

# PSYCHOSOCIAL CHARACTERISTICS IN CHILDREN WITH ASTHMA REGARDING PHYSICAL ACTIVITY

CARACTERIZAÇÃO PSICOSOCIAL DA CRIANÇA ASMÁTICA EM RELAÇÃO À ATIVIDADE FÍSICA

CARACTERIZACIÓN PSICOSOCIAL DEL NIÑO ASMÁTICO CON RELACIÓN A LA ACTIVIDAD FÍSICA



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## ABSTRACT

**Introduction:** Children who are more active enjoy sports, have confidence in their ability to engage in physical activity, feel competent and perceive fewer barriers to physical activity. **Objective:** Psychosocially characterize the asthmatic child's relationship with enjoyable physical activity, physical self-concept, health and perceived quality of life. **Method:** Eighty asthmatic children (age =  $11.33 \pm 1.10$  years, body mass index [BMI] =  $20.52 \pm 3.83$  kg/m<sup>2</sup>) and 80 healthy children (age =  $11.18 \pm 1.00$  years, BMI =  $20.81 \pm 4.24$  kg/m<sup>2</sup>) participated in the study. The Physical Activity Enjoyment Scale (PACES), Physical Activity Questionnaire for Children (PAQ-C), the Physical Self-concept Questionnaire (CAF) and the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) were used. **Results:** In the PACES questionnaire, healthy children had a better level of general physical activity while in the CAF questionnaire, significant differences were found in ability, physical fitness and general self-concept, which were higher in healthy children. There is a significant correlation between the PAQ-C and ability, general physical self-concept, PACES and total PAQLQ in asthmatic children. **Conclusion:** Asthmatic children had lower levels of physical activity, physical self-concept and enjoyment in physical activity than healthy children.

**Level of evidence II; Retrospective study.**

**Keywords:** Motor activity; Pleasure; Child; Asthma.

## RESUMO

**Introdução:** As crianças mais ativas gostam de esportes, confiam em sua capacidade de realizar atividades físicas, sentem-se competentes e percebem menos barreiras à atividade física. **Objetivo:** Caracterizar psicossocialmente a relação da criança asmática com prática prazerosa de atividade física, autoconceito físico, saúde e qualidade de vida percebida. **Método:** Participaram 80 crianças asmáticas (idade =  $11,33 \pm 1,10$  anos, com índice de massa corporal – IMC =  $20,52 \pm 3,83$  kg/m<sup>2</sup>), e 80 crianças saudáveis (idade =  $11,18 \pm 1,00$  anos, IMC =  $20,81 \pm 4,24$  kg/m<sup>2</sup>). Utilizaram-se a Physical Activity Enjoyment Scale (PACES), o Physical Activity Questionnaire for Children (PAQ-C), o Questionário de Autoconceito Físico (CAF) e o Paediatric Asthma Quality of Life Questionnaire (PAQLQ). **Resultados:** Com relação ao PACES, as crianças saudáveis apresentaram melhor nível de atividade física geral. No CAF, encontraram-se diferenças significativas na habilidade, condição física e autoconceito geral, sendo estes maiores nas crianças saudáveis. Houve correlação significativa entre PAC-C e habilidade, autoconceito físico geral, PACES e PAQLQ total em crianças asmáticas. **Conclusão:** As crianças asmáticas apresentam níveis de atividade física, autoconceito físico e prazer na prática da atividade física inferiores em relação às saudáveis.

**Nível de evidência: II; Estudo retrospectivo.**

**Descritores:** Atividade motora; Prazer; Criança; Asma.

## RESUMEN

**Introducción:** A los niños más activos les gustan los deportes, confían en su capacidad de realizar actividades físicas, se sienten competentes y perciben menos barreras para la actividad física. **Objetivo:** Caracterizar psicossocialmente la relación del niño asmático con la práctica placentera de actividad física, autoconceito físico, salud y calidad de vida percibida. **Método:** Participaron 80 niños asmáticos (edad =  $11,33 \pm 1,10$  años, con índice de masa corporal – IMC =  $20,52 \pm 3,83$  kg/m<sup>2</sup>), y 80 niños saludables (edad =  $11,18 \pm 1,00$  años, IMC =  $20,81 \pm 4,24$  kg/m<sup>2</sup>). Se usaron la Physical Activity Enjoyment Scale (PACES), el Physical Activity Questionnaire for Children (PAQ-C), el Cuestionario de Autoconceito Físico (CAF) y el Paediatric Asthma Quality of Life Questionnaire (PAQLQ). **Resultados:** Con relación al PACES, los niños saludables presentaron mejor nivel de actividad física general. En el CAF, se encontraron diferencias significativas en la habilidad, condición física y autoconceito general, siendo éstos mayores en los niños saludables. Hubo correlación significativa entre PAQ-C y habilidad, autoconceito físico general, PACES y PAQLQ total en niños asmáticos. **Conclusión:** Los niños asmáticos presentan niveles inferiores de actividad física, autoconceito físico y placer en la práctica de la actividad física con relación a los saludables. **Nivel de evidencia: II; Estudio retrospectivo.**

**Descritores:** Actividad motora; Placer; Niño; Asma.



## INTRODUCTION

Children with bronchial asthma, especially those with more severe symptoms, tend to have a sedentary lifestyle and therefore lower cardio-respiratory aerobic capacity than healthy children.<sup>1</sup> Fear to dyspnea and an induced asthma attack inhibits participation in the physical-sports activity of many children.<sup>2</sup> All this, causes a deterioration of physical condition<sup>3</sup> and a lower capacity for physical work in relation to healthy children.<sup>4</sup> People with asthma may show less tolerance to exercise, due to worsening asthma symptoms during physical exertion or for other reasons, such as lack of physical condition, as a result of inactivity, medical advice or family influence and this could lead to the reduction of physical condition.<sup>5</sup> Although there is no and no reason to discourage children with asthma, with controlled disease to exercise.<sup>6</sup>

Therefore, physical activity can be useful in the management of asthma<sup>7</sup> and in the development of this disease<sup>8</sup> improving the management of asthma symptoms, lung function and mental health.<sup>9</sup>

The development of different attitudes and behaviors towards exercise can increase the participation of children with asthma in exercise, contribute to mental and physical health, to a better management of the disease, to prevent complications and to delay the development of the disease.<sup>10</sup>

Psychological factors such as self-identity, self - efficacy, perceived competence, enjoyment of physical activity and subject motivation influencing participation in physical activity.<sup>11</sup> Previous research has shown that a positive perception of physical competence is linked to enjoyment in physical exercise<sup>12</sup> and that there is a positive association between self-efficacy and physical activity.<sup>13</sup> The enjoyment of physical activity is cited as an important predictor of the participation of physical activity and is included in many models of health promotion and theories of the motivation of behavior.<sup>14</sup> Children who are more active enjoy sports, have confidence in their ability to perform physical activity, feel competent and perceive fewer barriers to physical activity in the future.<sup>15</sup>

Past negative experiences with exercise can lead to unpleasant perceptions of participation in physical activity, leading to a vicious circle of sedentary habits.<sup>16</sup> Children with asthma who experience the benefits of exercise are more likely to be active throughout their lives, however, there is little research that focuses on attitudes towards exercise from the perspective of school-age children with asthma.<sup>17</sup> More research is needed to analyze the relationship between children with asthma and sports. Currently, the psychosocial responses of children with asthma in relation to physical activity have not been described comprehensively. Therefore, the aim of this study is to determine the relationship between physical activity and enjoyment, physical self-concept and perceived health and quality of life in children with asthma.

## MATERIALS AND METHODS

### Participants

160 children participated, 80 children with asthma (age=11.3±1.10 years, body mass index [BMI]=20.52±3.83 kg/m<sup>2</sup>) diagnosed of asthma by the allergology unit of two Andalusian hospitals (Spain), 60% they had moderate persistent asthma and 40% intermittent asthma, and 80 children without asthma (age= 11.18±1.00 years, BMI=20.81±4.24 kg/m<sup>2</sup>), all of them enrolled in eight educational centers in the province of Jaén (Spain). We found a balanced percentage distribution by sex, in the group of asthmatics 39 children (48.7 %) and 41 girls (51.3%) participated and in the healthy group, 29 children (36.3%) and 51 girls (63.7 %). All children with asthma respected the following inclusion criteria: diagnosis of asthma and severity according to the Global Initiative for Asthma<sup>18</sup> under medical treatment at least six months before the study and in a stable phase of the disease. Along with healthy children,

it was established as exclusion criteria that they did not suffer from other cardiopulmonary, musculoskeletal and intellectual disability diseases. The study was conducted in adherence to the ethical standards of the Declaration of Helsinki (2013 version) and following the considerations provided in the *European Community's Guidelines for Good Clinical Practice* (111/3976/88, July 1990) in addition to the Spanish legislation on the subject. clinical investigations with humans (Royal Decree 561/1993). The model of informed consent and the study were finally approved by the Bioethics Committee of the University of Jaén (Spain). The legal guardians of all the underage participants signed the informed consent.

As anthropometric parameters we analyzed the height (cm) that was measured with a stadiometer (Seca 222, Hamburg, Germany). The weight (Kg) was registered with a scale Seca 634 (Hamburg, Germany). The BMI was obtained from the formula, BMI = weight(Kg)/height(m<sup>2</sup>). The *Physical Activity Enjoyment Scale (PACES)* was used,<sup>19</sup> in its Spanish version,<sup>20</sup> to measure enjoyment in the practice of physical activity. Alpha Cronbach in this study was .907. Physical activity was calculated using the *PAQ-C questionnaire (PAQ-C, Physical Activity Questionnaire for Children)*.<sup>21</sup> We have used the translated version of Martínez-Gómez et al.<sup>22</sup> with translation and retranslation of the item added in the children's version. Alpha Cronbach in this study was .726. To analyze the physical self-concept, we used the physical self-concept questionnaire (CAF),<sup>23</sup> Alpha Cronbach in this study was .922. By last, the analysis of the quality of life of children with asthma was performed by *PAQLQ (Pediatric Asthma Quality of Life Questionnaire)* in its Spanish version.<sup>24</sup> Alpha Cronbach in this study was .955

### Statistic analysis

The data were analyzed using the statistical program *SPSS*, V.20.0 for Windows, (SPSS Inc., Chicago, USA). The data are shown in descriptive statistics of mean, standard deviation. The normal distribution of the data was verified by the Kolmogorov - Smirnov test, so we opted for non-parametric tests. The Mann Whitney U test was used for comparison between groups and Spearman correlations were also made between variables. Significance levels were established at  $\alpha = 5\%$ .

## RESULTS

Table 1 shows the results of the CAF, PACES, PAQ-C and PAQLQ questionnaires. In the CAF there are significant differences in skill ( $p=.027$ ), physical condition ( $p<.001$ ) and general self-concept ( $p<.001$ ), which is higher in healthy children. In the PACES, healthy children obtain a better score ( $p=.007$ ). Finally, in the PAQ-C, healthy children have a higher level of general physical activity ( $p<.001$ ) and specifically, greater physical activity in the Physical Education class (items 2,  $p<.001$ ) and at school break (items 3,  $p=.027$ ).

Table 2 shows the results of the Spearman correlation analysis between the PAQ-C and the rest of the variables analyzed. We highlight the significant correlation between the PAQ-C and the skill ( $r=.310$ ,  $p<.01$ ), general physical self-concept ( $r=.308$ ,  $p<.01$ ), PACES ( $r=.280$ ,  $p<.05$ ) and total PAQLQ ( $r=.271$ ,  $p<.05$ ) in children with asthma.

## DISCUSSION

This study involves a broad approach to the psychosocial characterization of the children with asthma in relation to physical activity, jointly analyzing aspects related to the practice of physical activity, self-concept, enjoyment through physical activity and health and quality of life. The most relevant finding of this study was the presence of lower values of physical self-concept, physical activity practice and enjoyment in children with asthma in relation to their healthy peers.

In relation to physical self-concept, significant differences were found between groups in the dimension of ability, physical condition

**Table 1.** Scores equivalent to CAF, PACES, PAQ-C and PAQLQ in asthmatic and healthy children.

	GA X ± S	GS X ± S	p-value
<b>CAF - Self-concept</b>			
Ability	21.60 ± 4.60	23.35 ± 4.04	0.027
Physical condition	19.76 ± 5.48	23.08 ± 4.82	< 0.001
Attractive	19.81 ± 4.04	19.71 ± 4.49	0.985
Force	20.74 ± 5.60	20.65 ± 4.75	0.702
General Physical Self-concept	24.24 ± 4.87	25.43 ± 4.46	0.099
General Self-concept	22.70 ± 4.47	25.18 ± 4.21	< 0.001
PACES - Enjoy in Physical Activity	4.07 ± 0.73	4.41 ± 0.50	0.007
<b>PAQ-C - Physical Activity</b>			
P.E. Class	3.24 ± 1.35	3.98 ± 0.99	< 0.001
Time at recess	2.04 ± 1.35	2.51 ± 1.44	0.027
General Physical Activity	2.45 ± 0.61	2.83 ± 0.55	< 0.001
<b>PAQLQ - Quality of Life</b>			
Limitation of activities	3.53 ± 1.43	NA	
symptom	3.89 ± 1.44	NA	
Emotional function	4.58 ± 1.53	NA	
PAQLQ Total	4.04 ± 1.37	NA	

GA (asthmatic group); GS (healthy group); CAF (Physical Self-Concept Questionnaire); PACES (Physical Activity Enjoyment Scale); PAQ-C (Physical Activity Questionnaire for Children); Items 2: In the last seven days, during the Physical Education class, how often are you very active (playing hard, running, jumping, throwing)? Items 3: In the last seven days, what have you done most of the time at recess? PAQLQ total (Pediatric Asthma Quality of Life Questionnaire); NA Not applicable.

**Table 2.** Spearman correlation between the general physical activity of the PAQ-C and other variables analyzed.

	GA	GS
IMC	-0.143	-0.125
<b>CAF - Self - concept</b>		
Ability	0.310**	0.135
Physical condition	0.283*	0.230*
Attractive	0.228*	0.186
Force	0.297**	0.200
General Physical Self-concept	0.308**	0.230*
General Self-concept	0.187	0.152
PACES - Enjoy in Physical Activity	0.280*	0.196
<b>PAQLQ - Quality of Life &lt;</b>		
Limitation of activities	0.323**	NA
symptom	0.222	NA
Emotional function	0.256*	NA
PAQLQ Total	.271*	NA

GA (asthmatic group); GS (healthy group); IMC (body mass index); CAF (Physical Self-Concept Questionnaire); PACES (Physical Activity Enjoyment Scale); PAQ-C (Physical Activity Questionnaire for Children); PAQLQ total (Pediatric Asthma Quality of Life Questionnaire); NA Not applicable. \* p <.05, \*\* p <.01. <a higher score higher quality of life.

and general self-concept, with the group of healthy children presenting the highest score. The results obtained in the physical self-concept are similar to those provided in healthy adolescents by Etzaniz<sup>25</sup> and Revuelta and Esnaola<sup>26</sup> but higher than the study with boys and girls aged 11 to 17 years of Soriano et al.<sup>27</sup> However, Chiang et al.<sup>28</sup> and NTRA not any significant differences in physical self - concept of asthmatics and healthy children of similar age to those in this study.

In the degree of satisfaction with the activity performed, measured through the PACES questionnaire, significant differences between groups have been found and reveal greater enjoyment by physical activity in healthy children. It is possible that part of the physical activities carried out by children with asthma both in the school and in the extracurricular field are not adapted to the level of the disease, which may compromise the general enjoyment of physical activity and consequently the motivation and adherence to it. In this sense, Spearman correlation analysis highlights that the level of physical activity correlates significantly in children with asthma and PACES. In a review, Van der Horst et al.<sup>13</sup> found no association between physical activity and enjoyment towards it, however, Davison et al.<sup>29</sup> point out significant correlations of PACES with athletic competition and with subjective perception in physical activity in healthy children.

In relation to the daily physical activity of children with asthma, several investigations corroborate the results obtained from this study and that is that children with asthma have a lower level of physical activity in relation to their healthy peers,<sup>30,31</sup> above all, as regards refers to vigorous activities.<sup>28</sup> This study also highlights the lower involvement of children with asthma in school physical activities. The results found in this study in healthy children are similar to the study by Martínez-Gómez et al.<sup>22</sup> in adolescents.

The level of physical activity in children with asthma correlates significantly with all the dimensions of the CAF except for the general self-concept. In this sense, Moreno et al.<sup>32</sup> highlighted an association between the level of physical activity - sports and physical self-concept in healthy children and adolescents. In the same way, other authors find a positive association between self-efficacy and physical activity.<sup>17</sup> Finally, another relevant finding of this study is the positive correlations between the level of physical activity and the health and quality of life of the children with asthma.

As limitations of this study, we emphasize that the differences between the sexes have not been analyzed or taking into account the severity of the asthma, which would require even more this characterization. Future research should address these limitations.

## CONCLUSIONS

As a conclusion of this study it should be noted that children with asthma have levels of physical activity, physical self-concept and physical activity enjoyment lower than healthy children. These results should be a reference for the design of physical and sports exercise programs that favor the incorporation and increase of the adherence of children with asthma to physical activity, which has been shown to be an effective treatment for asthma.

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