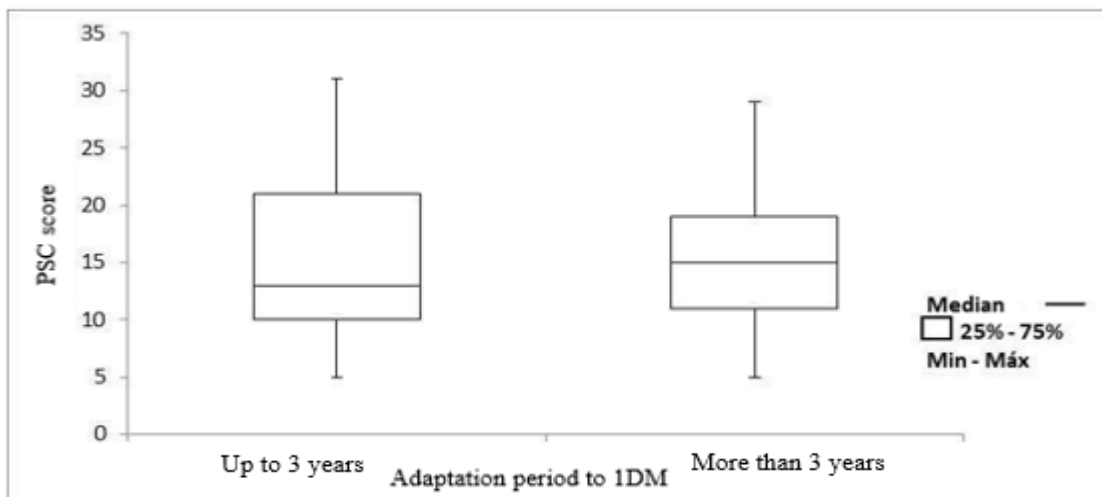
Graphic 2: Relationship between PSC score and sex

Graphic 3: Relationship between PSC score and school grade

Graphic 4 shows the relationship between the PSC score and the adaptation period to the diagnosis of T1DM.

Graphic 4: Relationship between PSC score and adaptation period to type 1 diabetes mellitus diagnosis

IV. Discussion

There has been an increase in incidence of T1DM cases in the world [3], therefore, it is necessary to increase the attention to mental health in this specific population, mainly during childhood and adolescence, when occurs the most significant physical and mental development. The diagnosis of T1DM usually occurs up to the second decade of life.

Psychiatric disorders incidence is two to three times higher in children and adolescents with the diagnosis of T1DM when compared to their healthy peers [9,10]. Anxiety, depression, and eating disorders are most frequently associated with poor T1DM control. The presence of such diseases is associated with reduced self-care, worse glycemic control, increased hospitalization rates, and reduced quality of life, leading to short and long-term repercussions [3,9,11,12].

Although there wasn't a correlation between the PSC score, age, and school grade in this study, it was noted that older ages were associated with higher scores on the PSC. This result is similar to that found in the literature, which describes the increased prevalence of mental disorders in adolescents and young adults with T1DM [10,13,14,15].

Despite there being no difference by sex in this study, female diabetic adolescents were more likely to have mental disorders, according to the literature [9,10,13,14,16].

This study showed no relationship between PSC score and time to diagnosis. This association is divergent in the literature, some studies suggesting that the early years after diagnosis are associated with a higher incidence of depression and anxiety [1,13], while others argue that a long time of diagnosis favors the onset of mental disorders [14, 17].

Early and continuous assessment of young people's mental health is necessary, with the physician and the multidisciplinary team having the ability to question and identify risk factors for mental disorders [3,18]. It is known that the appearance of these disorders during the course of the disease is common, especially in those who already have some previous psychiatric disorder [10,13,14].

Children and adolescents with mental disorders, especially anxiety, have worse glycemic controls, higher risk of diabetic ketoacidosis, and a higher rates of hospitalization [12,16,19]. This finding reinforces the need for adequate screening methods and early multidisciplinary follow-up [10, 20] since such complications are preventable with adequate treatment and present a potential risk to life, in addition to increasing health care costs.

This research had some limitations: low number of participants; the use of a generic questionnaire for emotional and psychosocial disorders; and, the fact that the questionnaire is answered only by the parents, limiting the perception to only one of the parts and restricting the information collected.

V. Conclusion

The percentage (11%) of diabetic children and adolescents with positive PSC scores was similar to the general non-diabetic population of the same age group (10 to 15%). However, some studies describe the prevalence of mental disorders in children and adolescents with T1DM as two to three times higher, compared to the general population of the same age group.

The high prevalence of mental disorders in young T1DM patients, especially anxiety disorders, reinforces the need for psychological and psychiatric care in this population. The treatment of psychiatric comorbidity benefits the individual globally, contributing to the quality of life, improving control of the underlying disease, reducing complications, and resulting in a better prognosis.

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