

# Short-term effects of the 2008 Great Recession on the health of the Italian population: an ecological study

Giorgio Mattei · Silvia Ferrari · Luca Pingani ·  
Marco Rigatelli

Received: 3 December 2012 / Accepted: 5 January 2014 / Published online: 21 January 2014  
© Springer-Verlag Berlin Heidelberg 2014

## Abstract

**Purpose** To report on the effects on health that the 2008 Great Recession is producing in Italy, by comparing the consistency of Italian data with general observations reported in the scientific literature, and by pointing out consequences on the rates of all-cause mortality, cardiovascular mortality, male suicidal behaviours, daytime alcohol drinking and traffic fatalities.

**Methods** This is an ecological study in which MEDLINE, PsycINFO and PubMed were searched for the literature with combinations of the following keywords: economic recession, financial crisis, unemployment, health, suicide

and mental health. Data from two Italian government agencies (Italian Institute of Statistics, ISTAT, and Italian Agency of Drugs, AIFA) in the years from 2000 to 2010 were obtained and analysed, by producing models of multiple linear regressions.

**Results** After the recession onset, all-cause mortality remained stable, and was not associated with the economic fluctuations. Differently, cardiovascular mortality was associated with the rate of unemployment, and showed a significant increase in 2010. Alcohol consumption increased in 2009, the year with the worst real GDP decrease (−5.1 %). Though the total rate of suicide was not associated with the economic situation, male completed and attempted suicides due to financial crisis were significantly associated with the rate of unemployment and the real GDP. The increasing diffusion of antidepressants was not associated with a lowering of the rate of suicide.

**Conclusions** The data on the Italian situation here discussed are sufficiently reliable to conclude that a link exists between the ongoing economic recession and health and mental health of Italians. Further research is needed to understand more in detail and with stronger reliability such link, to support primary and secondary preventive interventions and orient the development of effective sociopolitical interventions.

---

Some of the results reported in this paper were presented at the annual scientific XIV Meeting of the European Association for Consultation-Liaison Psychiatry and Psychosomatics (Budapest, 30 June–2 July 2011), at the XX European Congress of Psychiatry (Prague, 3–6 March 2012) and at the XI European Congress of Psychiatry (Nice 6–9 April 2013) [12, 13].

---

G. Mattei (✉) · S. Ferrari · M. Rigatelli  
Section of Psychiatry, Department of Clinical-Diagnostic  
Medicine and Public Health, University of Modena and Reggio  
Emilia, Modena, Italy  
e-mail: giorgiomattei@alice.it

G. Mattei · S. Ferrari · L. Pingani · M. Rigatelli  
Mental Health Department, University of Modena and Reggio  
Emilia, Modena, Italy

L. Pingani  
Human Resources, AUSL Reggio Emilia, Reggio Emilia, Italy

L. Pingani  
International PhD School in Clinical and Experimental  
Medicine, University of Modena and Reggio Emilia,  
Modena, Italy

**Keywords** Recession · Economic crisis · Italy ·  
Mental health · Suicide

## Introduction

Since 1947, the first article of the Italian constitution states that “Italy is a Democratic Republic, founded on

work". It is known that work may affect mental health and psychological well-being of workers in various ways, with some occupations or working conditions being at high risk for the development of substance abuse, depression and self-harm behaviours [1]. But it is also lack of work, unemployment and working instabilities that have well-known negative consequences on mental health [1–3]. The study of these consequences is the focus of the present research. Work and the work market have been challenged in the last years by one of the worst economical crises ever, the so called "2008 Great Recession" [4]. In economics, the difference between an economic crisis and a recession is that the latter, intended as a contraction phase of a business cycle, is featured by two or more consecutive quarters of negative growth of the gross domestic product (GDP) [5], which is the main indicator of a national economy's conditions. Most of the countries in Europe have been affected, having the lowering of income and the increase in unemployment as major consequences [6]. Moreover, in 2012, Italy faced a major reform of work rules and market, promoted by the Minister of Labour Elsa Fornero. Both unemployment and the fear of unemployment may have negative consequences on the general health of individuals [7]: in particular, they can determine an increase in all-cause mortality (especially in low-income countries), in cardiovascular mortality, in male suicides, in daytime drinking, and a decrease in mortality from transport accidents [1–3]. In 2011, the World Health Organization claimed at the possible consequences of the crisis in terms of increase in suicide and alcohol death rates, and at the need for prevention by proper national policies, with special regard to social welfare [8].

Recent studies that focused on mood disorders as possible long-term effect of unemployment [9, 10] reported that high level of unemployment may correlate to premature exit from the workforce due to disability retirement, and that the epidemic of depression-related disability could contribute significantly to this general trend. Reciprocal negative effects were observed between deteriorating mental well-being and unemployment and marginalisation.

Despite many attempts to explore scientifically this topic, no general consensus still exists on the effects of recession on mental health [11]. The present study aims at reporting on the short-term effects on mental health of the Great Recession among the Italian population; the consistency of data on the Italian contemporary situation with other scientific analyses of previous crises (1929s Great Depression, early 1990s' post-communist depression, and late 1990s' East Asian financial crisis) is also discussed [12, 13].

## Methods

### Literature review

A preliminary review of literature was conducted, searching MEDLINE, PsycINFO and PubMed databases with combinations of the following keywords: economic recession, financial crisis, unemployment, health, suicide and mental health. Articles were selected that focused on the effects of economic recession on health.

### Collected data

These were the data that were collected:

1. Real GDP
2. Rate of unemployment
3. DDD of SSRI AD
4. DDD of non-SSRI, non-TC antidepressants
5. Rate of completed suicide
6. Rate of attempted suicide
7. Male completed suicides
8. Male completed suicides due to financial problems
9. Male completed suicides due to financial problems/ total male suicides
10. Male attempted suicides
11. Male attempted suicides due to financial problems
12. Male attempted suicides due to financial problems/ total male suicides
13. All-cause mortality
14. Rate of mortality due to cardiovascular diseases
15. Traffic fatalities
16. Alcohol consumption among people aged over 14

### Comments on data source

All data were found on the website of the Italian National Institute of Statistics, ISTAT ([www.istat.it](http://www.istat.it)), except those referring to drug consumption [14], available on the website of the Italian Drug Agency, AIFA ([www.agenziafarmaco.gov.it](http://www.agenziafarmaco.gov.it)). The defined daily dose (DDD, i.e. the assumed average maintenance dose per day for a drug used for its main indication in adults [15]) of SSRI and non-SSRI, non-TC antidepressants was considered. The rate of unemployment and the real GDP are two basilar macroeconomics indicators. The real GDP is the GDP adjusted for price changings, as the nominal GDP does not account for inflation. Since unfortunately the black economy is still a huge and unresolved problem in Italy, an extremely precise system to estimate the contributing of the black market on GDP was developed and systematically implemented by ISTAT and other government agencies to

counterbalance the potential confounding effect: for example, of the nearly 60 million inhabitants of Italy in 2008, those working off the books were 2,958,000 (ISTAT), and their contribution to the GDP was between 16.3 and 17.5 %. The figures of the Italian GDP we refer to in the present research always include this correction.

To describe quantitatively suicide, not only the rate of suicide and attempted suicide were collected, but also the number of male attempted and completed suicides, and the proportion of these that could be reliably referred to the financial crisis since the male Italian population was mainly hit by unemployment in the first years of crisis [16] and the consequences of unemployment in terms of self-harm behaviours were mainly reported on men [2]. In Italy, there are two different systems to record suicides: one is the “survey on the deceased and the causes of death”, based on the information reported by physicians (general practitioners and pathologists) in the death certificate that has to be filled in for each subject. It is very reliable, yet data concerning 2004 and 2005 were missing, because in those years ISTAT suspended the record of the causes of deaths. The second one is the “survey on suicides and attempted suicides” on data collected by law enforcement agencies (State Police, Carabinieri, Finance Police). Though less reliable and possibly underestimating the phenomenon, it provides the complete set of data since 2000, and therefore was used in the present research [17]. The two systems were cross-validated by ISTAT. A level of concordancy between 70.0 and 87.7 % was reported. One further indicator of validity of the data was the observation that suicides and attempted suicides classified as occurring for unknown reasons remained relatively stable during the crisis period in both the record systems [18].

All-cause mortality, rate of mortality due to cardiovascular diseases, traffic fatalities and alcohol consumption among people aged over 14 were also considered for the present research, as possible indicators of the effects of the economic crisis on health, as suggested by previously published researches [2].

Correct dating of the economic recession was relevant to define the appropriate range of time for data analysis, but can be complex since many indicators have to be considered at the same time. The global economic crisis was sparked by the outbreak of the financial crisis of 2007–2008: the recession began in December 2007, and took a particularly sharp downward turn in September 2008 (National Bureau of Economic Research 2010). In the first days of July 2008, the markets broke down; on September 15th, there was the fall of the Lehman Brothers Bank in the US [19]; on September 26th, the Economic Financial Stability Committee of the European Union acknowledged the crisis. In Italy, the then Minister of Economics and

Finance Giulio Tremonti first referred to the crisis during his speech at the Parliament on October 9th 2008; he defined the European crisis “protean and segmented”, meaning that not every country in Europe was hit by it, and not in the same way [20]. In 2008 for the first time after 10 years the Italian rate of unemployment increased. This happened in the fourth trimester, and was particularly dramatic for the people aged 15–24. Consequently, the second half of 2008 can be considered the moment in which Italian population really started experiencing the crisis, with visible and measurable effects.

### Statistical analysis

Multiple linear regression models were built to analyse the data. In the first model, the independent variables were the real GDP and the rate of unemployment (no. 1 and 2 of the list of variables above) and the dependent variables were those from no. 5 to 16 of the list above.

In the second model, DDD of SSRI and non-SSRI, non-TC AD were included as independent variables, tested against the dependent variables from no. 5 and 12 of the list above. TC AD was not included in the research since their diffusion shows a steady decline in Italy in the last 15 years.

The software STATA 10.1 (Stata Corporation, College Station, TX, USA) was used for all analyses. As data were anonymous, ethics approval was not necessary given the structure of the study, and the guidelines governing research from the Declaration of Helsinki were followed.

## Results

All collected data for the present study are displayed in Table 1.

Table 2 shows the results of the first multiple regression model, with the two independent variables real GDP and rate of unemployment. The rate of unemployment was associated with the rate of mortality due to cardiovascular diseases and with alcohol consumption out of meal in persons aged 14 or more. The real GDP was associated with the number of male completed suicides due to financial problems, and with the percentage of male completed suicides due to financial problems.

Table 3 shows the results of the second multiple regression model, in which the DDD of SSRI AD and the DDD of non-SSRI AD, non-TCA assumption were also included as independent variables. The rate of unemployment was associated with the number of male completed and attempted suicides due to financial problems, and with the percentage of male completed suicides due to financial problems. The real GDP was associated with the number of

**Table 1** Values of variables under exam between 2000 and 2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rate of unemployment (%)	10	9	8.5	8.4	8	7.7	6.8	6.1	6.7	7.8	8.4
Real GDP fluctuations (%)	3.7	1.9	0.5	0	1.7	0.9	2.2	1.7	−1.2	−5.1	1.5
SSRI AD DDD/1,000 persons per day	5.5	12.3	15.7	17.9	20.9	22.3	23.9	25	25.9	26.6	27.2
Non-SSRI AD, non-TCA DDD/1,000 persons per day	1.53	2.3	2.7	3	3.5	3.9	4.8	5.6	6.3	6.8	7.3
Overall mortality (×1,000)	9.8	9.7	9.7	10.1	9.2	9.7	9.4	9.6	9.7	9.7	9.7
Rate of mortality due to cardiovascular diseases × 10,000	41.9	41	41.2	41.71	/	/	37.20	37.58	37.52	37.16	37.78
Traffic fatalities	7,061	7,096	6,980	6,563	6,122	5,818	5,669	5,131	4,725	4,237	4,090
Rate of completed suicide (%)	5.5	5	5.2	5.9	5.7	5	5.2	4.9	4.7	5	5.1
Rate of attempted suicide (%)	/	/	/	/	6	5.6	5.6	5.4	5.5	5.5	5.1
Male completed suicides (N)	2,324	2,117	2,260	2,526	2,507	2,192	2,355	2,210	2,197	2,343	2,399
Male completed suicides due to financial problems (N)	86	79	101	93	89	115	105	109	141	188	182
Male completed suicides due to financial problems/total male completed suicides (%)	3.70	3.73	4.47	3.68	3.55	5.25	4.46	4.93	6.42	8.02	7.59
Male attempted suicides (N)	1,604	1,503	1,512	1,748	1,825	1,757	1,754	1,706	1,768	1,769	1,646
Male attempted suicides due to financial problems (N)	87	78	89	97	120	104	123	111	154	198	191
Male attempted suicides due to financial problems/total male attempted suicides (%)	5.42	5.19	5.89	5.55	6.58	5.92	7.01	6.51	8.71	11.19	11.60
Alcohol consumption (persons aged 14 or more)—in the year	70.4	72	70.2	70.9	/	71.9	70.7	70.2	69.9	70.4	67.6
Alcohol consumption (persons aged 14 or more)—everyday	33.3	34.8	34.5	32.1	/	32.1	30.6	30.3	28.3	27.8	27.2
Alcohol consumption (persons aged 14 or more)—occasionally	37	37.1	35.8	38.7	/	39.8	40.2	39.9	41.7	42.5	40.5
Alcohol consumption (persons aged 14 or more)—out of meal	23.2	24.9	23.1	25.6	/	26.5	26.9	26.4	26.2	26.2	25.8

male attempted suicides due to financial problems. The consumption of non-SSRI, non-TC antidepressants was associated with the number of male completed suicides due to financial problems, with the percentage of male completed suicides due to financial problems, with the number of male attempted suicides due to financial problems and with the percentage of male attempted suicides due to financial problems.

## Discussion

Aim of the present study was to report on the effects on various indicators of health, particularly mental health, that the 2008 Great Recession produced in Italy, and to compare the consistency of Italian contemporary data with general observations reported previously in the scientific literature, derived mainly by the study of the Great Depression (1929), the Post-communist Depression (early 1990s) and the East Asian financial crisis (late 1990s) [2]. Since unfortunately the crisis is still an ongoing process, the present analysis can only “take a picture” of short-term effects, considering the years soon after the recession onset (2008–2010).

Whether economic critical fluctuations have consequences on health (especially mental health) and, if so, of what kind, is still under debate, with some authors strongly supporting this [2, 3] and others suggesting a more cautious approach to such a complex phenomenon [21]. Contrasting evidences were collected: for example, despite the deep economic recession, with rapidly rising rates of unemployment, in Helsinki, Finland, attempted suicide rates remained unexpectedly stable, and the male rate even decreased [22]. Findings like this convey the idea that the phenomenon is complex indeed, and very much context-dependent [2], influenced by specific political and social measures implemented by national Governments. Our results provide evidence that the 2008 Great Recession is having mainly negative consequences on health, but the complexity of the matter and the paucity of scientific evidence suggest the need for further investigation.

All-cause mortality is quite a gross indicator, yet it provides a sufficiently reliable idea of the general health of a population. It was reported increasing in less affluent countries experiencing a recession [23], while mixed results were found across European countries, especially the more affluent ones [2]. In Italy, the rise in

**Table 2** Multiple linear regression with two independent variables: rate of unemployment and real GDP

Dependent variables	Independent variables			
	Rate of unemployment		Real GDP	
	<i>p</i>	$\beta$	<i>p</i>	$\beta$
Rate of suicide	0.21	0.44	0.05	0.16
Rate of attempted suicide	0.92	0.05	0.85	0.10
Male completed suicides	0.61	0.19	0.82	−0.08
Male completed suicides due to financial problems	0.78	−0.08	0.04	−0.65
Male completed suicides due to financial problems/total male completed suicides	0.66	−0.12	0.04	−0.64
Male attempted suicides	0.12	−0.51	0.50	−0.21
Male attempted suicides due to financial problems	0.60	−0.15	0.07	−0.59
Male attempted suicides due to financial problems/total male attempted suicides	0.79	0.08	0.09	−0.56
All-cause mortality	0.22	0.43	0.31	−0.35
Rate of mortality due to cardiovascular diseases	0.03	0.73	0.47	0.19
Traffic fatalities	0.11	0.47	0.16	0.41
Alcohol consumption (persons aged 14 or more)—in the year	0.89	0.06	0.97	0.02
Alcohol consumption (persons aged 14 or more)—everyday	0.22	0.41	0.24	0.39
Alcohol consumption (persons aged 14 or more)—occasionally	0.08	−0.51	0.09	−0.47
Alcohol consumption (persons aged 14 or more)—out of meal	0.02	−0.74	0.66	−0.11

unemployment and the contraction of the real GDP were not followed by a short-term increase in all-cause mortality that remained substantially stable in years 2000–2010. The measures implemented by the Italian Government in terms of social protection, such as redundancy, could explain this finding. The noticeable exception in 2003 mortality rate was probably due to climatic extreme conditions, namely a very hard winter and summer, that led to an increase in the overall number of deaths, and to a consequent increase in the mortality rate [24]. Apart from that, all-cause mortality remained substantially stable in years 2000–2010, and presented a variation consistent with a three-decade trend [25].

Differently and interestingly, along years 2000–2010 the increase in the rate of unemployment was significantly associated with the increase in the rate of mortality due to cardiovascular diseases. Cardiovascular disorders such as ischaemic cardiac disorders could be considered more sensible to the socioeconomic context, rather than suicide

and attempted suicide, that appear to be a more “all-or-nothing” phenomenon. The well-known role of catecholamines during acute stressful events (such as consequences of rapid, economic changes) in precipitating cardiovascular events could represent the psychobiological link [26].

Traffic fatalities decreased after the onset of the Great Recession. This was expected, but, in the same way as alcohol consumption, traffic fatalities showed a steady decline in years 2000–2010, even several years before the recession onset. It is difficult to attribute this trend to the economic changes; it seems more probable that it was a positive consequence of several interventions of the Italian Government on the “Saturday night deaths”, with restricting laws regulating driving and driving under the effects of substances.

Alcohol consumption “out of meal” was significantly associated with the rate of unemployment: it declined while unemployment increased; this could mirror less financial resources for leisure activities connected with drinking [27], which would have, in fact, a protective effect on health.

In recent years, a change occurred in Italians’ alcohol drinking behaviour: against a general decrease in alcohol consumption, “occasional” consumption increased, witnessing the movement from a traditional, Mediterranean, meal-related, mostly wine drinking to a North-European, weekend binge-drinking behaviour [28]. “In the year” and “occasional” alcohol consumption increased in 2009, against a globally decreasing trend across the 10-year period we considered: 2009 recorded the worst percentage variation of real GDP (−5.1 %). In the same year, the greatest amount of suicides and attempted suicides due to financial problems was registered. In the US, during the 2008 Great Recession the prevalence on any alcohol use significantly declined, while the prevalence of frequent binge drinking increased [27]; binge drinking was found to correlate with deteriorating macroeconomic conditions [27, 29]. A link between GDP reduction, alcohol consumption and suicide due to financial problems may be hypothesised, though not yet confirmed by this and previous researches.

Only male suicides were considered in the present study, since Italian male workers were mostly affected by unemployment in the first years of recession, and because major changes in terms of mental health were expected mainly among the male population, as suggested in the scientific literature [2, 16]. Recent researches pointed out that every percent increase in unemployment directly correlates with increase in suicides (+0.79 %) and homicides (+0.79 %) [3]. In our data, though no significant association was found between the total rate of suicide and attempted suicide, real GDP and the rate of unemployment, an increase of male completed suicides due to financial problems was predicted significantly by decrease of the

**Table 3** Multiple linear regression with four independent variables: rate of unemployment, real GDP, DDD of SSRI AD and DDD of non-SSRI, non-TC AD

Dependent variables	Independent variables							
	Rate of unemployment		Real GDP		SSRI AD DDD/1,000 persons per day		Non-SSRI, non-TC AD DDD/1,000 persons per day	
	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$	<i>p</i>	$\beta$
Rate of suicide	0.23	0.71	0.83	0.08	0.22	1.37	0.14	-1.33
Rate of attempted suicide	0.39	-0.28	0.20	-0.40	0.22	-3.21	0.36	2.17
Male completed suicides	0.20	0.91	0.79	0.12	0.22	0.0875	0.39	-0.86
Male completed suicides due to financial problems	0.01	0.47	0.04	-0.23	0.97	-0.01	0.01	1.07
Male completed suicides due to financial problems/total male completed suicides	0.14	-0.31	0.08	-0.26	0.48	-0.26	0.01	1.18
Male attempted suicides	0.90	-0.07	0.78	-0.11	0.32	1.12	0.43	-0.68
Male attempted suicides due to financial problems	0.03	0.47	0.22	-0.15	0.61	0.16	0.01	0.98
Male attempted suicides due to financial problems/total male attempted suicides	0.01	0.55	0.27	-0.09	0.87	0.04	<0.001	1.15

real GDP, while an increase in the rate of unemployment emerged as a possible predictor of increased male completed and attempted suicides due to financial problems. A previous study by De Vogli et al. [18] estimated that 290 excess suicides and attempted suicides in Italy were potentially attributable to the recession, whereas, contrastingly, in Latvia, despite major percentage variations in the real GDP no significant change in the rate of suicide was noticeable [21]. It seems that only after filtering the rate of suicide, by considering gender or reasons attributed to suicide, the epidemiologic connection stems out. This argument seems crucial to partly explain the recent debate about the association between unemployment and suicide [21, 30, 31]. Some authors reported that, in the US, 4,750 excess deaths potentially attributable to the rise in unemployment occurred during the Great Recession; consequently, rising unemployment could account for about a quarter of the excess suicides counted at that time in the US [30]. Other authors expressed criticism about this association, noticing chronological inconsistencies, and that in other countries (e.g. Baltic States), despite an even worse economic downturn, no such rise in suicide mortality as in the US was appreciable: they concluded that the causal link between unemployment and suicide is complex and multifactorial [21].

The present study contributes to this debate in two ways: first, by suggesting how aggregated data could be misleading. Drawing conclusions only on aggregated data (such as mortality rate or suicidal rate) could be too precipitous, and even harmful, given that the discussion on suicidality in the media is itself an independent risk factor

for suicides [21]. Reeves and colleagues proved the correlations both in aggregated and disaggregated data, this way providing strong evidence in favour of the association between suicide and unemployment [30].

Second, the rate of unemployment was the main factor, and sometimes only macroeconomic index was taken into account to study the association between economic fluctuations and suicidal behaviour. In the present study, also the real GDP was considered, and emerged as a possible predictor. The real GDP could be a more sensitive indicator, whose reduction affects even those who are not experiencing unemployment, but redundancy or more general economic difficulties (such as rise in personal debts and mortgage foreclosures). Future studies should therefore include not only various meaningful indicators of economic crisis: unemployment rate, real GDP variations, but also the rate of those experiencing redundancy or job insecurity.

Given the structure and aim of the present study, it was relevant to include data on rate of antidepressant prescriptions in Italy in the considered period. It is expected that the rate of self-harm behaviours, and particularly completed suicides, should decrease as the use of antidepressant drugs becomes wider [32, 33], as well as, on the other side, the prescription of antidepressants should increase in case of stressful environmental factors such as unemployment. In Italy, between 2000 and 2010, the prescription of SSRI and non-SSRI antidepressants (excluded TCs) showed a steady increase. Yet, no significant association was noticeable between the wider diffusion of SSRI and the rate of suicide. This finding is consistent with that from an impressively long-term analysis (between years

1955 and 2000) that outlined no change in the rate of suicide after the introduction of SSRIs in Italy [34]. Prescription of other antidepressants than SSRIs and TCs, instead, predicted significantly an increase of both male completed and attempted suicides due to financial problems. Greater availability of antidepressant therapies does not seem to impact on suicide rate as elsewhere reported (i.e. Hungary, [32]), and the steady increase in Italy of male self-harm behaviours in times of economic crisis could support an important environmental effect, mediated by financial problems [2, 3, 6, 34]. It should be recognised that suicide is not a syndrome itself, rather a behavioural sign that can occur in many different psychiatric disturbs. From a psychopathological point of view, the suicide in a person affected by schizophrenia individual is not the same as a suicide in a depressed person. Moreover, the spectrum of depressions is featured by different sub-types (e.g. reactive, melancholic,...) with different responses to the therapies, both psychotherapies and pharmacotherapies [36]. The reason why the diffusion of AD seems to have no influence on the suicide rate could also be found in the peculiar type of depression developed by those who committed suicide due to financial problems. In fact, many of them were entrepreneurs, working in the northeast of Italy [37]. Among the entrepreneurs, the narcissistic wound determined by the damage or loss in the social role could have represented a major determinant in the development of a particular type of depression that finally led to self-harm behaviours, namely a reactive form, less responsive to antidepressants than the endogenous ones [36].

Unemployment has been recognized as a major factor influencing suicide rates and other public health indicators over long periods of time and in different national contexts: [2, 35] yet, the present study suggests that effects of unemployment on suicidal behaviour are not only long term, but also “acute”, i.e. short term. In fact, the reported data suggest to distinguish two different periods: one “acute”, soon after the recession onset (years 2008–2009, the worst from an economic point of view), another, started in the following years, still on going. This distinction mirrors both the epidemiological approach to the topic, that may be longitudinal or transversal, and the economic events occurred: in fact, the 2008–2009 global financial crisis (the “acute” phase), triggered in 2010 a European crisis still going on (the “chronic” phase) [38]. The proposed distinction between an “acute phase” and a second, “chronic phase” could be supported by a fundamental change occurring in the life of the individuals: i.e. in years 2008–2009 they faced an “economic earthquake” concerning the social, psychological and economical coordinates of the previous decades, when “growth at any cost” was the imperative, and it was intended to be natural and everlasting—a belief really challenged in the second period.

Some limitations of this study have to be acknowledged. First, for its ecological nature, the quality of data is not assessable and no implications on causality can be drawn. Yet, the data were derived from two major government agencies, ISTAT and AIFA, which reliably guarantee their quality. Second, as already mentioned, data about suicides and attempted suicides came from a less reliable source (“survey on suicides and attempted suicides” of police and law enforcements) than the best available (“survey on the deceased and the causes of death” of ISTAT), with possible consequent underestimation of the phenomenon. Nevertheless, the two systems have been cross-validated and, moreover, in case of underestimation, this would only make our finding about the correlation between male suicides and attempted suicides due to financial problems and unemployment/decrease in GDP more striking. Third, as far as alcohol consumption is concerned, this study did not consider age-adjusted behaviours that could account for significant differences; yet, it seems that the four options presented (alcohol consumption “in the year”, “everyday”, “occasionally”, and “out of meal”) provide quite a complete description of this phenomenon, with a special focus on the change in drinking behaviours occurred over recent years in Italy. Finally, the high number of Italian people working off the books may cause underestimation of GDP; but, as already mentioned, economic data provided by ISTAT already include a correcting estimate of black economy.

## Conclusions

Sufficient and reliable evidence on consequences on health and mental health of Italians in the years of economic crisis is here provided, in one of the first attempts to analyse scientifically this subject. Even though data referring to overall mortality and traffic fatalities were not consistent with previously reported observations, an increase in male completed and attempted suicides due to financial problems was recorded, and contrasting with the increasing diffusion of antidepressants during the last 10 years. Alcohol consumption showed as expected a short-term increase featuring “in the year” and “occasional” consumption. The rate of unemployment emerged as predictor of cardiovascular mortality.

Further research is needed to understand more in detail and with stronger reliability the link between economic crisis and recession and health of the exposed populations: findings could support primary and secondary preventive interventions and may and should be used by governments to establish effective sociopolitical interventions.

**Conflict of interest** The authors report no competing interests.

## References

- Wilhelm K, Kovess V, Rios-Seidel C, Finch A (2004) Work and mental health. *Soc Psychiatry Psychiatr Epidemiol* 39:866–873
- Uutela A (2010) Economic crises and mental health. *Curr Opin Psychiatry* 23(2):127–130
- Stuckler D, Basu S, Suhrcke M, McKee M (2009) The health implications of financial crisis: a review of the evidence. *Ulster Med J* 78(3):142–145
- Wessel D (2010) Did ‘Great Recession’ live up to the name? *Wall Str J*. <http://online.wsj.com/news/articles/SB10001424052702303591204575169693166352882>
- Shiskin J (1974) The changing business cycle. *New York Times*, New York
- Stuckler D, Basu S, Suhrcke M et al (2009) The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet* 374:315–323
- Lewis G, Sloggett A (1998) Suicide, deprivation and unemployment; record linkage study. *BMJ* 317(7168):1283–1286
- World Health Organization (2011) Impact of economic crises on mental health. <http://www.euro.who.int/en/what-we-do/health-topics/noncommunicable-diseases/mental-health/publications/2011/impact-of-economic-crises-on-mental-health>
- Lamberg T, Virtanen P, Vahtera J, Luukkaala T, Koskenvuo M (2010) Unemployment, depressiveness and disability retirement: a follow-up study of the Finnish HeSSup population sample. *Soc Psychiatry Psychiatr Epidemiol* 45(2):259–264
- Madianos M, Economou M, Alexiou T, Stefanis C (2011) Depression and economic hardship across Greece in 2008 and 2009: two cross-sectional surveys nationwide. *Soc Psychiatry Psychiatr Epidemiol* 46(10):943–952
- Catalano R (2009) Health, medical care, and economic crisis. *N Engl J Med* 360(8):749–751
- Mattei G, Ferrari S, Rigatelli M (2011) Economic recession in Italy: a review of short-term effects on health. *J Psychosom Res* 70:606
- Mattei G, Ferrari S, Rigatelli M (2012) How does economic recession in Italy affect the health of Italian people? *Eur Psychiatr* 27 (2) Suppl. 1. Video presentation available on <http://www.psychiatry.conference-companion.com/videos/2012/9>
- Gruppo di lavoro OsMed (2011) The use of drugs in Italy. 2010 national account. (L’uso dei farmaci in Italia. Rapporto nazionale anno 2010). Il Pensiero Scientifico Editore, Rome (in Italian)
- WHO Collaborating Centre for Drug Statistics Methodology (WHOC): DDD Definition and general considerations. [http://www.whocc.no/ddd/definition\\_and\\_general\\_considera/](http://www.whocc.no/ddd/definition_and_general_considera/)
- Giovannini E (2009) Document on the economic-financial planning concerning the 2010–2012 measure for public finance (Documento di Programmazione Economico-Finanziaria relativo alla manovra di finanza pubblica per gli anni 2010–2012). Audition of the President of the National Institute of Statistics. Istituto Nazionale di Statistica, Rome (in Italian)
- ISTAT (2000–2010) Suicides and attempted suicides in Italy (Tables 2000–2010). (Suicidi e Tentativi di Suicidio in Italia, Tavole 2000–2010). Istituto Nazionale di Statistica, Rome (in Italian)
- De Vogli R, Marmot M, Stuckler D (2013) Excess suicides and attempted suicides in Italy attributable to the great recession. *J Epidemiol Community Health* 67(4):378–379. doi:10.1136/jech-2012-201607
- Rapoport A, Gerts A (2010) The Global economic crisis of 2008–2009. Sources and causes. *Probl Econ Transit* 53(6):45–62
- Tremonti G (2008) Address of the minister of economics and finance about the development of the ongoing financial crisis. (Informativa del Ministro dell’Economia e delle Finanze Giulio Tremonti sugli sviluppi della crisi finanziaria in atto). [http://www.mef.gov.it/podcast/2008/video\\_0041.html](http://www.mef.gov.it/podcast/2008/video_0041.html) (in Italian) finanziaria in atto). [http://www.mef.gov.it/podcast/2008/video\\_0041.html](http://www.mef.gov.it/podcast/2008/video_0041.html) (in Italian)
- Fountoulakis KN, Koupidis SA, Siamouli M, Grammatikopoulos IA, Theodorakis PN (2013) Suicide, recession and unemployment. *Lancet* 381(9868):721–722. doi:10.1016/S0140-6736(13)60573-5
- Ostamo A, Lönnqvist J (2001) Attempted suicide rates and trends during a period of severe economic recession in Helsinki, 1989–1997. *Soc Psychiatry Psychiatr Epidemiol* 36(7):354–360
- Falagas ME, Vouloumanou EK, Mavros MN, Karageorgopoulos DE (2009) Economic crisis and mortality: a review of the literature. *Int J Clin Pract* 63(8):1128–1135
- ISTAT (2006) Mortality tables of the resident population. Year 2003. (Tavole di mortalità della popolazione residente. Anno 2003). Istituto Nazionale di Statistica, Rome (in Italian)
- World Health Organization (2013) Health for all database. <http://www.euro.who.int/en/what-we-do/data-and-evidence/databases/european-health-for-all-database-hfa-db2>
- Greenwood DC, Muir KR, Packham CJ, Madeley RJ (1996) Coronary heart disease: a review of the role of psychosocial stress and social support. *J Public Health Med* 18:221–231
- Bor J, Basu S, Coutts A, McKee M, Stuckler D (2013) Alcohol use during the great recession of 2008–2009. *Alcohol* 48(3):343–348. doi:10.1093/alcalc/agt002
- ISTAT (2011) Alcoholic use and abuse in Italy (Tables 2000–2010). (Uso e abuso di alcol in Italia, Tavole 2000–2010). Istituto Nazionale di Statistica, Rome (in Italian)
- Davalos ME, Fang H, French MT (2012) Easing the pain of an economic downturn: macroeconomic conditions and excessive alcohol consumption. *Health Econ* 21(11):1318–1335. doi:10.1002/hec.1788
- Reeves A, Stuckler D, McKee M, Gunnell D, Chang S, Basu S (2012) Increase in state suicide rates in the USA during economic recession. *Lancet* 380:1813–1814
- Reeves A, Stuckler D, McKee M, Gunnell D, Chang S, Basu S (2013) Suicide, recession and unemployment. Author’s reply. *Lancet* 381(9868):722
- Rihmer Z, Belső N (2001) Antidepressants and suicide prevention in Hungary. *Acta Psychiatr Scand* 103:238–239. doi:10.1034/j.1600-0447.2001.103003238.x
- Gibbons RD, Hur K, Bhaumik DK, Mann JJ (2005) The relationship between antidepressant medication use and rate of suicide. *Arch Gen Psychiatry* 62:165–172
- Guaiana G, Andretta M, Corbari L, Mirandola M, Sorio A, D’Avanzo B, Barbui C (2005) Antidepressant drug consumption and public health indicators in Italy, 1955 to 2000. *J Clin Psychiatry* 66(6):750–755
- Ceccherini-Nelli A, Piebe S (2011) Economic factors and suicide rates: associations over time in four countries. *Soc Psychiatry Psychiatr Epidemiol* 46(10):975–982
- Cuijpers P, Sijbrandij M, Koole SL, Andersson G, Beekman AT, Reynolds CF 3rd (2013) The efficacy of psychotherapy and pharmacotherapy in treating depressive and anxiety disorders: a meta-analysis of direct comparisons. *World Psychiatry* 12(2):137–148. doi:10.1002/wps.20038
- Bortolussi G (2012) L’economia dei suicidi. Piccoli imprenditori in crisi. Marcianum Press, Venezia (in Italian)
- Blanchard O, Amighini A, Gavazzi F (2010) Macroeconomics. A European perspective. Financial Times, Upper Saddle River, New Jersey