

## Application of Pediatric Symptoms Checklist in Children with Academic Underachievement

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### Abstract:

**Objective:** To carry out a psychosocial and emotional disorders screening in children with academic underachievement through the application of the Pediatrics Symptoms Checklist (PSC).

**Methods:** Cross-sectional, epidemiological, observational cohort study with children and teenager, aged from 6 to 14 years old, followed up at a academic underachievement outpatient clinic of a University Hospital. The analyzed variables were PSC score, gender, age, school grade, BMI, and its correlations.

**Results:** They were analyzed 137 clinical charts, of which 20 were excluded because of improper filling, 117 children were included, 80 (68.4%) male and 37 (31.6%) female. The average age was 8.71 ( $\pm 1.71$ ), and 85 (72.65%) had negative PSC score and 32 (27.35%) had positive PSC score. The covariance analysis showed that, beyond the age, the positivity in the PSC score was a direct and independent predictor of the school grade ( $p < 0.000$  e  $p = 0.004$ , respectively).

**Conclusion:** Gender, school grade, and BMI did not present as risk factors for mental disorders in children and teenagers with academic underachievement in this study. The positivity of the PSC scale and age were determinant and independent factors in school delay. Screening instruments for mental disorders, such as the PSC questionnaire can be useful in the routine evaluation of these children and teenagers, once it can help to detect psychosocial and emotional difficulties, leading toward a mental health professional evaluation.

**Key-words:** child, adolescent, underachievement, mental disorder, questionnaire.

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### I. Introduction

Academic Underachievement (AU) is defined as lower school performance at certain age, and it is a common condition between children and teenagers (Siqueira and Gurgel, 2011). Studies show that school deficit is present in about 15 to 20% of the children at the beginning of schooling (Ohlweiler, 2006). Learning skills difficulties are divided into two types: school difficulties, related to pedagogic issues; and learning disorders, related to a Central Nervous System malfunction, because of a school skills development and/or acquisition failure, excluding factors in order of sensorial, motor, cultural and others (Ciasca, 2003).

Childhood mental health disorders have a global prevalence rate of 15.8%, being that it increases proportionally to the age, reaching 10.2% among preschoolers and 16.5% in teenagers (Roberts et al, 1998). Among the most prevalent disorders are depressive disorder (DD), anxiety disorder (AD), oppositional defiant disorder (ODD), and attention deficit/hyperactivity disorder (ADHD). Therefore, the association between AU and mental health disorders has created the need to carry out research to comprehend it as a multifactorial phenomenon, which involves family, social, environmental, and even organic matters (Thiengo et al, 2014).

The use of valid instruments in mental disorder screening is an alternative, once the early perception of its signals and symptoms can improve the evolution of children with AU and minimize its individual and social impacts (Muzzolon et al, 2013; Muzzolon and Santos, 2008). In that way, the application of questionnaires such as the Pediatrics Symptoms Checklist (PSC) assists in both, diagnosis and treatment, and the follow-up of these children, besides contributing to identifying behavioral and emotional aspects of the schoolers (Gordon, 1993). Early detection of signals and symptoms could improve the evolution of children with AU and minimize its individual and social impacts (Meister et al, 2001).

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This research had as objective to carry out a psychosocial and emotional screening in children and teenagers followed up by an academic underachievement outpatient clinic of a University Hospital.

## II. Material and Methods

Cross-sectional, epidemiological, observational cohort, study with children and teenagers of both genders, ages ranking from 6 to 14 years old, followed up at an academic underachievement outpatient clinic at a teaching hospital. The analyzed variables were PSC score, gender, age, school grade, BMI, and its correlations.

All the medical records of this outpatient clinic were selected. The questionnaires were answered by the parents or legal guardians, applied by medicine or psychology students, and supervised by a psychologist or a pediatrician. The research was carried out from 2010/January to 2022/December. PSC questionnaire was used for the psychosocial and emotional disorders screening, which is a screening instrument for the identification of children and teenagers with social and/or emotional issues, and it is composed of 35 items that assess the behavior of the child towards some situations in order to demonstrate the frequency of occurrence. Each item score varies according to the answer: zero for “never”, one for “sometimes”, and two for “often”. The established cutoff for this research was equal or superior to 28 points, situation wherein the subject would have the indication of being referred to a mental health professional evaluation.

The weight of the participants was measured on a digital scale of the Líder® Branding (model P-300C, series 31403, fabrication year: 2014; Brazil) and the height was measured using a wall stadiometer (model E150 A, Tonelli Equipamentos Médicos Ltda., fabrication year: 2014, Brazil). After performing these measures, the body mass index (BMI) was calculated through the division of the weight (in kilograms) by the square of the height (in meters), and the results were classified accordingly to the World Health Organization (WHO, 2007) 's charts to age and gender in severe thinness, thinness, normal weight, overweight and obesity, Z-score based (WHO). They were grouped into: group 1 (severe thinness and thinness), group 2 (normal weight) and group 3 (overweight and obesity).

Exclusion criteria were children in which the PSC scale was not applied, participants not accompanied by their legal guardian, guardians that did not authorize the participation of the child in this study, and subjects that did not desire to participate.

All statistics analyses were made in the IBM SPSS Statistics software, version 26.0, Armonk, NY: IBM Corp, 2021. Regarding statistical analysis, it considered quantitative variable descriptive statistics (average and standard deviation) and qualitative (absolute and relative frequency), in percentage. The association of the variables PSC-related was calculated through the Pearson Chi-Square test. In addition to that, Covariance Analysis was used for following variables: gender, age, school grade, BMI, and PSC score. It was considered significant levels of  $p < 0.01$ .

This research was approved by the Committee of Research Ethics of the Western Paraná State University from Cascavel, PR, Brazil, under the number 5,262,877 on 2022, February 24<sup>th</sup>.

## III. Results

In the study period, 137 medical records of children between 6 and 14 years old were analyzed, 20 being excluded because of the non-application of the PSC questionnaire. Table 1 displays the absolute and relative frequencies of the analyzed variables of the 117 selected medical charts.

**Table 1 – Relative (%) and absolute (n) frequencies, average age and the standard-deviation (SD) of the sample of the research.**

Variables	Categories	n	%
PSC* scale	Negative	85	72.7
	Positive	32	27.4
Gender	Male	80	68.4
	Female	37	31.6
Grade	1	4	3.4
	2	17	14.5
	3	50	42.7
	4	25	21.4
	5	10	8.6
	6	4	3.4
	7	3	2.6
	8	3	2.6
	9	1	0.9
BMI**	Group 1	3	2.6
	Group 2	67	58.3
	Group 3	45	39.1
	6	7	6.0

	7	23	19.7
	8	30	25.6
	9	25	21.4
<b>Age</b>	10	15	12.8
	11	8	6.8
	12	5	4.3
	13	3	2.6
	14	1	0.9
<b>Age (Average+ SD)</b>	8.7±1.71		

\* PSC: Pediatric Symptoms Checklist. \*\* BMI: Body Mass Index.

Qualitative variables categories association analysis demonstrated that there was no statistical difference between the positive and negative PSC groups of children ( $p > 0.01$ ), denoting, thus, that sex, school grade and BMI are no risk factors for psychosocial and emotional disorder development (Table 2).

**Table 2 – Association among PSC and gender, school grade, BMI, and age variables of the studied sample.**

Variables	Categories	Participants		Positive		p-value**
		n	%	n	%	
<b>Gender</b>	Male	80	68.4	21	26.3	0.695
	Female	37	31.6	11	29.7	
	1	4	3.4	1	25	
	2	17	14.5	9	52.9	
	3	50	42.7	9	18	
	4	25	21.4	8	32	
<b>Grade</b>	5	10	8.6	3	30	0.287
	6	4	3.4	1	25	
	7	3	2.6	1	33.3	
	8	3	2.6	0	0	
	9	1	0.9	0	0	
	Group 1	3	2.6	1	33.3	
<b>BMI*</b>	Group 2	67	58.3	16	23.8	0.264
	Group 3	45	39.1	14	31.1	
	6-9 years	85	72.7	21	24.7	
<b>Age</b>	10-14 years	32	27.3	11	34.4	0.684
* BMI: Body Mass Index. ** p-value <0,01 is significant						

Qualitative variable categories association showed that age and PSC score are independent predictors of the school grade ( $p < 0.000$  and  $p = 0.004$ , respectively), with the effect corrected by the other variables included in the model (Table 3).

**Table 3 – Association among school grade and the gender, age, PSC, and BMI variables of the studied sample.**

Variables	p-value***
Gender	0.875
Age	0.000
PSC*	0.004
BMI**	0.439

\* PSC: Pediatric Symptoms Checklist.

\*\* BMI: Body Mass Index.

\*\*\* p-value <0.01

#### IV. Discussion

Mental illness has been widely studied due to its incidence and development impact that it may cause in children and teenagers, especially related to AU (Siqueira and Gurgel, 2006; Borba et al, 2017). The literature points out that learning deficits are condition of psychosocial risk, once childhood education has a main role in

the integration of the individual into society (Muzzolon and Santos, 2008; Tomé and Matos, 2006; Medeiros and Loureiro, 2004). Children with school difficulties present inadequate coping modes towards everyday situations and interpersonal relations, with the predominant conducts that suggest low self-regulation capability, hostility, and rule resistance (Marturano et al, 2004; Hinshaw, 1992).

In the present study, boys showed a higher percentage of AU, corroborating with literature, which demonstrates a bigger prevalence of learning difficulty in male children (Rutter et al, 2004; Shaywitz et al, 1990; Santos and Graminha, 2006). This proportion of boys at an academic underachievement outpatient clinic may be biased since the medical referral occurs when associated with aggressive, impulsive, or hyperactive behavior, most commonly in male (Folco et al, 2021; Abreu and Marturano, 2010). However, literature data showed that the prevalence is still bigger in boys and that the bias only overestimates such proportion (Folco et al, 2021; Arnold, 1997).

This research did not show association between mental disorder and gender, yet the percentage of boys found in it was higher. The literature shows a bigger association of some psychiatric disorders, such as ADHD, ODD, and substance abuse with males (Thiengo et al, 2014; Osti and Brenell, 2013). Furthermore, during childhood, academic underachievement represents an association with inattention and hyperactivity, while in adolescence it is more related to antisocial and opponent behavior (Hinshaw, 1992; Canino et al, 2004). Studies still describe that mental illness in academically underachieved girls may be underdiagnosed, since they express fewer externalizing symptoms, which causes less impact in family and school context, with consequently fewer medical evaluations referrals (Biederman et al, 1999).

According to medical literature, there is an association between mental disorders and AU in children and teenagers (Borba and Marin, 2018; Tomé and Matos, 2006; Roeser and Eccles, 2000). The behavioral disorders influence the academic environment, once it might express internally, such as anxiety attitudes, fear, social retraction, and shyness, or externally, with opposition, aggression, hyperactivity, impulsivity, defiant, and antisocial manifestation behaviors (Hinshaw, 1992; Santos and Graminha, 2006; Folco et al, 2021). In this sense, those children have difficulties do deal with school demands, since they present conflicts in interpersonal relations and are not able to dedicate themselves to curricular activities, which compromise their academic achievement and lead to a school grade-related delay (Navon et al, 2001).

This study showed association between psychosocial and emotional problems with school grade delay, so they correlate and present as a risk condition between them, given that behavior problems interfere with school performance such as can complicate them, as described in the literature (Medeiros and Loureiro, 2004; Muzzolon et al, 2013; Arnold et al, 2005).

## V. Conclusion

The acknowledgement and the early intervention of mental disorders in children that present school difficulty is important to change the prognostic and minimize the future negative social effects, contributing to a healthier psychosocial development of the child. Tool to mental illnesses screening, such as the PSC questionnaire, should be part of the pediatrician's evaluation routine during the investigation of AU, as it can subside the detection of behavioral difficulties of the patients and refer them to a better mental health-related investigation. School delay and psychoemotional disorder probability by PSC are intimately related.

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