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## Use of psychotropic drugs in Lombardy in time of economic crisis (2007–2011): A population-based study of adult employees



Giorgio Vittadini<sup>a</sup>, Massimiliano Beghi<sup>b</sup>, Mario Mezzanzanica<sup>c</sup>, Gloria Ronzoni<sup>c</sup>,  
Cesare Maria Cornaggia<sup>d,e,\*</sup>

<sup>a</sup> Department of Statistics, University of Milano Bicocca, Milan, Italy

<sup>b</sup> Department of Mental Health, G.Salvini Hospital, Rho, Milan, Italy

<sup>c</sup> CRISP, University of Milano Bicocca, Via Cadore 48, 20052 Monza MB, Milan, Italy

<sup>d</sup> Department of Surgery and Translational Medicine, University of Milano Bicocca, Milan, Italy

<sup>e</sup> Forensic Psychiatric Hospital, Castiglione delle Stiviere, Mantua, Italy

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### ABSTRACT

Over years, there has been an increase in the prescription of psychotropic drugs (PDs), particularly antidepressants (ADs). The aim of the study was to evaluate the consumption of PDs in adult employees in a productive area of Italy and the possible changes induced by the “economic crisis”. The study is a retrospective survey in all adult employees in Lombardy, Northern Italy, aged > 18 years in the period 2007–2011, classified by gender, age class, nationality, education and province. During the 5-year period, there were 3,554,860 employed adults in Lombardy, of whom 277,865 (7.8%) used PDs. The use of PDs (particularly ADs) was associated with being an Italian woman aged > 55 years with a basic education, a blue collar job, and an unstable working position. In 39% of cases, the use of PDs was limited to one trimester. The increase in the number of prescriptions of PDs after the economic crisis was the same as before it. The increase in PD use can be attributed more to ADs and anti-epileptic drugs with anxiolytic properties. Although continuously increasing, the use of AD fluctuated and was greater during the fall and winter. The increase involved all the provinces in Lombardy in a similar manner.

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### 1. Introduction

The analysis of official data (ISTAT *Research on INPS work force*) ([www.istat.it](http://www.istat.it)) shows that in years, starting from 2009, the job market in Lombardy was marked by a severe economic crisis.

Key indicators, such as unemployment, data on corporate crises, and birth and death of enterprises all show a decidedly negative trend. In 2009, as a result of the economic crisis, layoffs jumped from 47.2 million of the previous year to 271.7 million, an increase of 475%. In 2010 an increase was again recorded, reaching a peak with a 313.2 millions of authorised hours (+ 15% compared to 2009), while in 2011, the authorised hours were 221.7 million (– 29% compared to 2010) recording a first decrease in value.

A good indicator of the impact of work-related problems on mental health is the suicide rate, especially in periods of economic crisis. A recent trend analysis of 54 countries (of whom 27 European and 18 American) compared the number of suicides in

2009 with the number that would be expected based on trends before the economic crisis. The authors found that the increase in the suicide rate mainly involved men aged 15–24 in European countries, and aged 45–64 in American countries (Chang et al., 2013). There is an association between unemployment and suicide in Italy, with Lombardy being one of the regions in which the association is stronger (De Vogli, 2013).

However, as suicide is a rare event, it is important to detect other parameters of social distress that may be connected with the economic crisis.

There has been an increase in the prescription of psychotropic drugs (PDs), particularly antidepressants (ADs) over recent years. The prescriptions of PDs in Great Britain increased by an average of 6.8% per year between 1998 and 2010 (Ilyas and Moncrieff, 2012), but the trend was also clear previously: the number of AD prescriptions more than doubled in the period 1975–1998 and, in 1998, a total of 23.4 million AD prescriptions were issued by general practitioners (GPs) in the United Kingdom (Middleton et al., 2001). The total number of AD prescriptions in Italy increased by 55% from 1984 to 1999 (Barbui et al., 2001), and costs increased by 4.5% from 2004 to 2012 (Italian Medicines Agency) despite a 5.6% reduction in the total expenditure for medications

\* Corresponding author at: Department of Surgery and Translational Medicine, University of Milano Bicocca, Via Cadore 48, 20052 Monza MB, Milan, Italy.

E-mail address: [cesaremaria.cornaggia@unimib.it](mailto:cesaremaria.cornaggia@unimib.it) (C.M. Cornaggia).

([www.sanitanews.it](http://www.sanitanews.it)). In Lombardy (the Italian region analysed in this study), GPs were responsible for almost 90% of AD prescriptions (Percudani et al., 2004a, 2004b). AD prescription rates have increased markedly in all age and gender groups, with as much as a three-fold increase in older age groups (Middleton et al., 2001; Pietraru et al., 2001).

Recent studies of the working population have shown that job insecurity, being in debt, and working in repetitive occupations are all independently associated with an increased likelihood of depression (Meltzer et al., 2010; Kivimaki et al., 2010; Sverke et al., 2002), and the increased use of PDs significantly relates to poor job satisfaction and an unsatisfactory atmosphere at work (Traweger et al., 2004; Ngoundo-Mbongue et al., 2005; Stansfeld and Candy, 2006; Bonde, 2008). This is true of both genders, but more so among males (Boeuf-Cazou et al., 2009), particularly with regard to the use of AD (Virtanen et al., 2007) and the benzodiazepines (BZDs) (Pelfrene et al., 2004). Furthermore, Lakoff (2004) highlighted an increase in AD prescriptions in Argentina after the economic crisis of 2001 and hypothesised that it may have been due to both the Argentine context and the AD market.

The aim of this retrospective study was to evaluate the use of PDs by adult employees in Lombardy in the period 2007–2011, assess whether the “economic crisis” that began in the middle of this period (fall/winter 2008–2009) led to a change in usage patterns in this highly productive area of Italy, and determine which demographic variables are associated with this possible change.

## 2. Methods

### 2.1. Data source

The data used for the analysis are of an administrative nature and come from the regional database of Mandatory Communications and the Regional Social Health Care Information System. In particular, as regards the job market, the archives collect information on workers and companies headquartered in Lombardy; all subjects that had career changes (hires, terminations, etc.) starting from 2007 (about 4.5 million people) have been monitored and information is available about each work experience (beginning date, continuation and termination, the type of contract, sector and qualification and information regarding the company that carried out communications). The available data, unlike those obtainable by the usual inquiries, allow to trace, for the entire observation period, the history of the subject (succession of events described by type, number and duration of each individual contract), associating to each period status data (title, business sector, and so on). People identified in this manner have been investigated within the health care system to identify which and how many of them in the region presented drugs consumption regarding only ADs, mood stabilisers (MS) and antipsychotics (AP), thereby resulting in nearly 4 million drug prescriptions.

This allowed us to observe that of more than 4 million workers tracked in 5 years, more than 300 thousand have had at least one prescription for an antidepressant, MS or AP medication. All data were treated after anonymisation of the interested subjects, eliminating any reference that would allow the recognition and adopting as integration key an irreversible hashing.

### 2.2. Population

The study population consisted of all employees in Lombardy aged > 18 years. Lombardy is the most densely populated (and one of the most productive) regions in Italy. Of its 9,704,151 inhabitants (9.8% of whom are non-Italians) ([www.istat.it](http://www.istat.it)), 6,354,514 were aged 18–65 years in January 2011 ([www.istat.it](http://www.istat.it)). Lombardy has almost 807,000 businesses in the industrial and service sectors, which account for almost one-fifth of the businesses in the country (18.3%) that give work to 23% of the people (2006). During the 5 years of the study, there were 3,554,860 employees aged > 18 years, who were classified on the basis of their gender, age class (18–34, 35–54, and > 55 years), nationality (Italian or non-Italian), education (basic, high school, university), job (white collar, blue collar, unknown), and the number of years worked during the study period (< 1, 1–2.5 years, 2.5–4, > 4 years).

### 2.3. Study design

Healthcare in Italy is provided to all citizens and residents by a mixed public-private system. The public part is represented by the national health service (SSN) which is organised under the Ministry of Health and is administered on a regional basis. Surgeries and hospitalisations provided by the public hospitals or by conventioned designated private ones are completely free of charge for everyone, regardless of income. All Italian citizens and foreign residents have the right to healthcare, and the system covers all necessary treatments.

This community survey is based on the retrospective analysis of number of prescriptions for PD during the period 2007–2011. In Italy PD (except benzodiazepines) are refunded by the health care system through the use of specific regional prescription pads. General practitioners and psychiatrists working in the health care system are allowed to use these pads and all regional prescriptions are thus detectable.

In our study we only considered antipsychotics (AP), mood stabilisers (MS) including lithium and anti-epileptic drugs (AEDs), and AD because these drugs are used to treat major psychiatric disorders; the use of anxiolytics and hypnotics is less specific. Many AEDs (except valproate, carbamazepine, oxcarbazepine, lamotrigine, pregabalin and gabapentin) were excluded because they are not usually used for psychiatric disorders. The ADs were divided into four categories: selective serotonin reuptake inhibitors (SSRIs: citalopram, escitalopram, sertraline, paroxetine, fluoxetine, fluvoxamine), tricyclic antidepressants (TCAs: amitriptyline, nortriptyline, clomipramine, maprotiline, imipramine), serotonin noradrenergic reuptake inhibitors (SNRIs: venlafaxine and duloxetine), and others. The APs were divided into two categories: second generation or atypical (olanzapine, clozapine, quetiapine, aripiprazole, risperidone, paliperidone, ziprasidone, amisulpride, sulpride) and first generation or typical (haloperidol, clorpromazine, zuclopentixol, thioridazine, and others).

The demographic variables of all of the subjects that used a PD at least once during the study period were compared with those of the other employees resident in Lombardy.

### 2.4. Statistical analysis

The subjects were identified by searching the cited administrative healthcare archives for those who have been prescribed a PD under observation during the 5-year period 2007–2011, and recording the number of subjects taking AP, AD or MS every three months (where necessary, additional levels of detail are described). The time series thus obtained were further stratified by gender, nationality, province, education, age and occupational variables (blue/white collar employees, and the number of years worked). The results were normalised to the data available in the labour force archives on the website of the National Institute of Statistics (ISTAT) in order to create comparable non-homogeneous distributions.

The proposed univariate logit model estimated the probability of taking AD on the basis of the variables listed above, their significance, and the contribution they make to the probability of taking AD. With the aim of isolating the effect of the economic crisis on the use of AD, an empirical application is proposed that uses data from the mandatory disclosures and hospital discharge diagnoses (HDDs) through a univariate logistic modelling approach. The dependent variable was identified through a dummy variable which takes the value 1 if the subject does use AD, AP or MS at least once during the 5-year period. The covariate that allows the identification of the economic crisis was instead calculated by observing the job activity of every subject in 5 years from 2007 to 2011. An ordinal variable is constructed that indicates whether the subject has worked less than 1 year, between 1 and 2.5 years, between 2.5 years and 4 years, and for more than 4 years in this 5-year period.

The model allows the effect of this covariate on depression to be isolated from the effects of other variables included in the model (e.g., gender, age, and nationality), and therefore permits the effects of the economic crisis on the use of AD, AP, and MS to be specified.

The statistical tests used were the chi-squared test to evaluate average dependence, and Student's *t*-test to evaluate the significance of the increase in the quarterly distributions of the number of patients having been prescribed PDs.

## 3. Results

### 3.1. Descriptive data

The number of adult employees in Lombardy remained stable during the study period: 3,278,618 in 2007, 3,317,917 in 2008, 3,325,962 in 2009, 3,303,527 in 2010, and 3,295,481 in 2011 (Table 1).

There was a slow but progressive increase in the percentage of employees aged > 55 years (from 10.3% in 2007 to 12% in 2011)

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