THE DIRECT COST OF TREATING BRONCHIAL ASTHMA IN A TEACHING HOSPITAL IN MALAYSIA

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Abstract. A pilot study to evaluate the direct cost of treating 51 adults and 50 children with bronchial asthma was conducted. All aspects of the medical care provided over a 6-month period were considered. The mean treatment costs per month were US$ 22.97 (adults) and US$ 15.56 (children). The cost of maintenance therapy accounted for 55.5% and 73.4% of the total direct cost treatment for adults and children respectively. Only 27 (52.9%) adults and 17 (34.0%) children paid for their inhaled prophylactic drugs, amounting to 12.3% of the total maintenance therapy costs. Thirteen (25.4%) adults and 9 (18.0%) children were using alternative therapy at a monthly cost of US$ 41.50 and US$ 16.77 respectively. A substantial proportion of the direct cost of asthma treatment is heavily subsidized in Malaysia. Adequate attention to the allocation of the health budget, to ensure the optimal provision of health care, is warranted.

INTRODUCTION

Bronchial asthma is the world's commonest chronic respiratory disorder. The risk of serious morbidity and mortality associated with bronchial asthma is well recognized; there is, however, very little information on the economic burden of asthma in Malaysia.

The financial cost of bronchial asthma is substantial; asthma is a chronic disorder requiring prolonged follow-up care and expensive medication; it has a significant effect on the lifestyle and productivity of patients, especially when exacerbations occur. The intangible costs related to its detrimental effect on the quality of life, although difficult to measure quantitatively, are likely to be the most important concerns for people with asthma. The majority of public healthcare in Malaysia is provided by Ministry of Health hospitals and university-affiliated teaching hospitals and is very heavily subsidised by the government. Firm evidence that shows that the prevalence of bronchial asthma is rising is of great interest to the national healthcare system because this rise, if it continues, will eventually pose a major economic challenge (Holgate, 1999).

We decided to estimate the direct cost of the treatment of both adult and pediatric asthma in our establishment, a government, university-affiliated, teaching hospital.

MATERIALS AND METHODS

The University Malaya Medical Center, a government-funded teaching hospital in Kuala Lumpur, the capital of Malaysia, provides both primary medical care for the local population and tertiary referral services for the rest of the country. We conducted a pilot cross-sectional survey to estimate the direct cost of asthma treatment for 51 adults and 50 children who came for follow-up care at the Adult and Pediatric Asthma Clinic.

All the subjects had a firmly established diagnosis of moderate to severe bronchial asthma

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that required inhaled prophylaxis in accordance with the Global Initiative of Asthma (GINA) guidelines (National Heart, Lung, and Blood Institute and World Health Organization, 1998). We estimated the costs of all levels of asthma-related treatment and management that had been given during the 6 months to the beginning of our study; data were obtained from medical records and prescription reviews. A questionnaire was used to guide interviews with the adult patients and the parents/carers of the pediatric patients. The survey was designed to estimate only the direct costs of the treatment of bronchial asthma. The direct costs of asthma-related treatment, which could have been incurred at any level of healthcare, were defined as the costs of:

Maintenance therapy: this included regular inhaled prophylaxis, intermittent inhaled short-acting bronchodilators, inhaled long acting bronchodilators, inhalation devices, and follow-up consultations. The cost of other forms of trerapy (alternative therapy) was also included.

Acute asthma-related emergency treatment: treatment provided for a patient by a medical caregiver for an acute asthma event. Cost included additional medication, nebulization therapy, and medical consultation fees.

Asthma-related hospitalization

All costs were calculated in Ringgit Malaysia (RM) and then converted to US dollars (US$) at the rate of US$ 1 to RM 3.80.

Statistical analysis

All data collected were analysed with SPSS (version 10.0) for Windows 1998 (SPSS Inc, USA). Continuous variables were compared using Student's *t*-test and dichotomous variables were compared using Fisher's exact test. A p-value of less than 0.05 was considered significant.

RESULTS

The mean monthly direct cost of the provision of asthma-related treatment was US$ 22.97 (±8.04) for adults and US$ 15.56 (±3.49) children. The cost of maintenance therapy accounted for 55.5% and 73.4% of the total direct cost of asthma-related treatment in adults and children respectively (Fig 1). Only 27 (52.9%) and 17 (34.0%) children had to pay for their maintenance therapy, which was responsible for only 12.3% of the total maintenance therapy costs during the 6 month study period (Table 1).

There was no difference in the number of adults or children with asthma requiring emergency room care in the study reriod (4/51; 7.8% and 4/50; 8.0% respectively; p = 0.433). The mean treatment cost of emergency care for each asthma event was US$ 46.64 ±

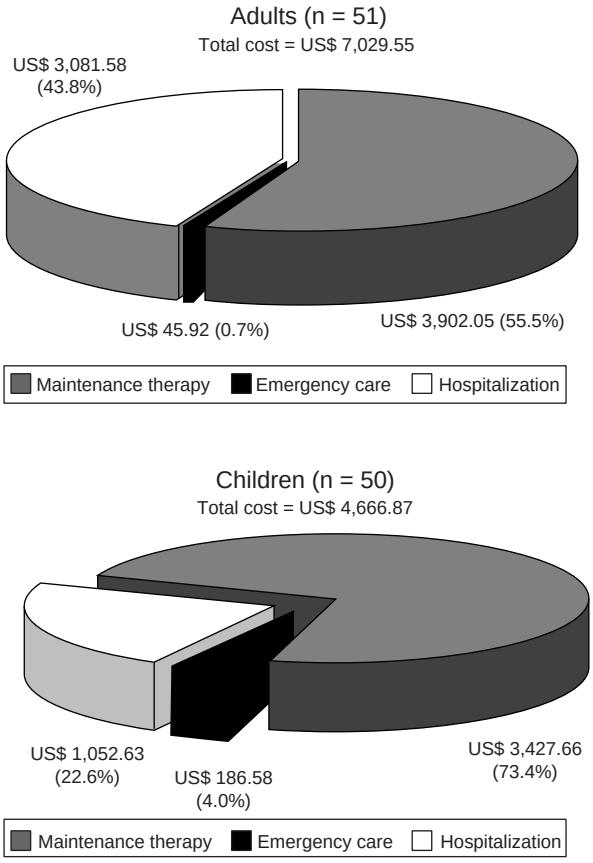

Fig 1–Direct costs of asthma treatment for 6 months: Sources of care.

Table 1
Direct cost of maintenance therapy for bronchial asthma in children and adults.

Direct costs	Adults (n = 51)	Children (n = 50)
Median daily corticosteroid dose (interquartile range)	600 µg/day (400 - 800)	400 µg/day (400 - 600)
Type of inhaler		
Metered dose inhaler[a]	51 (100%)	41 (82%)
Turbuhaler	0 (0%)	8 (16%)
Rotahaler	0 (0%)	1 (2%)
Total cost for 6 months	US$ 3,902.05	US$ 3,427.66
Total paid by patients during 6 months	US$ 622.58	US$ 276.84

[a]A metered dose inhaler was used for children: its accompanying spacer device was not included in the cost analysis.

28.30 per adult and US$ 37.79 ± 5.53 per child. There was no significant difference between the hospitalization rate for adults with acute asthma and that for children during the study period (5/51; 9.8% and 1/50; 2.0% respectively, p = 0.08).

Alternative therapy was used by 13 adults and 9 children (25.4% and 18.0% respectively; p = 0.313) at mean monthly cost of US$ 41.50 ± 19.10 and US$ 16.77 ± 7.38 respectively. The most common alternative therapy used was an herbal medication [12 patients (54.5%)] followed by special vitamins or mineral supplements [6 patients (27.3%)]. Three patients were using homeopathy and 1 was receiving regular massage therapy for asthma.

DISCUSSION

There has been increased interest in the economic appraisal of chronic diseases, due to the escalating healthcare costs associated with providing long-term maintenance medication, the regular need for medical consultation, and the occasional need for hospitalization. Repriotization and cost containment of healthcare is increasingly important in Malaysia given the prevailing unfavorable economic climate due to global and regional financial difficulties (Suleiman *et al*, 1998). The allocation of healthcare resources can be efficient only if information regarding treatment and medical costs for individual disease categories is available. It is reasonable to consider both the economic and clinical impact of chronic disorders like asthma.

The direct cost of bronchial asthma in our study is an indication of the economic burden an asthmatic subject imposes on the national healthcare budget, *ie* a mean annual cost of US$ 275.65 for an adult and US$ 186.66 for a child with moderate to severe asthma. The estimated prevalence of children with exercise-induced wheeze in Peninsular Malaysia is 4.3% and 14.0% for the 6-7 and 13-14 years age groups respectively (ISSAC Steering Committee, 1998). Using exercise-induced wheeze as the minimum indication for the use of inhaled prophylaxis, the projected number of children needing treatment based on the 1999 statistical estimate for the population of Penisular Malaysia (Department of Statistics, Malaysia, 1999) is 347, 214. The projected annual cost for providing treatment for these children amounts to US$ 64.8 million, an underestimate that provides a glimpse of the potentially overwhelming cost of asthma in Malaysia.

Bronchial asthma is clearly a substantial economic burden to the government because

public healthcare is heavily subsidized by the national public health budget allocation. Fewer than half of the asthmatic subjects surveyed needed to provide some form of payment for their treatment; the amount actually paid amounted to some 12% of the actual direct cost. This economic burden is shared by Malaysia's booming private healthcare sector: this redistribution of costs may serve to relieve the pressure on the state sector (Barraclough, 1997).

The costs calculated in this study are an underestimate of the true economic burden of bronchial asthma because the indirect costs of bronchial asthma, *ie* loss of productivity, absence from work, sleep fragmentation, time spent in seeking medical attention etc, were not considered. Indirect costs have been shown to be almost as significant as the direct costs of asthma-related treatment (Szucs *et al*, 1999; Chew *et al*, 1999). Likewise the cost of asthma-related treatment for children is increased by the impact of the illness on family dynamics and by the involvement of the caregiver/parents in asthma-related events (Toelle *et al*, 1995).

This is to our knowledge the first attempt to measure the direct cost of treating bronchial asthma in Malaysia. Our results indicate the financial burden that an asthmatic patient imposes on the national healthcare system, although this indication may not be a true reflection of the overall economic impact of asthma. A nationwide in-depth evaluation of the overall cost of asthma treatment for both children and adults is warranted: such an evaluation will determine the financial allocation required and provide the basis for the more balanced distribution of healthcare resources.

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