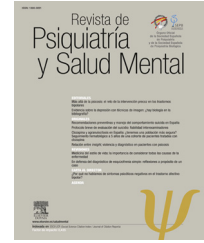




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## ORIGINAL ARTICLE

# Suicide, unemployment, and economic recession in Spain<sup>☆</sup>

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### KEYWORDS

Economic recession;  
Epidemiology;  
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### Abstract

**Introduction:** The aim of the present work is to determine the association between unemployment and suicide, and to investigate whether this association is affected by changes in the economic cycle or other variables such as age and sex.

**Methods:** A time-trend analysis was conducted to study changes in the number of suicides between 1999 and 2013 in Spain. Pearson's correlation coefficients and regression models were used to find the association between unemployment and suicide.

**Results:** A significant positive association was found between unemployment and suicide in the pre-crisis period in men. In that period (1999–2007), each 1% annual increase in unemployment was associated with a 6.90% increase in the annual variation of suicide in the total population, and with a 9.04% increase in the annual variation of suicide in working age men.

**Conclusions:** The correlation between unemployment and suicide is significant in periods of economic stability, but has weakened during the recent financial crisis. Unemployment and suicide have a complex relationship modulated by age, sex and economic cycle.

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**PALABRAS CLAVE**

Recesión económica;  
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España;  
Suicidio;  
Desempleo

**Suicidio, desempleo y recesión económica en España****Resumen**

**Introducción:** El objetivo del presente estudio es determinar la asociación entre desempleo y suicidio e investigar si existen factores relacionados con el ciclo económico o sociodemográficos que influyan sobre la citada asociación.

**Métodos:** Realizamos un análisis de tendencias temporales para estudiar los cambios habidos en España en el número de suicidios entre 1999 y 2013. Utilizamos el coeficiente de correlación de Pearson y modelos de regresión para valorar la asociación entre desempleo y suicidio.

**Resultados:** Encontramos una asociación positiva entre desempleo y suicidio en el periodo previo a la crisis en hombres. En ese periodo (1999-2007), en la población total, cada incremento del 1% en la variación anual de desempleo se asoció a un 6,90% de incremento en la variación anual de suicidio. En hombres en edad laboral, el 1% de variación anual de desempleo se asoció a un 9,04% de incremento en la variación anual de suicidio.

**Conclusiones:** La correlación entre desempleo y suicidio es relevante en periodos de estabilidad económica, y más débil durante la reciente crisis económica. Desempleo y suicidio tienen una relación compleja, modulada por la edad, el sexo y el ciclo económico.

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**Introduction**

Suicidal behaviour is influenced by personal (micro-socioeconomic level) and social (macro-socioeconomic level) factors.<sup>1</sup> Among the latter, financial/economic crisis and its consequences (unemployment, low income, personal debt, mortgage foreclosures) have often been associated with increases in suicide rates.<sup>2-7</sup> However, evidence regarding the influence of changes in the economic cycle on mental health remains ambiguous<sup>8,9</sup> and is sometimes challenged.<sup>10-13</sup> In particular, the association between one aspect of the financial crisis, i.e. unemployment, and suicide is weak,<sup>14</sup> and its amplitude varies from country to country. Furthermore, the relationship is influenced by other variables such as gender, age, labour market opportunities, duration of unemployment, and level of job skills; and we know that the hypothetical effect (increase in suicide rates) and cause (increased unemployment) could not be simultaneous.<sup>15-19</sup> Moreover, suicide data must be interpreted cautiously because the accuracy of the national suicide databases is unclear.<sup>20</sup>

Spain has been particularly hard hit by the financial crisis. Following a decade of expansion, economic growth began to slow in 2007, and gross domestic product (GDP) began to contract as of the second quarter of 2008, ushering in a recession lasting seven successive quarters.<sup>7,21,22</sup> Since 2007, the downturn in the Spanish economy has caused job losses, home foreclosures, and a large national budget deficit.<sup>23</sup> Between 2007 and 2014, unemployment trebled from 8.60% to 26.94% (first quarter of 2013), reaching the highest rate in the European Union. Since the onset of the financial crisis, austerity measures have included salary reductions for health care personnel, changes in drug-prescribing policies, and delays in payments to suppliers.<sup>24</sup>

This study aims firstly to determine the association between unemployment and suicide in Spain between 1999

and 2014 and secondly to investigate whether this association is affected by characteristics of the population or changes in the economic cycle.

**Method**

Annual data for the number of deaths by suicide were obtained from the database of the National Statistics Institute (INE) of Spain. The annual unemployment data were obtained from the database of the National Employment Institute. All deaths by suicide between 1999 and 2014 in Spain were selected. Data from 17 Autonomous Communities of Spain were analysed, including the Autonomous Cities of Ceuta and Melilla. Suicides deaths are coded as X60-X84 (ICD-10).<sup>25</sup> In Spain, suicides are determined by a judicial inquest, as is any death that may have a possible accidental or violent cause.

To estimate the number of suicides that may be attributed to an increase in unemployment, instead of studying the overall unemployment numbers (a combination of the long-term unemployed and those who have lost their jobs more recently), we assessed annual variations in unemployment (AVU) figures, which more accurately reflect the number of jobs lost each year, and correlated these figures with the annual variation in the number of suicides (AVS).

**Statistical analysis**

Data normality was checked by means of the Anderson-Darling test.<sup>26</sup> A time-trend analysis was conducted using the Cox-Stuart test<sup>27</sup> to determine the change in the number of suicides in the total population, in men and in women. Two types of linear regression models were then fitted to find the association between changes in unemployment levels and suicide. The first model made it possible to calculate the AVS rates as a function of the

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