Estimating the Prevalence of Attention Deficit Hyperactivity Disorder in Castile-La Mancha, Spain (1992-2020)

Abstract

Background: Attention Deficit and Hyperactivity Disorder (ADHD) is one of the most common behavioral disorders of childhood, its prevalence in Spain is estimated at 6.8%. Studies have shown an increase in the use of ADHA medications. The aim of this study was to learn the pattern and the evolution of ADHD medication consumption, and estimate the prevalence in Castile-La Mancha (Spain).

Methods: The prevalence of ADHD is estimated by calculating the Defined Daily Dose per 1000 inhabitants and day (DDD) of the total medication for ADHD (Therapeutic group N06BA) during the years 1992 to 2015. The trend its shift points and the Annual Percentages of Change (APC) using regression join point. The prevalence estimated is calculated with a model ARIMA.

Results: We estimated a prevalence of ADHD 13.22 cases per 1000 inhabitants per day for Castile-La Mancha in the population aged 5 to 19 years in 2015, the consumption total has increased a 98.93%. The consumption has increased by 10.3% APC from 1992 to 2015 with several years or join points (2000, 2009 and 2012). The prevalence estimated in 2020 is 14.11 cases per 1000 inhabitants per day.

Keywords: Hyperactivity; Psychostimulants; Incluyen; Pharmacotherapy

Introduction

Attention Deficit and Hyperactivity Disorder (ADHD) is a neurodevelopment disorder with a worldwide prevalence of 5% [1]. The actual increased interest in this pathology has been promoted by the increased number of cases and the use of psychostimulants in children, being the most diagnosed behavioral disorder in this age group [1]. Recent meta-analyses estimate an overall prevalence of 3-7%, being in Spain 6.8%, perhaps for an overdiagnosis or overtreatment [2-6]. ADHD treatment may require the use of psycho stimulants, like Metilphenidate (MPH) and Lisdexamphetamine (LDX); and not stimulants, like Atomoxetine (ATX), that are the officially drugs approved in Spain [4]. In Spain pharmacotherapy concurred with marketing of extended-release MPH formulation, about 2003-2004 [5]. The aim of this study was to describe trends in ADHD diagnosis, and to estimate the prevalence in Castile-La Mancha (Spain), studying the evolution of drugs consumption.

Methods

Castile-La Mancha (CLM) is the second largest region in Spain (13.6% of the total area), with a population density of 26.7 inhabitants/km², being the child population a 16.4% of total. Each municipality has a wide network of pharmacies and medical center. For the period (1992-2001), the databases of the Spanish Ministry of Health has been used, which it was published previously study [6]; and for the period (2002-2015) the Health Regional Service of Castile-La Mancha (SESCAM) databases was used. Both databases offer information on the consumption of the drugs dispensed by pharmacies at the expense of the Spanish National Health Service.
We used Regression models of Join point or models segmented Poisson Regression to be very effective to identify changes in trend. It is analyzing the effect over time, which behaves as an independent variable on the calculated proportions. In this analysis, the shift points (join point or inflection points) show the existence of significant changes in the trend (up or down). Each join point indicates a statistically significant change in the trend, and an Annual Percentage Rate (APC) is calculated for each of these trends, using generalized linear models assuming a Poisson distribution. Each APC is calculated with confidence interval 95% (CI 95%) [9].

The trend pattern and temporal prediction consumption is calculated using a model of Autoregressive Time Series (ARIMA) in total consumption of drugs for ADHD in children under 19 years, using DDD per 1000 inhabitants per day, until a future period of 5 years (2020) with CI 95% [8].

Results

The consumption of drugs in Castile-La Mancha has been increased by 98.93%, from 0.15 in 1998 to 13.22 DDD per 1000 inhabitants per day in 2015 (13.22 cases per 1000); this data can be used as an estimate of the prevalence of ADHD, for ages 5 to 19 years in Castile-La Mancha. Extrapolating to the entire population, we can see that the prevalence increases 0.03 in 1992 to 2.07 DDD per 1000 inhabitants per day in 2015. In 2015, MPH is the most consumed drug, with 89.6% of the total, as it has increased from 0.15 in 1992 (when it was the only drug available), to 11.84 DDD per 1000 inhabitants per day in 2015, an increment of 98.72%. The LDX is the second most consumed drug in 2015 (8%). The ATX is the least consumed drug, in 2015; however, consumption has increased a 61%, from 0.12 in 2008, to 0.32 DDD per 1000 inhabitants per day in 2015.

The APC for ADHD drugs, in Castile-La Mancha, from 1992 to 2015 is 10.3% (CI 95%: 7.0-13.7). This increase has not been uniform, and we can see three significant join points (years 2000, 2009 and 2012) overtime. The APC of MPH, from 1992 to 2015 is 9.8% (CI 95%: 6.5-13.3); and for ATX, from 2008-2015 is 13.1% (CI 95%: 2.3-24.9).

The time series model fits 2, 0, 2, which explains most of variance. In the fifth year, the temporal prediction is destabilized, with a sigmoid curve increase, for 2020 of 14.11 DDD per 1000 inhabitants per day (C195%: 10.18-18.05), as a prevalence estimated, which means an increase of 6.3%, from 2015 to 2020 (Figure 1).
Conclusion

The consumption of drugs estimated the distribution of ADHD in Castile-La Mancha. The changes in the use of stimulants are a warning of a possible over diagnosis or a marketing strategy, and explain the possible growth in consumption of these drugs.
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