



Revista Portuguesa de Pneumologia

ISSN: 0873-2159

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Sociedade Portuguesa de Pneumologia
Portugal

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Asthma prevalence in Portuguese preschool children: The latest scientific evidence
Revista Portuguesa de Pneumologia, vol. 22, núm. 5, septiembre-octubre, 2016, pp. 293-
295

Sociedade Portuguesa de Pneumologia
Lisboa, Portugal

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a median of 24 h. Our findings support the use of respiratory therapy HFNC as an alternative to NIV in non-severe hypercapnic patients for whom tracheal intubation is not an option.

In the analysis of the subgroup of patients with a prior diagnosis of COPD, no significant changes in pH or PaCO₂ levels were found. However, all the patients in our sample had pH > 7.28 and PaCO₂ < 50 mmHg. Caution should be taken in severe hypercapnic patients with HFNC, since clinical evidence for the use of HFNC in patients with chronic CO₂ retention is low and its use in a systematic way in these patients is not recommended; several ongoing studies are trying to assess the use of HFNC in these patients.⁵

Regarding the improvement in dyspnea, other studies have found similar results in terms of comfort.^{1,6,7} A clinical trial compared HFNC with Venturi mask, showing greater comfort, fewer desaturations and interface displacements in patients with HFNC.⁸

In short, HFNC improves oxygenation in patients with acute hypoxemic respiratory failure despite conventional low flow oxygen therapy, without affecting pH or PaCO₂, with good results in terms of comfort and reduction of dyspnea.

Authors' contributions

- Pablo Demelo-Rodríguez: literature search, data collection, study design, analysis of data, manuscript preparation, review of manuscript.
- María Olmedo-Samperio: literature search, data collection, study design, analysis of data, manuscript preparation, review of manuscript.
- Daniel Germán Gaitán-Tocora: literature search, data collection, study design, analysis of data, manuscript preparation, review of manuscript.
- Juan Carlos Cano-Ballesteros: literature search, study design, analysis of data, manuscript preparation, review of manuscript.
- Jorge del Toro Cervera: literature search, study design, analysis of data, manuscript preparation, review of manuscript.
- Juan Antonio Andueza-Lillo: literature search, study design, analysis of data, manuscript preparation, review of manuscript.

Conflicts of interest

The authors have no conflicts of interest to declare.

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<http://dx.doi.org/10.1016/j.rppnen.2016.04.005>

Asthma prevalence in Portuguese preschool children: The latest scientific evidence



Dear Editor,

Asthma is the most common and important chronic non-infectious disease in childhood and its prevalence has increased in recent years.¹ However, information on childhood asthma prevalence research covering Portuguese young

children is scarce and has not been compiled. Therefore, as part of the INAIRCHILD project,² this letter aimed to review the major scientific findings of the most recently published papers on childhood asthma prevalence in Portuguese preschool aged children.

Articles published from 2005 to date were identified in the following on-line databases: *Science Direct*, *Scopus*, *PubMed*, and *Google Scholar*. Only studies in press or fully published (in English and/or Portuguese) were analyzed. Although 8 studies were found published in the last 10 years on the assessment of childhood asthma prevalence

Table 1 Comparison of the main characteristics of the two reviewed studies.

		Branco et al. (2015)	de Sousa et al. (2011)
Study design	Date	2013 and 2014	Between February and July 2009
	Location	Porto and Bragança districts	Matosinhos (Porto Metropolitan Area)
	Study population	497 children attending nursery schools (aged under 6 years old)	576 patients, of which a sub-group of 136 were children aged 0–7 years old
	Aim	To assess asthma prevalence and associated risk factors for infants and preschoolers living in northern Portugal	To determine the prevalence of asthma by gender and stratified age groups in a Family Health Unit in Portugal
Methodology	To recruit study population	Children attending nursery schools	A stratified random sample obtained from the practice general database of patients in the Family Health Unit
	To collect health information	ISAAC-derived questionnaires	Two questionnaires: a physician's questionnaire and a patient's questionnaire (ISAAC-derived)
	Criteria to consider a child asthmatic	Wheezing and dyspnea reported simultaneously in the absence of upper airways inflammation, or self-reported previously diagnosed asthma	If the doctor and the patient reported symptoms of asthma, a diagnostic algorithm was used in order to confirm or reject the diagnosis. In cases of inconsistency between the information provided by the doctor and the patient, an assessment of the patient was conducted to validate the diagnosis
Outcomes	Asthma prevalence	10.7%	9.56% (8.6% when standardized for Portuguese population)
	Risk factors	Living in a non-rural location, male gender and having an asthmatic parent	Not considered

in Portuguese young children, only two of them focused on preschool aged children.

Thus, this letter reviews those only two published papers, one recently published³ and the other one published 5 years ago,⁴ concerning study design, methodologies used, prevalence rates and risk factors.

Table 1 summarizes the main characteristics of the two studies reviewed. Both of these studies were cross-sectional and they were conducted in big urban areas near the coast, although the study by Branco et al.³ was also conducted in rural areas away from the coast (Bragança district) providing comparisons between different geographical, social and demographic contexts. Different study population sizes were considered, but the aim was the same. Different methodologies were used to recruit the study population and to obtain health information, although in both ISAAC-derived questionnaires were used, which provided estimates of asthma prevalence based on symptoms and asthma previously diagnosed. However, the comparison of asthma prevalence results between the two studies is difficult due to different criteria used for asthma diagnosis, namely: (i) combination of answers given by the patient about respiratory symptoms and the physician's best knowledge of the patient's asthma status⁴ and (ii) wheezing and dyspnea simultaneously mentioned in the absence of upper respiratory infections.³ In fact, de Sousa et al.⁴ assumed they had found a lower prevalence for preschool age than expected due to diagnostic problems (the diagnostic procedures were based on a combination of the answers given by the patient on respiratory symptoms and the physician's best

knowledge of the patient's asthma status). Thus, the difference between the asthma prevalence values found in the two studies should be interpreted with caution, because it could possibly be due to different methodologies used and different criteria considered for asthma diagnosis. Moreover, other factors like children's ages and environmental contexts were also different, which could have contributed to differences in the prevalence results.

In these two studies medical exams, like exhaled nitric oxide or spirometry, to confirm asthma diagnosis were not performed. Although not very common in preschool children, spirometry seems to be feasible in that age.⁵ It has been used worldwide to confirm asthmatic symptoms reported in questionnaires,⁶ which is very important to increase the robustness of the conclusions.

Risk factors for childhood asthma prevalence, namely demographic, environmental, psychosocial and clinical risk factors, were only studied in Branco et al.³ which concluded that living in a non-rural location, being male and having an asthmatic parent were risk factors for childhood asthma development in Portuguese preschool children. However, other important risk factors for childhood asthma development already reported in the literature for primary school aged children were not considered, namely exposure to air pollution.⁷

These findings led to the conclusion that asthma studies on Portuguese preschool children are rare and limited due to methodological constraints, namely obtaining precise health information and performing medical exams to confirm symptoms. More studies are needed, particularly in preschool age

children living both in urban and rural areas. Those studies should include medical exams to confirm asthma symptoms. The study of lifestyle risk factors must be associated to others already studied in primary school children.

Conflicts of interest

The authors have no conflicts of interest to declare.

Acknowledgements

This work was financially supported by: Project POCI-01-0145-FEDER-006939 (Laboratory for Process Engineering, Environment, Biotechnology and Energy – LEPABE funded by FEDER funds through COMPETE2020 - Programa Operacional Competitividade e Internacionalização (POCI) – and by national funds through FCT – Fundação para a Ciência e a Tecnologia. The authors are also grateful to project PTDC/SAU-SAP/121827/2010 funded by FCT, COMPETE, QREN and EU; grants SFRH/BD/97104/2013 and SFRD/BPD/91918/2012, for PTBS Branco and SIV Sousa, respectively, funded by FCT, POPH/QREN and European Social Fund (ESF).

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<http://dx.doi.org/10.1016/j.rppnen.2016.03.013>