Research Paper

Screening for Emotional and Psychosocial Disorders in Children and Adolescents with Endocrinological Diseases

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Abstract:
Background: *Children and adolescents with chronic illnesses often face greater psychological challenges and are more likely to exhibit emotional and behavioral problems.*
Objective: *To screen for the risk of emotional and psychosocial disorders in children and adolescents with endocrinological disorders.*
Method: *The Pediatric Symptom Checklist (PSC) was filled by parents or tutor of children aged 6 to 16 years followed at a pediatric endocrinology outpatient clinic in a teaching hospital. To this research, a cut-off PSC score ≥28 was considered indicative of risk for emotional and psychosocial disorders.*
Results: *A total of the 90 PSC questionnaires was applied, 75 (83.3%) were valid. Among these, 36 (48%) were female and 39 (52%) male. Age ranking from 6 to 16 years old, in the PSC-negative group (n=69; 92%) mean age was 11 years old and concerning PSC-positive group (n=6; 8%) the mean age was 12.5 y.o The percentage of PSC-positive screening was higher among participants with overweight or obesity (n=3;12.5%) compared to those with normal weight (n=3; 6.3%). The most prevalent endocrinological diseases were type 1 diabetes mellitus (T1DM) in 38 (50.6%) patients, precocious puberty in 12 (16%), and hypothyroidism in 10 (13.3%). PSC-positive results were more frequent among patients with T1DM (n=4; 10.5%). The highest proportion of positive screening occurred in those diagnosed between 1 and 5 years prior, with six (9.5%) cases among 57 participants.*
Conclusion: *An increased risk of emotional and psychosocial disorders was observed in patients with elevated BMI and T1DM, reinforcing the need for a comprehensive and multidisciplinary approach to children carrier of endecrinological diseases.*

Keywords: *Endocrine system disease, Child, Adolescent, Mental Disorders, questionnaire.*

I.INTRODUCTION

Studies indicate that children and adolescents with chronic diseases face greater challenges in terms of psychological adjustment and are at higher risk of developing emotional and behavioral problems[1]. According to the 2024 report by the World Health Organization, one in seven adolescents aged 10 to 19 lives with a mental disorder. In addition to causing significant impairment in a child's overall functioning, mental disorders in childhood tend to persist throughout development and frequently do not receive adequate treatment. This condition increases the risk of adverse outcomes, such as substance abuse, involvement in criminal activity, unemployment, higher mortality, educational difficulties, and the development of mental disorders in adulthood[2].

Among chronic diseases, childhood endocrinological diseases such as Type 1 Diabetes Mellitus, overweight, short stature, and precocious puberty deserve special attention, as they can significantly affect

emotional development and psychosocial adjustment in children and adolescents[3]. Disorders such as anxiety and depression, for example, may arise from the interaction between an individual's emotional vulnerability and the demands imposed by the clinical condition[4].

Several instruments have already been validated for screening emotional and behavioral difficulties in children and adolescents, including the Pediatric Symptom Checklist (PSC), the Behavior Assessment System for Children – Second Edition (BASC-2), and the Child Behavior Checklist (CBCL). Although these tools are not diagnostic, they allow for the identification of possible cases of mental disorders in this population[5,6].

The objective of this study was to carry out a screening for emotional and psychosocial disorders in children and adolescents with endocrine diseases.

II.METHOD

This cross-sectional, observational, and descriptive epidemiological study was carried out between 2024 June and 2025 August. The sample comprised children and adolescents aged 6 to 16 years in follow-up care at a pediatric endocrinology outpatient clinic of a university hospital located in Cascavel City, Paraná, Brazil. The endocrine diseases included were Type 1 Diabetes Mellitus, precocious puberty, hypothyroidism, hyperthyroidism, obesity, and short stature, as these conditions were the most prevalent at the study site.

Eligibility criteria included a confirmed diagnosis of one of the afore mentioned endocrine diseases and voluntary participation in the study. Parental Written Informed Consent were obtained from parents or legal guardians, and Adolescent Written Informed Assent were obtained from participants aged 12 years or older.

The variables analyzed included age, sex, body mass index (BMI), type of endocrine disease, time since diagnosis, and scores obtained on the Pediatric Symptom Checklist (PSC). Body weight was measured with participants wearing light clothing using a calibrated electronic scale (Líder®, model P-300C, series 31403, Brazil), and height was measured with participants barefoot using a wall-mounted stadiometer (Tonelli®, model E120P, Brazil). BMI was calculated using the Quetelet index (weight in kilograms divided by height in meters squared, kg/m^2). BMI classification was based on z-scores, defined as follows: thinness (-3 to -2), normal weight (-2 to $+1$), overweight ($+1$ to $+2$), obesity ($+2$ to $+3$), and severe obesity ($> +3$). The interpretation of BMI values followed the World Health Organization (WHO) Child Growth Standards (2006), using age- and sex-specific growth charts.

Emotional and psychosocial symptoms were assessed using the Brazilian version of the Pediatric Symptom Checklist (PSC), a standardized instrument routinely applied in the institution's pediatric outpatient clinics. The questionnaire was completed by the legal guardians of children younger than 12 years and by adolescents aged 12 years or older. The PSC consists of 35 items that assess behavioral and emotional functioning in children and adolescents based on the perceptions of parents or caregivers. Responses are rated on a three-point frequency scale: "never" (0 points), "sometimes" (1 point), and "often" (2 points). The PSC is a screening instrument and does not provide a diagnostic assessment; rather, it is used to identify symptoms suggestive of emotional and psychosocial disorders. In this study, a cutoff score of ≥ 28 was adopted, indicating suspected mental disorder and the need for specialized evaluation.

Statistical analyses were performed using Stata/SE software, version 14.1 (StataCorp LP, USA, 2020). Descriptive statistics for the variable age included mean, median, minimum and maximum values, and standard deviation. Categorical variables were described using absolute and relative frequencies (percentages). Comparisons between PSC classifications (positive or negative) according to age were conducted using Student's t test for independent samples. Associations between qualitative variables and PSC classification were assessed using Fisher's exact test. For comparisons involving multiple tests related to body mass index (BMI) and time since diagnosis of the endocrine disease, Bonferroni Correction was applied. A p-value < 0.05 indicated statistical significance.

This research was approved by Institutional Review Board from Western Paraná State University, Cascavel campus, Paraná, Brazil, under approval number 6,789,112/2024.

III.RESULTS

A total of 90 questionnaires were distributed, of which 15 (16.7%) were excluded due to incomplete responses, lack of a confirmed diagnosis, or because participants were receiving treatment for a psychiatric disorder at the time of data collection.

The final analytical sample consisted of 75 participants (83.3%), including 36 (48.0%) females and 39 (52.0%) males. Among female participants, 34 (94.4%) screened negative on the PSC, whereas two (5.6%) screened positive. Among male participants, 35 (89.7%) screened negative and four (10.3%) screened positive. No statistically significant association was observed between gender and PSC classification (Table 1).

Table 1: Relationship between gender and PSC score

PSC score	Gender

	Female		Male		p value*
	n	%	n	%	
Negative	34	94.4%	35	89.7%	0.676
Positive	2	5.6%	4	10.3%	
Total	36	100.0%	39	100.0%	

*p-value < 0.05 indicates statistical significance.

Regarding the relationship between age and PSC scores, the mean age was higher in the group with a positive PSC result; however, this difference was not statistically significant (Table 2).

Table 2: Relationship between age and PSC score

PSC score	n	Average	Median	Minimum	Maximum	Standard-Deviation	p value*
Negative	69	11.0	11	6	16	2.6	0.195
Positive	6	12.5	12.5	10	16	2.3	

(*) Student's t-test for independent samples; p<0.05 indicates statistical significance.

When PSC scores were analyzed considering nutritional status (BMI), a trend toward an increased proportion of positive cases was observed as BMI increased (Table 3).

Table 3: Relationship between BMI and the PSC score

	Body Mass Index					
PSC Score	Underweight		Normal weight		Overweight/Obesity	
	n	%	n	%	n	%
Negative	3	100.0%	45	93.7%	21	87.5%
Positive	0	0.0	3	6.3%	3	12.5%
Total	3	100.0%	48	100.0%	24	100.0%

Comparison of PSC results across BMI categories revealed p values of 1.0 and 0.393, both exceeding the adjusted significance threshold ($p < 0.017$). Although descriptive analysis indicated a trend toward a higher proportion of positive PSC cases with increasing BMI from 0(zero) in the thinness group to 12.5% in the overweight/obese group these differences were not statistically significant (Table 4).

Table 4: Comparison between BMI groups

Comparison Groups	p value*
Underweight vs. Normal weight	1
Underweight vs. Overweight and Obesity	1
Normal weight vs. Overweight and Obesity	0.393

(*) Fisher's Exact Test; $p < 0.017$

In the analysis of endocrine diseases among the 75 participants, the most prevalent conditions were Type 1 Diabetes Mellitus (T1DM) in 38 (50.6%) participants, precocious puberty in 12 (16.0%) participants, and hypothyroidism in 10 (13.4%) participants. The remaining conditions including hyperthyroidism, short stature, and others, which accounted for 15 (20.0%).

Assessment of the association between the most prevalent endocrine diseases and positive PSC scores revealed a higher proportion of positive results among participants with T1DM (n = 4; 10.5%) compared to other clinical conditions. There wasn't positive cases among participants with hypothyroidism, and only one case (8.3%) occurred among those with precocious puberty. However, no statistically significant association was identified between type of endocrine disease and the likelihood of emotional or psychosocial difficulties (Table 5).

Table 5: Relationship between the most common diseases and PSC positivity.

Disease	Positive PSC*		
	With Disease n (%)	n (Total of group with Disease)	p-value**
Type 1 Diabetes Mellitus	4 (10.5%)	38	0.674
Precocious Puberty	1(8.3%)	12	1.000
Hypothyroidism	0 (0)	10	1.000

*PSC: Pediatric Symptoms Checklist, **p-value < 0.05 indicates statistical significance

An analysis was also performed to assess the association between duration since diagnosis and PSC scores. Due to the small number of participants, duration was categorized into three groups: less than 1 year (n = 4; 5.4%), between 1 and 5 years (n = 63; 84.0%), and more than 5 years (n = 8; 10.6%). Overall, the prevalence of positive PSC scores was low, however, the 1–5 years group exhibited a higher percentage of positive cases compared to the other subgroups. Nevertheless, no statistically significant association was observed between duration since diagnosis and the risk of emotional or psychosocial disorders in the study population (Table 6).

Table 6: Relationship between the time of diagnosis and PSC score positive.

PSC score	Time of endocrines diseases diagnosis						
	< 1 year		1 to 5 years		> 5 years		*p value
	n	%	n	%	n	%	
Negative	4	100.0%	57	90.5%	8	100.0%	0.393
Positive	0	0.0	6	9.5%	0	0.0	
Total	4	100.0%	63	100.0%	8	100.0%	

*p-value < 0.05 indicates statistical significance

IV.DISCUSSION

Living with chronic diseases during childhood and adolescence represents a documented risk factor for psychosocial and emotional difficulties. The impact of these long-term and complex conditions is further exacerbated by the high prevalence of mental disorders in the young population, which, according to a 2024 study, affects over 10% of individuals aged 5 to 24 years globally.[7,8] This highlights the importance of early detection of these disorders through screening tools.

In the present study, there wasn`t association between sex and PSC scores, a finding that contrasts with a 2024 study conducted in Romania, which reported a higher prevalence of depression among girls in a sample of 915 patients aged 9 to 17 years.[8] This discrepancy may be related to the type of instrument and the population assessed, as the PSC is a broad screening scale, whereas the cited study analyzed cases with a confirmed diagnosis of depression, a condition more prevalent among girls.[8,9,10] Furthermore, gender differences tend to be more pronounced in contexts of greater emotional severity or in chronic diseases, as demonstrated in studies with adolescents with Type 1 Diabetes Mellitus, in which girls exhibited higher emotional vulnerability and poorer quality of life.[1,5,11]

Although was not observed relationship between age and the likelihood of developing mental disorders in this study, adolescents presented trend to have higher PSC scores. Previous studies have shown a progressive increase in psychiatric comorbidities among children with chronic diseases from childhood through adolescence. Additionally, data from the United Nations (UN) and the Global Burden of Disease (GBD) study indicate that the prevalence of mental disorders increases with age, from 10.2% in preschool children to 16.5% in adolescents.[11,12,13] This trend may be attributed to adolescence being a period of heightened vulnerability and developmental transition.

The association between overweight and mental health difficulties in children and adolescents is well established. Studies indicate that excess weight can negatively affect emotional well-being and contribute to behavioral problems.[14,15] In a Spanish study involving 200 children, the majority of participants with obesity exhibited stress and mental health disorders, particularly anxiety.[16] Although no association between weight and psychosocial disorders was identified in the present study, a trend toward higher PSC scores was observed as BMI increased. This finding highlights the importance of further investigating this association in populations with endocrine disorders.

Regarding the endocrine diseases analyzed, the prevalence of positive PSC screening for psychosocial difficulties was higher among participants with T1DM. This finding aligns with evidence demonstrating the severe impact of T1DM on mental health in young people. Studies have shown associations between the disease and elevated levels of anxiety, depression, and reduced quality of life.[11],[17],[18] The psychological burden is compounded by daily disease management, which requires rigorous monitoring, insulin therapy, and dietary restrictions. Approximately 15% of adolescents with T1DM—almost one in seven—report depressive symptoms, which directly impair disease self-management.

In the present study, no association was observed between precocious puberty and psychosocial disorders, which contrasts with findings in the literature. A 2022 review suggests that early pubertal maturation may increase the risk of psychosocial difficulties, although evidence remains limited. Conversely, a 2025 German cohort study demonstrated that central precocious puberty (CPP) significantly increases the risk of depression, anxiety, attention-deficit/hyperactivity disorder, and conduct disorders.[19],[20] Additionally, girls with precocious puberty are more likely to experience depression, anxiety, low self-esteem, and behavioral and emotional problems resulting from the stress induced by early physical and social changes.[21],[22]

In the present study, children with hypothyroidism did not exhibit symptoms of mental disorders, which contrasts with the literature that show a connection of hypothyroidism particularly its congenital form to deficits in neuropsychomotor development and mood disturbances, such as depressive symptoms.[23],[24] Similarly, a study conducted in a hospital in Pakistan reported a high prevalence of anxiety and depression symptoms among adolescents and young adults with thyroid dysfunctions.[25] The absence of this correlation in the present study may be a consequence of the small sample size.

Although there wasn`t association between disease duration and emotional or psychosocial risk, it is noteworthy that all positive cases were in the group with a diagnosis between 1 and 5 years. This finding is consistent with studies indicating that the period of adaptation to a chronic disease represents a phase of increased emotional vulnerability. Despite the lack of statistical association, this may be explained by the small sample size and the unequal distribution of participants across groups. Nevertheless, this pattern suggests that the first years following diagnosis, particularly between 1 and 5 years, may be an important period for providing mental health support to children and adolescents.[3],[16],[17]

This study had some limitations, including the small sample size and the specificity of the study population, which consisted of participants with endocrine diseases from a single center. These factors limit the generalization of the findings and reduce the statistical power of the analyses, making it difficult to identify true associations. In addition, it is important to note that the PSC is a screening instrument rather than a diagnostic tool, which may limit the detection of all cases at psychosocial risk.

V.CONCLUSION:

In this study, no association was observed between endocrine diseases and PSC scores, although a higher proportion of positive cases was identified among patients with elevated BMI and Type 1 Diabetes Mellitus, highlighting the importance of a comprehensive approach. The PSC is useful for the early detection of psychosocial and emotional risks; however, clinical assessment remains essential. Future studies with larger samples are needed to validate these findings and improve care strategies.

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