

BRIEF COMMUNICATION

The Brazilian policy of withholding treatment for ADHD is probably increasing health and social costs

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Objective: To estimate the economic consequences of the current Brazilian government policy for attention-deficit/hyperactivity disorder (ADHD) treatment and how much the country would save if treatment with immediate-release methylphenidate (MPH-IR), as suggested by the World Health Organization (WHO), was offered to patients with ADHD.

Method: Based on conservative previous analyses, we assumed that 257,662 patients aged 5 to 19 years are not receiving ADHD treatment in Brazil. We estimated the direct costs and savings of treating and not treating ADHD on the basis of the following data: a) spending on ADHD patients directly attributable to grade retention and emergency department visits; and b) savings due to impact of ADHD treatment on these outcomes.

Results: Considering outcomes for which data on the impact of MPH-IR treatment are available, Brazil is probably wasting approximately R\$ 1.841 billion/year on the direct consequences of not treating ADHD in this age range alone. On the other hand, treating ADHD in accordance with WHO recommendations would save approximately R\$ 1.163 billion/year.

Conclusions: By increasing investments on MPH-IR treatment for ADHD to around R\$ 377 million/year, the country would save approximately 3.1 times more than is currently spent on the consequences of not treating ADHD in patients aged 5 to 19 years.

Keywords: attention-deficit/hyperactivity disorder; social and political issues; costs and cost analysis; child psychiatry; central nervous system stimulants

Introduction

Attention-deficit/hyperactivity disorder (ADHD) generates huge direct and indirect costs for countries worldwide. Considering that immediate-release methylphenidate (MPH-IR) is one of the best-known, most efficacious and least expensive treatments in psychiatry,¹ it seems reasonable to consider the economics of avoiding the consequences of non-treatment instead of paying for the financial losses generated by non-treatment. This is not the case in Brazil. Our country does not have a specific treatment policy for ADHD, resulting in a series of complex procedures for low-income patients to obtain MPH-IR. In Brazil, there are two ways of obtaining pharmacological treatment for ADHD through the Unified Health System: by lawsuits or through an administrative process beset by red tape.

MPH-IR is covered by the Exceptional Circumstance Drug Dispensing Program of Brazil, and is thus included in a formulary of treatments funded in part by the Brazilian federal government and 50% by states. Despite wide coverage by the Program, greater attention to psychiatric disorders in general, and to ADHD in particular, is required. A 2005 survey carried out in the state of São Paulo identified diseases which prompted lawsuits to secure access to drugs, and found that, of 27 diseases, only one was not covered by a treatment policy: ADHD.²

To neglect ADHD is to ignore facts about direct and indirect costs, as shown in several other countries. According to the Brazilian National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária, ANVISA), the estimated amount paid out of pocket by Brazilian families to buy methylphenidate in 2011 was R\$ 28.5 million for patients aged 6 to 16 years.³ In an extremely conservative analysis, Mattos et al.⁴ demonstrated that at least 257,662 young people (aged 5 to 19 years) with ADHD were untreated in Brazil as of 2012.

We aimed to estimate the economic consequences of the current Brazilian government policy for ADHD treatment and how much the country could save if treatment as suggested by the World Health Organization (WHO) was offered to ADHD patients.

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Method

Literature review

Direct cost-of-illness studies about ADHD have focused on the areas of education, the justice system, and therapeutic interventions. Thus, we first conducted a systematic review of the PubMed, LILACS, and SciELO databases to detect studies which evaluated the economic effects of MPH-IR on the three aforementioned areas. As no study was found, we expanded the systematic review to include the impact of MPH-IR on functional outcomes for ADHD patients. We were able to find papers only on the effect of MPH-IR on percent reduction of three functional outcomes: grade retention, emergency department (ED) utilization, and criminality among ADHD patients. The search queries used were: ("Cost of Illness"[Mesh]) AND "Attention Deficit Disorder with Hyperactivity"[Mesh]; (("Educational Status"[Mesh]) AND "Attention Deficit Disorder with Hyperactivity"[Mesh]) AND "Cost of Illness"[Mesh]; ("Attention Deficit Disorder with Hyperactivity"[Mesh]) AND "Emergency Medical Services"[Mesh]; ("Attention Deficit Disorder with Hyperactivity"[Mesh]) AND "Criminal Law"[Mesh]; ("Educational Status"[Mesh]) AND "Attention Deficit Disorder with Hyperactivity"[Mesh]. We accepted papers published in the last 15 years and in English. As most studies in this field are systematic reviews, we accepted this study design and clinical trials for data extraction. Data on the costs of ADHD for the three mentioned outcomes (grade retention, ED utilization, and criminality) were extracted directly from studies found in the three cost-of-illness meta-analyses about ADHD published in the last 10 years.^{5,6}

Estimation of costs and savings

Considering an extremely conservative ADHD prevalence of 0.9%, our group previously estimated that around 257,662 patients aged 5 to 19 years were not receiving ADHD treatment in Brazil in 2010.⁴

We implemented a procedure similar to the one used by Doshi et al.⁵ to estimate direct costs on grade retention, ED utilization, and criminality among ADHD patients in Brazil. Since we decided to be as conservative as possible, we estimated only direct costs related to these outcomes by entering only data on outcomes for which we were able to find documented effects of MPH-IR for ADHD patients in the literature. When more than one study covering the same outcome was found, we calculated the mean cost for that outcome (Table 1). Since data on reduction of criminality with the use of ADHD medication was based on adult samples, and medications other than MPH-IR were also included, we focused our analyses on grade retention and ED visits, for an even more conservative estimate.

As we needed to use foreign data (from the United States and Belgium) extrapolated to the Brazilian population to estimate costs and savings, we used the purchasing power parity (PPP) conversion factor in our calculations. According to The World Bank, the PPP conversion factor for 1 U.S. dollar as of 2013 was R\$ 1.61; for comparison purposes, on 26 December, 2013, the exchange rate was US\$ 1 = R\$ 2.26.¹⁵ Adequate treatment was defined according to WHO recommendations: one pill of MPH-IR, three times per day, year-round (Figure 1).

Table 1 Estimate of direct costs per person for untreated ADHD and expected economic results if treated with MPH-IR, considering data from the United States, converted to the Brazilian reality on the basis of purchasing power parity*

	Cost (year) [†]	Cost adjusted to 2014 [‡]	Expected costs (R\$)	Expected costs (R\$/PPP)*	Expected savings (R\$) [§]	Expected savings (R\$/PPP)*
Grade retention						
Robb ⁷	US\$ 222 (2010)	US\$ 244.47	R\$ 552.50	R\$ 343.17	-	-
Jones ⁸	US\$ 6,875 (2000)	US\$ 9,718.27	R\$ 21,963.29	R\$ 13,641.80	-	-
Total (mean)			R\$ 11,257.90	R\$ 6,992.48	R\$ 7,205.05 [§]	R\$ 4,475.19
Total expected			R\$ 2,900,732,050.68	R\$ 1,801,696,925.89	R\$ 1,856,468,512.44	R\$ 1,153,086,032.57
Emergency department use						
Leibson ⁹	US\$ 147 (1987)	US\$ 316.13	R\$ 714.45	R\$ 443.76	-	-
Chan ¹⁰	US\$ 39.95 (1996)	US\$ 61.85	R\$ 139.78	R\$ 86.82	-	-
Guevara ¹¹	US\$ 38 (1997)	US\$ 56.94	R\$ 128.68	R\$ 79.93	-	-
De Ridder ¹²	€ 4.7 (2002)	€ 5.78	R\$ 18.03	R\$ 11.20	-	-
Total (mean)			R\$ 250.24	R\$ 155.43	R\$ 65.06**	R\$ 40.41
Total expected			R\$ 64,476,875.09	R\$ 40,047,748.50	R\$ 16,763,987.52	R\$ 10,412,414.61

ADHD = attention-deficit/hyperactivity disorder; MPH-IR = immediate-release methylphenidate; PPP = purchasing power parity.

* Purchasing power parity conversion calculates the equivalent amount of a country's currency necessary to purchase the same product and/or service that one U.S. dollar would buy in the United States of America. The 2013 conversion factor is R\$ 1.61. Further information is available at the World Bank website (<http://www.worldbank.org/>).

[†] The year in parentheses corresponds to the year of data collection.

[‡] Cost estimates were adjusted to 2014 U.S. dollars and Euros with the Inflation Calculator (<http://fxtop.com/en/inflation-calculator.php>).

[§] US\$ 1.00 = R\$ 2.26; € 1.00 = R\$ 3.12 (April 2014).

^{||} Total expected for an estimated 257,662 untreated patients.

* Expected reduction: 64%.¹³

** Expected reduction: 26%.¹⁴

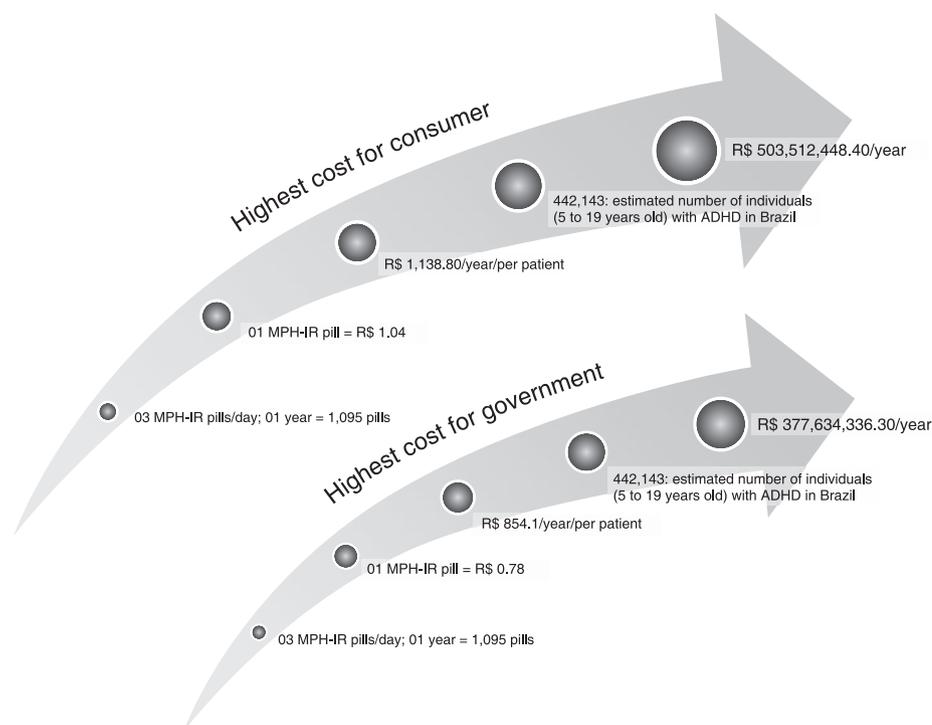


Figure 1 Best ADHD treatment scenario: cost for all young ADHD patients treated with three MPH-IR pills/day, 365 days/year. Highest purchasing price of one box of MPH-IR (20 pills/box) plus highest rate (19%) of the Brazilian value-added tax on sales and services (Imposto sobre Circulação de Mercadorias e Serviços, ICMS) = R\$ 20.85; highest purchasing price of one box of MPH-IR (20 pills/box) to the government, with 0% ICMS = R\$ 15.69. Source: WHO Collaborating Centre for Drug Statistics Methodology (WHOCC).¹⁶

Results

Based on the data extracted from the literature and using the estimates mentioned above, Brazil would be wasting approximately R\$ 1.841 billion/year only on part of the direct consequences of not treating ADHD in children aged 5 to 19 years, considering only those outcomes for which data on the impact of MPH-IR treatment in this age range are available. On the other hand, treating all young ADHD patients according to WHO recommendations (Figure 1), i.e., with three pills of MPH-IR per day, year-round, with a consequent reduction in grade retention and accident rates related to untreated ADHD as suggested by Barbaresi et al.¹³ and Raman et al.¹⁴ respectively, would lead to savings in the region of R\$ 1.163 billion/year (Table 1).

Discussion

To the best of our knowledge, this is the first study to estimate costs and savings of ADHD treatment in young patients from Brazil. Results were estimated solely on the basis of data about grade retention and ED utilization, and did not consider direct costs on other areas, such as special education, inpatient or outpatient care, and juvenile criminality. Furthermore, we did not calculate indirect costs incurred by caregivers.

The results of this study warrant careful attention, especially considering that we tried to be as conservative as possible in several assumptions. The size of the untreated population with ADHD in Brazil was underestimated in our previous study due to several reasons: a) the low prevalence of 0.9% considered (the pooled worldwide prevalence is estimated at 5.29%¹⁷); b) ADHD treatment was defined as the use of only one pill of any medication (e.g., 1 pill MPH-IR 10 mg) for 10 months (considering summer vacations), 5 days/week (considering weekend holidays); and c) the volume of MPH-IR sales in 2009/2010 was based on IMS Health data. Data provided by ANVISA indicated that fewer patients received treatment in the same period. Furthermore, to estimate the number of untreated ADHD patients aged 5 to 19 years for this study, we used figures for all ages under treatment (children, adolescents, and adults) from the previous study, as there were no data on treatment stratified by age. Thus, we artificially reduced the actual number of untreated ADHD patients aged 5 to 19 years. Finally, when estimating the cost of treatment, we considered the highest purchasing price for one box (20 tablets) of MPH-IR 10 mg available in Brazil's public accounts plus the highest rate of the Brazilian value-added tax on sales and services (Imposto sobre Circulação de Mercadorias e Serviços, ICMS, which varies across states, from 12 to 19%) in the country (19%), for a total price of R\$

15.69. Thus, by estimating the highest possible cost, we may have underestimated potential savings.

Conversely, some other factors might overestimate our findings. The rates of patients treated in Brazil were based on 2009/2010 data; we expect that more patients would be receiving treatment in recent years. The PPP conversion used to adapt the costs of international services to Brazilian standards might not have sufficiently discounted the lower prices in Brazil for the outcomes assessed. In other words, several differences regarding education and health services between Brazil and the other countries could have inflated our cost estimates. In addition, the cost associated with ADHD in studies might be partially determined by comorbidities or other medical conditions. Lastly, when estimating reduction of injuries associated with MPH use, we considered not only injuries that received treatment in an ED setting but also those treated at other health facilities, such as general practice and hospital visits. The direction of bias is difficult to determine for the other factors, as the costs of outcomes associated with ADHD vary widely among studies. Although we used mean values for our analyses, this variability introduces imprecision.

In conclusion, if Brazil decides to increase the investment in treating ADHD from the current R\$ 28 million spent by families out of pocket³ to R\$ 377 million (Figure 1), the country would still save 3.1 times more than it currently spends. The Brazilian government must urgently review its treatment policy for ADHD, or lack thereof, and facilitate access to ADHD therapy.

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