ORIGINALES

Child asthma control: main associated factors
Controlo da asma infantil: principais fatores asociados
Control del asma infantil: principales factores asociados

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ABSTRACT:
Introduction: Asthma is an airways chronic and inflammatory disease characterized by episodes of reversible bronchial obstruction and can be triggered by several factors. It is the most common childhood disease, an important hospitalization cause and a public health problem. International guidelines of asthma management recognize that treatment based on current management and exacerbations risk, which are based on symptom management. Regarding the control perception of childhood asthma, there are discrepancies between the caregiver's perception and the international indications.
Objectives: To describe and analyze the clinical, sociodemographic and factors associated with childhood asthma control.
Methodology: Methodological, quantitative and transversal study, in a sample of 60 children, between 6 and 11 years, and caregivers. Asthma control was evaluated by the instrument childhood Asthma Control Test.
Results: The sample consisted of 60 children and caregivers. 12% (n = 7) of the children had uncontrolled asthma, 53% (n = 32) partly controlled asthma. In 38% (n = 23) of the caregivers there were discrepancies between the grade classified through the international guidelines and their perception. Logistic Regression analysis confirms that children with inhalational rescue therapy needs 7 times more likely asthma to be uncontrolled.
Conclusion: The complexity of the factors that interfere in the control of asthma is urgent and there is a need for symptom management intervention programs focused on the caregivers, the child and the identified needs.

Key words: children asthma; care provider; symptom management; asthma control; nursing.

RESUMO:

Introdução: A asma apresenta-se como uma doença crónica e inflamatória das vias aéreas caracterizada por episódios de obstrução brônquica reversível podendo ser desencadeada por diversos fatores. Constitui-se como a doença infantil mais comum, uma importante causa de internamento hospitalar e um problema de saúde pública. As diretrizes internacionais sobre a gestão da asma reconhecem que o tratamento reside no controlo atual e no risco de exacerbações, sendo baseados na gestão de sintomas. Relativamente à perceção do controlo da asma infantil, existem discrepâncias entre a perceção dos cuidadores e as indicações internacionais.

Objetivos: Descrever e analisar os dados clínicos, sociodemográficos e fatores associados ao controlo da asma infantil.

Metodologia: Estudo metodológico, quantitativo e transversal, numa amostra de crianças, entre os 6 e os 11 anos, com asma e cuidadores. O controlo da asma foi avaliado pelo instrumento Childhood Asthma Control Test.

Resultados: A amostra foi composta por 60 crianças e cuidadores. 12% (n=7) das crianças apresentam asma não controlada e 53% (n=32) asma parcialmente controlada. Em 38% (n=23) dos cuidadores existiram discrepâncias entre o grau classificado mediante as guidelines internacionais e a sua perceção. A análise de Regressão Logística confirma que as crianças com necessidades de terapêutica inalatória de resgate apresentam 7 vezes maior probabilidade da asma estar não controlada.

Conclusão: Torna-se perentório a necessidade de apreensão da complexidade dos fatores que interferem no controlo da asma, existindo necessidade de programas de intervenção de gestão de sintomas centrados nos cuidadores, na criança e nas necessidades identificadas.

Palavras-chave: asma infantil; prestador de cuidados; gestão de sintomas; controlo da asma; enfermagem.

RESUMEN:

Introducción: El asma aparece como una enfermedad inflamatoria crónica de las vías respiratorias y se caracteriza por episodios de obstrucción bronquial reversible pudiendo ser desencadenada por varios factores. Se constituye como la enfermedad infantil más común, una importante causa de internamiento hospitalario y un problema de salud pública. Las directrices internacionales sobre la gestión del asma reconocen que el tratamiento reside en el control actual y en el riesgo de exacerbaciones, basándose en la gestión de los síntomas. En cuanto a la percepción del control del asma infantil, existen discrepancias entre la percepción de los cuidadores y las indicaciones internacionales.

Objetivos: Describir y analizar los datos clínicos, sociodemográficos y factores asociados al control del asma infantil.

Metodología: Estudio metodológico, cuantitativo y transversal, en una muestra de niños, entre los 6 y los 11 años, con asma y cuidadores. El control del asma ha sido evaluado por el instrumento Childhood Asthma Control Test.

Resultados: La muestra fue compuesta por 60 niños y cuidadores. 12% (n = 7) de los niños presentan asma no controlada y 53% (n = 32) asma parcialmente controlada. En el 38% (n = 23) de los cuidadores existieron discrepancias entre el grado clasificado mediante las pautas internacionales y su percepción. El análisis de Regresión Logística confirma que los niños con necesidad de terapia inhalatoria de rescate presentan 7 veces mayor probabilidad de que el asma no esté controlada.

Conclusión: Resulta perentoria la necesidad de aprehender la complejidad de los factores que interfieren en el control del asma, existiendo necesidad de programas de intervención de gestión de síntomas centrados en los cuidadores, en el niño y en las necesidades identificadas.

Palabras clave: asma infantil; prestador de cuidados; gestión de síntomas; control del asma; enfermería.
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INTRODUCTION

Childhood asthma is a chronic inflammatory airways disease, manifested by episodes of hyperactivity of trachea and bronchi in response to stimuli various, resulting in airflow obstruction, spontaneously reversible or as a result of the strategies implementation[1]. Airways inflammation causes changes in the geometry and biomechanical properties, with excessive mucus production and consequent clogging

and decreased lumen, resulting in development and persistence of airflow obstruction[2], causing wheezing, shortness of breath, tightness in the chest and coughing recurrent episodes, predominantly in the early morning or evening periods[1]. According Weinberger[3], children's asthma presents more severity symptoms due to the physiological component of airways, presenting a small gauge and, therefore, less tolerant to the characteristic hyperactivity.

This disease is intrinsic to morbidity factors already described in the scientific community, being the main cause of school absenteeism[4], which, due to it's impact, is recognized as a school health issue[5]. There is also literature that supports the existence of other associated problems, such as poor academic performance, adaptation problems to school environment and social and psychological stress symptoms[6,7].

International guidelines on asthma management recognize that treatment is based on current management and the risk of exacerbations, which are based on symptom management [1]. In this sense, the goal of asthma treatment is to minimize symptoms, optimize lung function and prevent exacerbations [8]. In children, asthma control is assessed on the basis of symptom manifestation, activity limitation, and salvage therapy [1]. Reddel et al [9] point out the need to measure the level of functionality in asthma control, that is, indispensable evaluation, not the limitation, but the ability to achieve life activities and consequent quality of life.

According to the National Heart, Lung and Blood Institute [8] asthma control can be explained as the "degree to which the asthma manifestations are minimized by therapeutic interventions, that is, the degree to which the goals of therapy are satisfied". According to Global Initiative for Asthma (GINA) [1], in children between the ages of 6 and 11, there are guidelines for assessing asthma control, including monitoring of asthma symptoms within a 4 weeks, focusing on the evaluation of existence and intensity of diurnal and nocturnal symptoms, the limitation of life activities and the need for rescue therapy for symptomatic control, which can be classified as controlled, partially controlled or uncontrolled, as we can verify in Table 1.

Table 1 - Assessment of Asthma Control in Children

Asthma Symptom Control

In the last four weeks the child presented:	**Controlled**	**Partially Controlled**	**Uncontrolled**
1. *Asthma symptoms, during the day, more than twice a week?* 2. Nighttime Symptoms Due to Asthma? 3. *Need for rescue therapy more than twice a week?* 4. *Any limitation of activity due to asthma?*	You do not have any of the conditions	It presents one to two of the conditions	It presents three to four of the conditions

Source: GINA [1]

In this sense, asthma is considered to a complex disease, since it may depend on several multilevel factors, the nature of these factors and their interrelationships not being well understood, and may have an impact on several functional domains, including physical, psychological, social and family [10]. In Portugal, the National Program for Respiratory Diseases [11], considered as a priority intervention program and asthma is a priority intervention disease, in line with GINA guidelines [1] and Rule 016/2011 [12], not only harmonized management in order to delimit an early diagnosis, but also the necessary education of the child and the caregiver, the efficient use of the therapy to help control the disease, and the existence of surveillance, rehabilitation and rehabilitation procedures, monitoring integrated disease management.

The objectives of this research study are to analyze and describe the clinical, sociodemographic and factors associated with the control of childhood asthma, starting from both the asthma control perception by caregivers as well as the classification according to the international guidelines defined by GINA.

METHODOLOGY

This is a cross-sectional methodological study with a qualitative approach. The study sample consisted of children with asthma and their caregivers, belonging to six municipalities of Alto Minho, accompanied in primary health care. The criteria for inclusion in the sample were defined as follows:

• Children between 6 and 11 years with a diagnosis of asthma (medical diagnosis made through coding in the clinical process) for at least 6 months, with prescription of symptomatic relief therapy; Do not present other co-morbidities than asthma;

• Caregivers, older than 18 years, of children who met the criteria defined above, with reading and writing skills; Accept participate in the study along with the child.

The sampling technique by which the participants were selected was non-probabilistic of convenience, and the calculation of the sample size given that the population was small (n = 67) was the Raosoft Platform, where for an estimated error of 5%, with a Confidence Interval of 95%, the recommended sample was 58 observations. In this sense we opted for a sample with 60 observations. Data collection was carried out by the research team between September 2017 and March 2018.

As a data collection instrument, the childhood Asthma Control Test (c-ACT), constructed by Liu et al [13] and validated by the current research team, was used as the instrument Severity of Chronic Asthma by Horner, Kieckhefer & Fouladi [14]. Simultaneously, a sociodemographic and characterization questionnaire was applied.

The c-ACT instrument was developed with the aim of being a "simple reliable measurement tool to assess the asthma control in children" [13]. It was designed for use in children aged 4 to 11 years, being self-fulfilling and integrating the perspectives of both the child and the caregiver, capturing the "multidimensional nature" that is necessary for the management of symptoms [13]. This questionnaire, developed in the United States by Liu et al [13], is composed by two parts, a total of 7 items, of a Likert-type scale that assesses the level of asthma control in the last 4 weeks. The first part, destined to be completed by the child, is composed of 4 questions, with 4 response options each accompanied by an illustrative image of a boy's face, about the

perception of asthma control, the limitation on activities, the diurnal symptoms and nocturnal awakening, with no specific temporal limitation. In the second part of the scale, consisting of 3 questions, with 6 options of response, to be completed by the caregiver, questions are asked about the symptoms in the daytime, night and breathing noises, circumscribed to a time period of 4 weeks. Clinical validity findings for this instrument demonstrate that it has the ability to discriminate various levels of symptom control, consistent with GINA guidelines and sensitive to pulmonary function assessment parameters [15].

The total scale score is obtained by the sum of all items, which may be between 0 and 27, where the lowest values correspond to worse asthma control, in which the author of the scale, in its first publication of the instrument, considers a cut-off point of 19, where equal or lower scores indicate the presence of inadequate disease control [13]. At a later time and with the purpose of evaluating the content validity, the interpretation of the score of the instrument was optimized, making it sensitive to GINA guidelines, more specifically to the defined control degrees. In this sense, for the evaluation of the control of asthma, there are two cutoff points, namely: from 0 to 12 values it is considered uncontrolled asthma; of the 13 to 19 values is considered partially controlled asthma; of the 20 to 27 values is considered controlled asthma [16].

The instrument Severity of Chronic Asthma, originally constructed and validated by Horner, Kieckhefer & Fouladi [14], is addressed to caregivers of the child with asthma, where it is assessed using a Likert scale (0 = 2 or less, or never limited to, 3 = constant or no physical activity), the frequency of daytime symptoms, sleep disturbance due symptom control, and the limitation of asthma activity in a retrospective 4-week time frame. Their score determines a continuous measure of asthma severity that is categorized into four degrees of severity (intermittent, persistent mild, persistent moderate and persistent severe), according to National Heart, Lung and Blood Institute guidelines [8]. In the original study, for internal consistency, a Cronbach alpha value of 0.44 and other low psychometric parameters were obtained, however, these results were expected for the authors, since they refer to the fact that it is a multidimensional scale with independent parameters [14]. Its translation and adaptation to the Portuguese language was conducted by Silva & Barros [17], who, regarding the internal consistency of the instrument, Cronbach's alpha coefficient was 0.56, and other psychometric parameters were not analyzed in the study. In this sense, the psychometric properties of this instrument were evaluated in this study.

The data were organized and analyzed in the Statistical Package for Social Sciences (SPSS) version 21. It was started by the descriptive statistics analysis of sociodemographic and clinical descriptors, followed by the results of the application of childhood Asthma Control Test and Severity of Chronic Asthma, where its psychometric properties were evaluated, since it was not validated for the Portuguese population, and internal consistency was verified through Cronbach's Alpha Coefficient. In a second phase, the relationships between the level of asthma control diagnosed with sociodemographic and clinical variables were evaluated. Later, in order to increase the level of understanding of these relationships, we opted for the logistic regression technique to construct a predictive model. The level of significance adopted in the statistical analysis was 5% ($p = 0.05$).

In the planning of this research study, authorization was requested for the use of the c-ACT instrument to its author [13] and to the pharmaceutical company holding the direct

use, GlaxoSmithKline. For the use of the Severity of Chronic Asthma instrument, the author of the original version [14] and the authors responsible for translating and adapting the instrument into the Portuguese language were requested [17]. The study was authorized by the Ethics Committee for Health of the Local Health Unit of Alto Minho (Opinion 31/2017) and authorization was requested from the National Commission for Data Protection (authorization 4377/2017) to consult data on the clinical children with asthma. Informed consent was requested and confidentiality was guaranteed, ensuring anonymity participation.

RESULTS

Regarding the sample used, it consisted of 60 children with asthma and their caregivers. The majority of the patients were mothers (91.7%, n = 55) and aged between 26 and 59 years (M = 39; SD = 6.12). In relation to household income, we observed that 31.7% (n = 19) of the households, to which the child belongs, have a monthly income between 800 euros and 1350 euros and that 23% (n = 14) receive a monthly income between 500 euros and 800 euros. Regarding the perception of the economic difficulties of the household, 50% (n = 30) of the caregivers report that the household presents no economic difficulties, and 28.3% (n = 17) report that "from time to time" they present economic difficulties.

Regarding the work condition, caregivers mostly work full-time (71.7%, n = 43), where 40% (n = 24) present academic qualifications corresponding to secondary education and 35% (n = 21) completed the 3rd cycle of basic education.

With regard to the additive consumption of tobacco, it was considered not only the care provider, but also another member of the household that cohabits with the child. The results show that 36.7% (n = 22) of the children live with active smokers.

As for children with asthma, 53% (n = 32) are female and 47% (n = 28) are male. The children were aged between 6 and 11 years (M = 9; SD = 1.75). In relation to the disease, children presented asthma with an average of 5.87 years of evolution (SD = 2.6), which the diagnosis was defined on average at 3 years of age (SD = 2.28). Regarding health care, 63.3% (n = 38) of the caregivers reported that their choice fell on services of the National Health System, more specifically 43.3% (n = 26) performed this follow-up in an External Pediatric Consultation in a Public Hospital and in 20% (n = 12) of the cases, this monitoring is carried out in the scope of primary health care with the Family Health Team. In the remaining 36.6% (n = 22) the option was followed up in a Particular regimen, being performed in medical consultations of specialties, namely Pediatrics and Pulmonology.

Regarding asthma exacerbations, in medical terms, each child presented 4 days (SD = 7) of school absenteeism in last academic year, with an average of 1 (SD = 2) attendance in Emergency Service, and with an average of 1 (SD = 3) unscheduled medical consultation in the last 12 months (due to exacerbation of asthma). Regarding the need for rescue therapy, over a period of four weeks, on average, each child required pharmacological therapy (SD = 2.73; Range = 12). It is important to mention that 33% (n = 20) did not require the use rescue therapy, that is, 67% (n = 40) had a need for at least one rescue therapy in last 4 weeks.

Concerning perception asthma control of child by the caregiver, 85% (n = 51) classified asthma as partially controlled and 15% (n = 9) as controlled. It should be noted that no caregiver classified asthma as uncontrolled.

The results generated by application of c-ACT instrument showed that 35% (n = 21) of the children had controlled asthma and 65% (n = 39) uncontrolled asthma according the first version of this instrument that only had a cutoff point in 19 values. In order to objectively examine these results, analyzing the scores considered as uncontrolled asthma and the recent indications of the author of the scale, with two cut-offs, we observed that 11.7% (n = 7) of the children had uncontrolled asthma and 53 % (n = 32), their asthma is classified as partially controlled.

Regarding the instrument Severity of Chronic Asthma, since there are no validation studies of the instrument, we proceed to the analysis of its psychometric properties. The study of instrument fidelity, performed by internal consistency analysis, allowed us to verify that Cronbach's alpha value was 0.59, showing inadequate levels of internal consistency [18]. In this sense and given that this instrument does not reveal appropriate psychometric qualities, we opted for a qualitative analysis of the issues that make up the instrument, not proceeding with the factorial analysis.

In order to quantify the strength of the association between the c-ACT instrument score and the variables constituting the Severity of Chronic Asthma instrument, the Pearson coefficient was calculated. The results point to the existence of a moderate relationship and two strong relationships (R = -0.41 p = 0.001; R = -0.53 p = 0.000; R = -0.68 p = 0.000). In view of these results, quantification of asthma control was performed using the c-ACT instrument.

In order to assess the degree of agreement between the control of asthma obtained through the c-ACT instrument and the perception of asthma control by the caregivers, we used the calculation of Kappa Cohen test [19]. The coefficient presented is 0.024 (p = 0.694), being classified as a poor relation [20].

Given the size of the sample under study, for the analysis of Normality we used the Kolmogorov-Smirnov test. We attempted to test whether the 3 groups, which constitute the control of asthma, the variables follow a Normal distribution. The variables tested were as follows: caregiver's age; age of the child; age of the child in the diagnosis of asthma; number of years of disease progression; number of unscheduled medical visits in the last 12 months (due to asthma exacerbation); number of days of absenteeism in the last school year (due to asthma exacerbation); number of emergency room visits in the last 12 months (due to asthma exacerbation) and the use of inhaled rescue therapy in last 4 weeks. (KS = 0.30 p = 0.062, KS = 0.14 p = 0.137, KS = 0.16 p = 0.165) and the age of the child at diagnosis (KS = 0.16 pg) = 0.200, KS = 0.13 p = 0.190, KS = 0.17 p = 0.125) follow a normal distribution. These variables also present Homogeneity of variances, estimated by Levene test, presenting values of p <0.05.

In this sense, for the analysis of the comparison in the three groups regarding the age of the caregiver and the age of the child in the diagnosis we used the analysis of variance One-Way ANOVA, given that it is a parametric test and present conditions necessary to its applicability. The results show that null hypothesis is not rejected, that is, there is no evidence of the difference between the mean values of the caregivers' age (p = 0.511) and the age of the child at diagnosis (p = 0.415).

Since the conditions for the application of parametric tests were not met, Kruskal-Wallis test was used for the analysis of variance in the groups regarding the age of the child, the number of years of evolution of the disease; to the number of unscheduled medical visits in the last 12 months (due to asthma exacerbation); the number of days of school absenteeism in the last school year (due to asthma exacerbation); to the number of emergency room visits in the last 12 months (due to asthma exacerbation) and the use of rescue therapy in last 4 weeks. The results are explained in Table 2, where we can, in relation to the variables number of unscheduled medical consultations, in the last 12 months (due to asthma exacerbation), number of emergency room visits in the last 12 months (due to exacerbation of asthma) and resorting to rescue therapy in the last 4 weeks, to reject the null hypothesis, concluding that there is a significant difference between the three defined groups.

Table 2 - Kruskal-Wallis test

	Age of child	Years of disease progression	Unscheduled medical consultations	Urgent episodes	School absenteeism	Recourse to rescue therapy
Chi-Square	1.059	1.962	19.616	11.092	4.105	19.355
df	2	2	2	2	2	2
Asymp. Sig.	.589	.375	.000	.004	.128	.000

Analyzing the means of the groups, we validate children with uncontrolled asthma, on average, require 4 more visits than children with controlled asthma. Regarding the need to use emergency services, due to acute asthma, children with uncontrolled asthma, on average, needed 2 more episodes than children with controlled asthma. Regarding the use of inhaled rescue therapy, children with uncontrolled asthma consumed, on average, 4 times more therapy than children with partially controlled asthma and 8 times more than children with controlled asthma.

Based on these three variables, which, in a substantiated way, present differences between averages, depending on the degree of asthma control, we chose to analyze the risk that these variables have on the degree of asthma control in child. For this purpose we used multinomial regression, however we did not have the necessary conditions, because the presented frequencies were not similar and the results from them could not considered robust. In this sense, we opted for Logistic Regression, considering as a dependent variable the Degree of asthma control, with only two classes, Uncontrolled (c-ACT instrument score from 0 to 19 values) and Controlled (c-ACT instrument score of 20 to 27 values).

In the analysis of Logistic Regression results, the likelihood ratio test between the null model and the models of each of the steps and the final model, we obtain $\chi^2 (3) = 12.635$; $p = 0.005$, where we can conclude that there is at least one variable studied in the model with predictive power over asthma control. The adequacy of the regression model was assessed by the Hosmer and Lemeshow test, where data are to be observed in Table 3.

Table 3 - Hosmer and Lemeshow test

Step	Chi-square	df	Sig.
1	4.590	4	.332

Being $\chi^2(4)=4,590$; $p=0,332$, we can conclude that the estimated values of the model are close to the observed values, ie, the model is adequate, adjusting to the data of the variables.

Table 4 presents the classification of asthma control in children observed and predicted by the adjusted model.

Table 4 - Asthma control observed and predicted by the regression model

Observed		Foreseen		Correct Percentage
		Asthma Control		
		not controlled	controlled	
Asthma	not controlled	32	7	82.1
Control	controlled	8	13	61.9
General Percentage (correctly classified)				75.0

Regarding the interpretation of the data described above, we can conclude that the constructed model has a sensitivity of 82.1%, correctly classifying children with uncontrolled asthma.

In this model, we only found a significant independent variable, consumption of rescue inhalation therapy (dichotomized in two categories - requiring therapy in last 4 weeks and without need for therapy in last 4 weeks). This variable presents statistical significance for the model, with Wald test $\chi^2(1) = 7.613$; p = 0.006, with an exp (B) = 7.287, where it can be concluded children who need to use inhaled rescue therapy are approximately 7 times more likely present uncontrolled asthma. For this adjusted model, in the sample of 60 observations only one case is not correctly classified by it. In order to evaluate the quality of the adjustment of this logistic regression model, we used the ROC Curve analysis, where we found an area of 0.77, where the descending power of our model can be considered acceptable, as can be seen in the Graph 1.

Graph 1 - ROC curve of the logistic regression model

Diagonal segments are produced by ties.
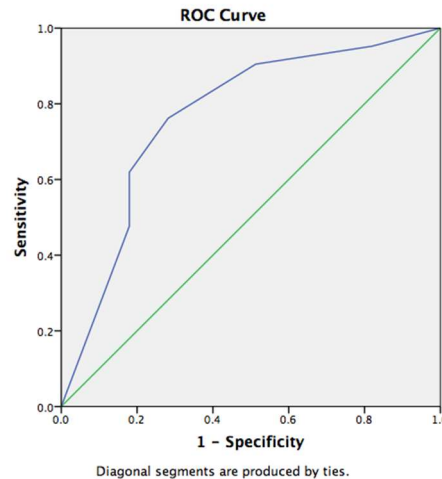
DISCUSSION

In a sample of 60 children with asthma and their caregivers, control of asthma was of concern, as only 35% had controlled asthma, 12% had uncontrolled asthma and 53% had partially controlled asthma. These data are consistent with the national reality, where it is estimated that 20.7% of users with asthma are uncontrolled [21]. Rabe et al [22] report that there is a low level of asthma control in the world that falls far short of GINA guidelines and objectives [1]. However, in a prism of person-centered [23] nursing intervention based on their needs, the professional will have to take into account that asthma as a chronic illness will always have implications in the daily life of the child and his / her caregivers, independently of their degree of control [24].

There is also a discrepancy between the control of asthma manifested and that perceived by caregivers. Although overall caregivers had a controlled or partially controlled perception of asthma, only 62% (n = 37) of the parents presented responses consistent with the symptoms manifested. Of the remaining 38% of caregivers, 18% rated with a higher degree of control and 20% with a lower degree of control. These discrepancies in the perception of asthma control in children are already documented in the international literature [25], invoking attention to the risks of increased morbidity as a consequence of disagreements in the perception of asthma control of caregivers. Significant morbidity indicators in the control of asthma uncovered in this investigation are the non-programmed visits (in consultation and emergency department) and the use of inhaled rescue therapy. The latter, very significant and with a predictive value for the existence of uncontrolled asthma. This fact has been documented in the international literature by a study carried out by Vermeire et al [26], which indicates that the consumption of inhaled rescue therapy "in the last 4 weeks was high in all countries". In this study, it was not possible to prove that a greater consumption was associated with an increase in the severity of the symptoms. In this investigation, we also failed to prove this relationship, but it was possible to prove that children who need rescue therapy are about 7 times more likely to have their asthma uncontrolled.

One of the objectives of this study was to evaluate the psychometric properties of the instrument Severity of Chronic Asthma in order to enable its use in research. After the application of the instrument, the analysis and study of the psychometric properties

were performed, however it did not demonstrate the qualities necessary for its validation. In this sense, it is recommended to use it in a qualitative perspective.

With the results of this study, some constraints should be considered, namely, the fact that it is limited to a geographic area and the sample is non-probabilistic and convenience does not allow the generalization of results. The use of this sample, based on the voluntary participation of caregivers and children, can be considered as a potential source of bias in results. Another drawback is that asthma is a chronic disease with a value below the estimated prevalence in Portugal, as in 2013 the percentage of people enrolled in primary health care with the diagnosis of asthma, referenced in their clinical process, was 1,98 [21], which is much lower than the estimated national prevalence of 7.4% [21], which are "clear indicators of an underdiagnosis" of the disease [27]. However, despite these identified limitations, the results of this study are consistent with the national and international literature, so the sample may be considered representative.

The empirical data of this study show that a critical analysis is necessary that goes far beyond what is statistically significant, reaching the clinically meaningful one, since it becomes preponderant for the health professionals, more specifically the Nurses, to guide their professional practice in accordance with international guidelines, such as those issued by GINA, implementing measurement instruments that can assist in the management of symptoms in children with asthma, as an example c-ACT instrument. These results validate the critical need for a specialized Nursing intervention in Rehabilitation that guarantee intervention programs in the management of symptoms centered on the family, the child and the needs identified [28]. One of the pillars that Rehabilitation Nursing can be based on is the medium-range theory Symptom Management Theory allows an approach to symptom management as a multidimensional process [29]. In this theoretical model symptom management focused on three interactive dimensions namely: the experience of the symptom, the management strategies of the symptom and the results obtained. In this framework, the c-ACT instrument can be used to improve communication with the caregiver and the child, in order to achieve an understanding of the experience with the symptoms, providing a window of opportunity in the development of more effective strategies and with more satisfactory results.

CONCLUSION

Asthma is the most common chronic illness in childhood and is associated with high morbidity, being responsible for the use of unscheduled care and constituting the main cause of hospitalization in children in Portugal.

The characteristics of asthma, especially the variability of symptoms and the existence of multiple triggering factors and indicators of morbidity, require symptom management, informed decision making and with successive adaptations and changes by the child and the caregiver. Based on this problem, the focus of attention of Nursing, becoming determinant the apprehension of the complexity factors for asthma control, and there is a strong need for intervention programs of symptom management.

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