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ORIGINAL ARTICLE

Cost of asthma in Portuguese adults: A population-based, cost-of-illness study

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KEYWORDS
Asthma;
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Abstract
Introduction: Asthma is one of the most frequent chronic diseases, putting a considerable economic burden on societies and individuals. We aimed to estimate the total cost of adult asthma in Portugal, as well as the extent to which direct and indirect costs are influenced by the level of asthma control.
Methods: A nationwide, prevalence-based, cost-of-illness study using a bottom-up approach to calculate direct and indirect costs of asthma was conducted, using participant data from the Portuguese National Asthma Survey (INAsma). Direct (healthcare service usage, diagnostic tests and treatment) and indirect (absenteeism and transportation) costs were measured. Decision analytic modelling was used to perform multivariate deterministic sensitivity analysis.
Results: On average, each adult costs 708.16€ (95%CI: 594.62–839.30) a year, with direct costs representing 93% (658.46€; 95%CI: 548.99–791.29) and indirect costs representing 7% (49.70€; 95%CI: 32.08–71.56). This amounts to a grand total of 386,197,211.25€ (95%CI: 324,279,674.31–457,716,500.18), with direct costs being 359,093,559.82€ (95%CI: 299,391,930.03–431,533,081.07). Asthma direct costs are 2.04% of the total Portuguese healthcare expense in 2010. The major cost domains were acute care usage (30.7%) and treatment (37.4%). Asthma control was significantly associated with higher costs throughout several domains, most notably in acute medical care.

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Conclusions: Asthma in adults poses a significant economic burden on the Portuguese healthcare system, accounting for over 2% of the total healthcare expenditure in Portugal in 2010. It is important to note that a considerable portion of this burden might be eased by improving asthma control in patients, as uncontrolled patients' costs are more than double those of controlled asthma patients.

Introduction

Asthma is a chronic inflammatory respiratory disease, and one of the most frequent chronic diseases in the world, with recent estimates ranging from 225 to 334 million.[1]

Estimates of the economic burden of asthma are unavailable for most countries and are difficult to quantify. Furthermore, studies in different parts of the world present highly variable estimates.

Direct costs are related to healthcare system usage, such as scheduled and unscheduled appointments, hospitalisations or emergency room visits, pharmacological treatment, and diagnostic tests. Indirect costs include productivity loss, such as work absenteeism, as well as transportation costs.[1] A systematic review published in 2012 reported that direct costs outweigh indirect costs.[2] Importantly, direct costs have been found to be reduced by better clinical control of asthma, which should be a feasible target to decrease this financial burden.[1,3]

In Portugal, recent estimates put asthma prevalence at 6.8% (95%CI: 6.0–7.7)[4] but its economic burden is still unknown, due to a lack of cost-of-illness studies. These are needed to support decision-makers in defining priorities for health policies and programmes. Especially with the political and social pressure related to the continuous growth of healthcare-related costs, which in 2010 already amounted to 9.9% of the Portuguese gross domestic product.

Therefore, the aim of this paper is to estimate the total cost imposed on the Portuguese society by asthma in adults, as well as the extent to which direct and indirect costs are influenced by the level of asthma control.

Methods

A nationwide, prevalence-based cost-of-illness study with a societal perspective was conducted. This study was reviewed and approved by the Ethics Committee of *Centro Hospitalar de São João*, Porto, Portugal. Informed consent was obtained.

This study included 309 participants from the Portuguese National Asthma Survey (INAsma study), which was a nationwide survey, from the general population, done through telephone interview to individuals living in Portugal in 2010. The study methodology has been previously described.[4,5] Moreover, data regarding the price of healthcare services, diagnostic tests, medication, absenteeism, and transportation was collected from different resources and databases as described below.

Cost estimation methods

Direct healthcare costs of asthma were estimated using a bottom-up approach. The cost domains included in direct costs were healthcare services, diagnostic tests, and treatment.

1. Healthcare service (medical visits, emergency department visits and hospitalisations) costs were based on the official values defined by Portuguese Central Administration of Health Systems (ACSS) 2010, assuming each patient used the services of the hospital in their home county's catchment area. If no published values existed for any given catchment area (tariffs were absent for five hospitals), average prices were used.
2. Diagnostic tests (blood workout, skin prick test, spirometry, and chest x-ray) costs were based on state-provided values for 2010, published by the Ministry of Health. Usage prevalence was given by the results of a yet unpublished study (ClinicalTrials.gov NCT01771120) where absent.
3. Treatment included costs of asthma-specific medication and other asthma-related medication. Costs of medication (asthma-specific and other asthma-related medication) were based on national values defined by National Authority of Medicines and Health Products (INFARMED) and published in Infomed – Medical products database (app7.infarmed.pt/infomed). For determination of the number of doses needed per asthma exacerbation, consensus was achieved by three physicians, in accordance to international guidelines. The mean usage scenario was considered for cost calculation. The value of one year of allergen immunotherapy was set by consensus after consultation of the market prices of the most used allergen immunotherapies in Portugal.

Indirect healthcare costs of asthma were estimated by the human capital method. The cost domains included in this category were absenteeism and transportation.

1. Professions reported by the participants were categorised per the Portuguese Classification of Occupations 2010 from the National Statistics Institute (INE). The monthly income, from which the daily income was extrapolated, was based on the official reports from the Ministry of Social Security and matched to each professional category. Costs related to absenteeism were then calculated using the daily income and the number of reported absent days.

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