WITHSTANDING AUSTERITY

Economic crisis and health inequalities in Spain

Juan Antonio Córdoba Doña
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To my family
# Table of Contents

Abstract ........................................................................................................... v  
Resumen en español.................................................................................... vii  
Original papers........................................................................................... ix  
Prologue ........................................................................................................ x  
Introduction and Background...................................................................... 1  
  1. Economic crises and health: An introduction to the field.................... 1  
  2. Impact of previous crises on health and health inequalities.............. 4  
  3. Impact of current crisis on health and health inequalities............... 5  
  4. Understanding the pathways from economic crises to health and health inequalities: A conceptual model................................. 8  
  5. National contexts and different responses to crisis: The Spanish and the Andalusian cases...................................................... 12  
Objectives ..................................................................................................... 14  
Methods ........................................................................................................ 16  
  1. Setting.................................................................................................... 16  
  2. Specific methods for the four objectives............................................ 19  
  3. Ethical considerations........................................................................... 28  
Results ........................................................................................................... 30  
Discussion ..................................................................................................... 45  
Methodological considerations.................................................................... 56  
Conclusions ................................................................................................... 59  
Policy and research implications.................................................................. 61  
Appendix ........................................................................................................ 64  
Acknowledgements....................................................................................... 66  
References ..................................................................................................... 68
Abstract

Background

Along with the austerity measures introduced in many countries, the economic crisis affecting Europe since 2008 seems to have impacted many aspects of the health of the Spanish population and has had a negative effect on the provision of health services. An increasing body of knowledge has shown a clear impact of the current crisis on suicidal behaviour and mental health, and a less consistent effect on physical health and access to healthcare. However, little is known about the impact of the crisis on social inequalities in health and healthcare access, an area on which the present study seeks to shed light in the context of Spain, and specifically Andalusia, a region hit very hard by the crisis.

Objective

To study the impact of the economic crisis starting in 2008 on health, health inequalities, and health service utilisation in Spain and Andalusia and the roles of sociodemographic factors in these associations.

Methods

Death rates were analysed to study the annual percent change in overall and cause-specific mortality in Spain between 1999 and 2011, and the Longitudinal Database of the Andalusian Population was used to study educational inequalities in overall mortality from 2002 to 2010 (study 1). To calculate suicide attempt rates, information from 2003 to 2012 on 11,494 men and 12,886 women provided by the Health Emergencies Public Enterprise Information System in Andalusia was utilised. The association between unemployment and suicide attempts was studied through linear regression models (study 2). Two waves of the Andalusian Health Survey (2007 and 2011–12) provided data for the third and fourth studies of this thesis. Educational and employment inequalities in poor mental health in relation with the crisis were analysed through Poisson regression models (study 3). The change in inequalities (pre-crisis–crisis) in healthcare utilisation outcomes (general practitioner, specialist, hospitalisation, and emergency attendance) was measured by the change in horizontal inequality indices. A decomposition analysis of change in inequality between periods was performed using the Oaxaca approach (study 4).
Results

Study 1: Overall mortality in Spain decreased steadily during the period, with annual percent changes of -2.44% in men and -2.20% in women. An increase in educational inequality in mortality was observed in men in Andalusia. In women, the inequalities instead remained stable. Suicide mortality showed a downward trend in both sexes in Spain. Study 2: A sharp increase in suicide attempts in Andalusia was detected after the onset of the crisis in both sexes, with adults aged 35 to 54 years being the most affected. Suicide attempts were associated with unemployment rates only in men. Study 3: Poor mental health increased in working individuals with secondary and primary studies during the crisis compared to the pre-crisis period, while it decreased in the university study group. However, in unemployed individuals, poor mental health increased only in the secondary studies group. Financial strain could partly explain the crisis effect on mental health among the unemployed. Study 4: Horizontal inequality in utilisation changed to a greater equality or a more pro-poor inequality in both sexes. In the decomposition analysis, socioeconomic position and health status showed greater contributions to the changes in inequalities.

Conclusion

This thesis illustrates the complexity of the influences of the current economic crisis on health inequalities in a Southern European region. Specifically, no noticeable effects of the crisis on overall and suicide mortality were detected; instead, increasing educational inequalities in mortality in men and a large increase in suicide attempts in middle-aged men and women were observed. The deterioration in poor mental health was mainly detected in those of intermediate educational level. Economic conditions such as unemployment and financial strain proved to be relevant. Finally, in the light of no increased inequalities in healthcare utilisation, the universal coverage health system seems to buffer the deleterious effect of the crisis and austerity policies in this context.

Keywords: economic crisis; mental health; socioeconomic inequalities; health determinants; healthcare utilisation; Spain; Andalusia.
Resumen en español

Antecedentes

Junto con las medidas de austeridad introducidas en muchos países, la crisis económica que afecta a Europa desde 2008 parece haber repercutido en muchos aspectos de la salud de la población española y haber tenido un efecto negativo en la prestación de servicios de salud. Hay cada vez más evidencias del impacto negativo de la crisis actual sobre los suicidios y la salud mental, aunque menos concluyentes sobre el efecto en la salud física y el acceso a la atención de la salud. Sin embargo, poco se conoce del impacto de la crisis en las desigualdades sociales en salud y en el acceso a la atención sanitaria, áreas sobre las que el presente estudio pretende aportar nuevos conocimientos en el contexto de España, principalmente de Andalucía, una región especialmente afectada por la crisis económica actual.

Objetivo

Estudiar el impacto sobre la salud, las desigualdades en salud y la utilización de los servicios sanitarios de la crisis económica que comenzó en 2008, en España y en Andalucía, así como el papel de diversos factores sociodemográficos.

Métodos

Se calcularon los cambios porcentuales anuales de las tasas de mortalidad general y por causa específica en España entre 1999 y 2011, y a partir de la Base de Datos Longitudinal de la Población Andaluza se utilizó se estudiaron las desigualdades por nivel educativo en la mortalidad general de 2002 a 2010. Para calcular las tasas de intentos de suicidio se utilizó información de 2003 a 2012 de 11.494 hombres y 12.886 mujeres proporcionada por el Sistema de Información de la Empresas Públicas de Emergencias Sanitarias de Andalucía. La asociación entre el desempleo y los intentos de suicidio se estudió a través de modelos de regresión lineal (estudio 2). Datos de dos oleadas de la Encuesta de Salud de Andalucía (2007 y 2011-12) se utilizaron para los estudios tercero y cuarto de esta tesis. Se analizaron las desigualdades en salud mental y por nivel educativo en relación con la crisis mediante regresión de Poisson (estudio 3). La tendencia de las desigualdades (precrisis—crisis) en los resultados de la utilización de los servicios de salud (médicos generalistas, especialistas, hospitalización y urgencias) se midió por el cambio en los índices de desigualdad horizontal. Se realizó un análisis de descomposición del cambio en la desigualdad entre periodos utilizando el método de Oaxaca (estudio 4).
Resultados

Estudio 1: La mortalidad general en España descendió de forma estable, con cambios porcentuales anuales de -2,44% en hombres y -2,20% en mujeres. Se observó un aumento de la desigualdad por nivel educativo en la mortalidad en los hombres de Andalucía. En las mujeres las desigualdades se mantuvieron estables. La mortalidad por suicidio mostró una tendencia a la baja en ambos sexos en España. Estudio 2: Se detectó un importante aumento de los intentos de suicidio en Andalucía con el inicio de la crisis, en ambos sexos, siendo los adultos de 35 a 54 años los más afectados. Los intentos de suicidio se asociaron con las tasas de desempleo en los hombres. Estudio 3: La salud mental percibida empeoró durante la crisis comparación con el período anterior en los individuos que trabajan y con estudios secundarios o primarios, mientras que mejoró en el grupo con estudios universitarios. Sin embargo, en los individuos desempleados sólo empeoró en el grupo de estudios secundarios. Las dificultades económicas pueden explicar en parte el efecto de la crisis sobre la salud mental entre los desempleados. Estudio 4: La desigualdad horizontal en el acceso cambió hacia una mayor igualdad o una desigualdad más favorable a los niveles socioeconómicos bajos en ambos sexos. En el análisis de descomposición, la posición socioeconómica y el estado de salud mostraron las mayores contribuciones a los cambios en las desigualdades.

Conclusión

Esta tesis ilustra la compleja relación de la actual crisis económica con las desigualdades en salud en una región del sur de Europa. En concreto, no se detectaron efectos apreciables de la crisis sobre la mortalidad general y por suicidio, pero en cambio aumentaron las desigualdades por nivel educativo en la mortalidad de los hombres y se detectó un elevado incremento en los intentos de suicidio en hombres y mujeres de mediana edad. El deterioro de la salud mental se detectó principalmente en las personas de nivel educativo intermedio. El desempleo y las dificultades económicas resultaron ser mediadores relevantes entre la crisis y la desigualdad en salud mental. Finalmente, en este contexto, el sistema de salud de acceso universal parece amortiguar los efectos perjudiciales de la crisis y de las políticas de austeridad.

Palabras clave: crisis económica; salud mental; desigualdades socioeconómicas; determinantes de la salud; utilización de servicios de salud; España; Andalucía.
Original papers

This thesis is based on the following four papers, referred to as Paper 1-4:


4. Córdoba-Doña JA, Escolar-Pujolar A, San Sebastián M, Gustafsson PE. Withstanding austerity: equity in access to health services in the first stage of the economic recession in southern Spain. (submitted)
Prologue

It is frequently said that the PhD process can be compared to a journey in the student’s life. If that were the case, two simple questions could be of help to better understand the scope of the thesis and the role of the student-researcher: Why did you decide to start this journey? Were you clear as to where you were going? When you start this journey almost in your fifties, the responses somehow become intriguing.

When the opportunity of starting this trip arose, my family and I were returning to Spain after years in Ecuador, where we lived during several periods. In this country, I had worked in the late 1990s together with Dr Miguel San Sebastián, who was now proposing that I should resume my research work in public health in a more formal way at a Swedish university. It really sounded like a prize, but much more like a great challenge.

After two decades of going back and forth between Europe and Latin America, this was a concrete possibility to combine my daily work as an epidemiologist/public health officer in a health district in Cádiz — a local setting — with a more global vision through the so-called sandwich PhD programme. I had some background experience in research and action on health inequalities, as well as a strong commitment to the defense of the public health system. Also, as a returnee, I was bringing back a wealth of experience of work at the grassroots level, engaged with community health workers and participatory development.

But by the time of the decision on the destination of the journey, a milestone in our lives was the economic recession, which came up by 2008 and was to stay with us. Our return home coincided with the beginning of the economic crisis in Spain. It was a predicted crisis, but it was totally neglected by national–regional governments and economic agents even several years after its onset. When starting the research for this thesis, I could not foresee that I was going to suffer the effects of the crisis in several ways. Besides the extremely high unemployment, which impacted friends and relatives — some of whom were forced to migrate abroad — I experienced significant reduction in my wage, and for some time I had to change my job and do extra work to make ends meet. Like most people, I was just looking for strategies to withstand the crisis and the austerity measures.

With a relative delay, a group of public health researchers in Andalusia and I had taken the first steps to measure the impact of the crisis on the health of our already battered regional economy. Although teamwork did not thrive, I could take advantage of the experience. At this point, with limited time and resources, together with Miguel and Per Gustafsson, my main
supervisor, and Antonio Escolar, my immediate boss at home, we proposed a feasible approach to study the unequal impacts of the crisis on the Andalusian population. Multiple designs were available, but we decided to be practical and measure impacts in the short and medium term. This led us to focus our research on mental health and access to services, essentially. It also compelled us to use secondary data sources, disregarding the qualitative approaches that we had initially considered.

During the four years of our work, we witnessed a boom in the number of publications on the economic crisis and health that have forced us to continuously update. Nevertheless, the big ‘whys’ were probably clear since the beginning of our research. Even some of the methodologies we used were familiar to me before we started the journey. However, I want to emphasise that I have been able to go much deeper into the ‘hows’, the mechanisms, and the pathways. This was an opportunity to approach the complexity of the chains and connections of causes and factors and look for explanatory theories, always keeping in mind the design of future intervention and research strategies.

Modestly speaking, I think that the main achievements of this thesis have to do with the lack of research on the impact of the crisis on health inequalities in Andalusia, despite its backward position in the Spanish and European contexts. I would also highlight the importance of addressing the effects of the crisis through the prism of inequality, trying to disentangle the most affected social groups, which are usually neglected in population averages. A third contribution is the evidence of the utility of available official registers and databases, however underutilised, for relevant epidemiological and health services research. Finally, we have detected the need to increase watchfulness of the causes of the causes, as this crisis is not a fleeting incident but a new state of things, a new state of being, already visible in the relocation of people and social classes in our country.
Introduction and background

1. Economic crises and health: An introduction to the field

1.1. Economic crises and the current Great Recession

Economic crises are defined as disruptions of the normal performance of financial and monetary systems, which upset the functioning of the real economy, slowing down production and reducing employment as a consequence (1). Crises present a rather unpredictable character, and they are frequently triggered by bank bankruptcies, currency crises, sudden depreciation of financial products, debt crises, or the bursting of financial bubbles (2). Crises are usually indicated by a rise of unemployment rates or a sustained drop in the gross domestic product (GDP). More specifically, an economic recession is defined as a period of general economic decline, usually a contraction in the GDP for at least six consecutive months (3).

In 2008 most developed economies of the world and the European Union fell into an economic recession, triggered by the crisis in the United States subprime mortgage market over the summer of 2007 (4). The immediate macro-economic effects of the crisis were seen by a decline of 6 percentage points in GDP in the US during 2008 and 4 percentage points in the EU-15 (5). One of the negative consequences of the crisis was a dramatic increase in the unemployment rate, rising from 5.6 % in 2007 to 8.3 % in 2009 in the OECD countries, with an estimated increase of 35 million unemployed worldwide (6).

For some authors, the crisis could be seen as ‘the culmination of the neoliberal era’ (7). More specifically, it revealed the fragility of a growth model based on the financialisation of the economy and household indebtedness, rooted in the relaxation of governmental regulations and a blind faith in markets, and fostered by the high degree of interconnections worldwide (8). In this sense, the crisis has been deemed to be unique from previous historical examples. Some authors even consider that the crisis is part of a more complex scenario encompassing a social crisis, an ecological crisis, and a political crisis, associated with an ongoing dismantling of the welfare state in Europe (9).

1.2. Economic crises and health: context specificity and methodological features

Studies on the relation between economic crises and health date back as far as the 1930s during the Great Depression, a period in which the detrimental
effects of the economic downturn became visible in the public health arena (10). However, after the onset of the current recession starting in 2008, academic publications on the topic increased rapidly (11). Moreover, the current economic recession has brought researchers and policy-makers back to revisit historical evidence on the complex relationships between financial crises and health (12). In this sense, the major crises in the twentieth century brought up a special contribution to the body of research on the impact of economic crises on population health (13).

Despite the great interest in the effects of the previous and current crises on the well-being of the population, evidence of these effects is still fragmented and uncertain. Some data show that when economic conditions worsen, both mental and physical health decline, and mortality tends to increase (14). However, increasing mortality and declining morbidity rates have also been reported in periods of expansion, which is called a pro-cyclical relationship (15). Various key aspects have been raised to explain these apparent inconsistencies of the associations of crises to health (16,17). These aspects can be classified into two groups: (i) regarding context-specific features and (ii) in relation to methodological issues of research.

**Context specificity**

Several context-specific features have been highlighted in the relationship between crises and health. First, effects of crises on health vary in low-income compared to high-income countries, where in the latter the population’s average wealth and non-financial resources may buffer against deleterious impacts of economic downturns for individuals and families. For example, the effect of economic crises on life expectancy mediated by food shortage has been well documented in African countries (18), in contrast to a pro-cyclical effect observed in Europe and the US. Second, the speed of onset of the crisis appears to be a hazard to health. This association was observed during the Russian crisis, among others, in which the increase in death rates was greatest in those regions with higher and more rapid labour market shocks (19). Third, different degrees of impact of economic crises, such as on suicide rates trends, have been reported between countries in relation to the generosity of the welfare state protection, such as unemployment benefits coverage (20). Fourth, divergent findings across countries have also been attributed to the availability or exposure to risk factors such as alcohol or unhealthy diets (21). Finally, in recent years there has been greater concern on the role of the economic policy adopted by governments in response to crisis, with growing evidence of the association between austerity measures (public expenditure cuts to reduce public debt) and declining health (22).
Methodological features

The variability of the findings in the economic crises–health literature also depends on methodological aspects. First, different mortality and morbidity outcomes, in both the mental and physical health domains, have been employed to measure impact, yielding a diversity of results and thus limiting the comparability of studies. Second, it has been consistently observed that the use of individual or aggregated data may influence the direction of the detected associations (23,24). For instance, an increasing unemployment rate is associated with reduced mortality rates at the aggregate level, while at the individual level unemployment has been unambiguously related to an increased risk of morbidity and mortality (25). Third, the literature on macro-economic development and health has mostly focused on the impacts of the ‘normal’, less dramatic variations in the trade cycle (26), whose consequences may differ substantially from those occurring under exceptional circumstances, such as the crisis we are facing at present. Fourth, the short- and long-term health effects of crises may differ; for instance, experiencing a recession in the late fifties leads to a reduction in longevity in workers, which is impossible to detect in the short run (27).

Additionally, one of the main methodological features, and most important for the aim of this thesis, is the difference between population average and specific group effects (28). Although research in high- and low-income countries in past decades has evidenced systematic inequalities in mortality and morbidity between groups with a higher and a lower socioeconomic condition, the majority of studies on crises and health have addressed the impact of crises on population averages. A plausible consequence of this oversight is that a lack of effect detected on a population’s health outcome could conceal a detrimental effect on a social subgroup compensated by a positive effect on another subgroup. Thus, it is necessary to highlight the relevance of distinguishing between the effects on the average health of the population and the effects on the health of specific groups of the population, which can differ due to higher vulnerability, potentially leading to increasing health inequalities.

Considering all these context-specific and methodological considerations, this thesis aims to advance the knowledge of the impact\(^1\) of the current crisis on health and health inequalities, especially in mental health, and the associated potential individual and contextual factors in a high-income

\(^1\) At this point, it seems necessary to clarify that the terms ‘impact’ and ‘effect’, used interchangeably throughout this thesis, are used in a manner that does not necessarily reflect confident causal relationships. It is not possible to demonstrate causality with the different designs carried out as part of this thesis; however, I use these words in order to convey the hypothetical direction of causality, progressing from crisis to health outcomes, as stated in the aim of the research.
country, Spain, and more specifically in Andalusia, a region with extremely high unemployment rates in the European context.

2. Impact of previous crises on health and health inequalities

Along the lines of the reasoning above, in this and the following subsections, evidence from previous (subsection 2) and current (subsection 3) crises is presented for both impacts on the average population and impacts on health inequalities.

2.1. Impact of previous crises on health

Public health research has examined across different contexts a great variety of health effects of crises, such as general and cause-specific mortality, mental health, infectious contagious diseases, neonatal outcomes, and alcohol consumption, amongst others (29).

Overall mortality has been the most widely studied outcome in previous crises (30). Compared with periods prior to financial crises, periods of economic hardship usually have been found to trigger an increase in overall population mortality, especially in vulnerable subgroups such as children, and more marked in low- than middle- or high-income countries (2). On the other hand, studies with aggregated data have showed that periods of recession may be followed by a paradoxical decline in general mortality in high-income countries, a phenomenon referred to as ‘pro-cyclical’ effects, as mentioned above. Such effects have been linked to improvements in the health of working people who managed to keep their place on the labour market during times of crisis, as well as to the reduction in some external causes of death, such as traffic injuries. Therefore, although the negative effects regarding the morbidity and mortality of those who lost their jobs during periods of economic crisis are not called into question, the net effect of the aggregated data might indicate a decrease in mortality (31). These findings have also been corroborated in the Spanish setting in a study that analysed the relationship between all-cause mortality and the fluctuations of regional unemployment rates between 1980 and 1997 (32).

The effects of the recession on other specific causes of mortality have also been published, such as an increase in cardiovascular-related deaths following the Great Depression of 1929 in the US (33), or the Argentine economic crisis at the end of the 1990s and the beginning of this century (34). In contrast, transport-related deaths usually stand out due to their pro-
cyclical pattern; in other words, they decrease throughout economic crises in the majority of studies (35).

Suicide has been the specific cause-of-death outcome most thoroughly studied during economic downturns. For example, it is well known that the economic crisis in East Asia in 1997–1998 gave way to a rapid increase in suicide-related deaths in several countries (36), and an excess number of suicides were reported in the US during the years following the Great Depression (37).

2.2. Impact of previous crises on health inequalities

As mentioned earlier, there is a scarcity of studies on the impact of crises on health inequalities. Increased educational inequalities in mortality during the Soviet crisis (38) and also in several countries in the East Asian crises in the 1990s have been reported (39). On the contrary, no changes in inequality trends were observed in Finland in the 1990s crisis (40). In Spain, despite the fact that social inequality in mortality has been studied over several decades, it has never been done in the context of an economic crisis.

Regarding suicidal behaviour, inequalities in depression, suicidal ideation, and suicide attempts doubled between 1998 and 2007 in Korea (41). Inequalities in self-perceived health were observed to increase in Japan before and after the crisis in the 1990s (42), although results are not conclusive.

3. Impact of current crisis on health and health inequalities

Differently from previous crises in which the majority of studies focused on mortality, the most widely analysed deleterious impacts of the crisis have been mental health outcomes. The findings have been quite consistent, including an increase in poor mental health, depression, and suicidal behaviour (17). The impacts on other health indicators have been less consistent, affected by contextual particularities and varying methodological approaches.

A more detailed account of the impact of the current crisis on health, health inequalities, and health service utilisation is given in the following subsections.
3.1. Impact of current crisis on health

Decreasing trends in overall mortality prior to the onset of the current recession have persisted unchanged in most countries. An increased decline in rates has been reported for traffic injuries mortality in most countries. On the contrary, there has been an increase in suicides in many countries within the European Union and North America (43,44).

Regarding mental health outcomes, some recent studies have examined the impact of the current crisis on earlier stages of the suicidal process and have found an increase in suicide attempts in Ireland (45) and suicidal thoughts in Greece (46) in the wake of the current economic downturn. In addition, there is growing evidence of the deleterious effects of the current recession on mental health more broadly, such as depression, mood disorders, and perceived mental health, as reported in several studies in Greece and Spain (47,48).

The impact on self-rated health and physical health has been far more inconsistent across countries. Some research has focused on chronic health conditions such as hypertension, diabetes, and asthma, reporting a rise in prevalence of new cases in relation to work-related stress (49). Similar findings in different studies have led some authors to attribute these associations to the release of stress hormones, with a negative effect on the cardiovascular system (50).

Finally, regarding health-damaging behaviour, some positive effects have been reported, including lower overall alcohol consumption (51), although a higher prevalence of binge drinking has also been detected in high-risk groups (52).

3.2. Impact of current crisis on health inequalities

Despite the amount of evidence of the impact of the crisis accumulating in Europe, results on the impact on inequalities are still inconsistent (13). Acknowledging the substantial risk of bias, a recent systematic revision highlighted the association of the current crisis with suicidal behaviour, especially in working-age men, and with mental health in women. Moreover, social inequalities disproportionately affected immigrants and the less-educated population (53). Specifically in Spain, associations have been detected between the crisis and the likelihood of suffering from myocardial infarction among the lower-educated population and the risk of depression and diabetes among less-educated women (54).
Several recent studies examining the impact of the current crisis have provided new evidence on health inequalities, specifically in mortality. First, educational inequalities in life expectancy increased in both sexes in Denmark between 2006 and 2007 and between 2010 and 2011 in a population aged 50 years (55). Increasing differences in a disability-free life expectancy were also detected. Second, in a study performed in the urban area of Barcelona, a widening gap of socioeconomic inequalities in mortality was observed after the crisis in 2009 (56). Finally, Loopstra et al. found rising mortality rates in pensioners aged 85 and older associated with reductions in spending on income support for poor pensioners in England between 2007 and 2013 (57).

When it comes to the gender-specific impact of economic crises on suicide, some studies suggest that unemployment and other socioeconomic variables have greater effects in men than in women (58). While several studies have measured the association between unemployment increase and suicide during the current recession (59–61), only one of them was stratified by sex (62). This ecological study on data from 54 countries found that suicide increased in men more than in women in the first years of the crisis, although the association was only detectable in countries with low pre-crisis unemployment rates.

Another important question is how economic crises affect the mental health of particularly vulnerable social groups. Even though research highlights that in times of economic stability mental disorders more frequently affect the unemployed population (25), people in the lower-income brackets, lower-educated groups (63), or groups with less social support (64), there is little knowledge of changes in mental health associated with a period of crisis in these groups (65).

3.3. Impact of current crisis on inequalities in healthcare utilisation

Along with the impact on many aspects of the mental and physical health of the European population, the pressure of the recession and rising healthcare needs and the direct consequences of the austerity measures on health services and social welfare systems may also have a negative impact on health service provision (43,66). Budget reductions, cuts in health personnel, introduction of co-payments, and limited coverage for population subgroups such as immigrants pose additional barriers to effective utilisation of health services for populations in greater need of care (67).
However, little is known about the effect of the crisis on social inequalities in healthcare utilisation. Despite this scarcity of information available on the differential impact on various population subgroups, data on several European countries indicate that the more affected groups include the low-educated, people with low income, and groups with greater health needs, as well as young couples, mainly due to the risk of unemployment (68).

4. Understanding the pathways from economic crises to health and health inequalities: A conceptual model

With the literature being rather inconsistent and sparse when it comes to whether the crisis affects health, and for whom it does so (28), it may not come as a surprise that comparatively little is known about the pathways by which economic crises affect health, especially mental health. Although the majority of studies on the topic fail to capture the mechanisms that affect health outcomes, relevant information has nevertheless been accumulated. In relation to the study designs, individual, contextual, or both types of variables have been used to assess the potential drivers and blockers of the association of crisis and health (inequalities) outcomes (69).

4.1. The complexity of the conceptual model

Before considering potential pathways, it may be important to take into account certain empirical observations in order to illustrate the complexities of studying the relationship between economic crises and population health (70). As mentioned above, the influence on the variability of the effects of crises on health of context-specific issues and methodological features has already been highlighted by some authors (16). In this sense, Bacigalupe et al. point out that in order to comprehend this complexity, researchers have become increasingly interested in the central role that social contexts play in moderating the health impact of economic crises. From their perspective, the lack of consistent evidence on the association between macroeconomic change and health does not impair the potential to generate hypotheses regarding its causes (71).

In this thesis, the conceptual framework of the Commission for Social Determinants of Health, inspired by the proposal of Solar and Irwin (72), and later adapted by the Commission to Reduce Social Inequalities in Health in Spain (73), has been used as a point of departure. The potential
mechanisms of how economic crises can impact on population health and health inequalities are summarised in a conceptual model, illustrated in Figure 1.

In brief, the model first suggests that global sociopolitical determinants include neoliberal policies, implemented in practice through different macroeconomic, labour market, and welfare state policies. These policies may, in turn, affect intermediary determinants in the population health according to the different inequality axes, such as gender, age, social class, education, or territory. Intermediary determinants include working status and conditions, income, housing conditions, and environment, which in turn influence psychosocial factors and behaviours. Health services also play a role as an intermediary determinant, potentially influencing health (inequalities) through access and performance patterns.

Figure 1. Conceptual framework. Based on Solar and Irwin (72) and the Commission to Reduce Social Inequalities in Health in Spain (73).
In this particular model, both the economic crisis and austerity policies are considered among the structural determinants. The crisis is placed in an upstream position as a characteristic or consequence of global neoliberalism, as previously explained in section 1.2. The economic crisis is directly affecting intermediary determinants, and it is also influencing macroeconomic policies at both the supranational and national level, thus affecting labour market and welfare state policies. The impact on labour market and welfare protection programmes depends on the political choice of austerity or stimulus policies. This potential mitigation or exacerbation of the harmful impacts of the crisis can be illustrated, e.g. as recent research has shown, by the relation between investment in active labour market programmes (74) or unemployment protection (20) and suicide rates. In a similar way, to understand, for instance, why the Soviet economic crisis increased dramatically the alcohol-related mortality in men in Russia in contrast to other countries, it is necessary to analyse the pathways from crisis to this specific outcome in each setting. We thus have to consider the influence of specific behaviours in relation to diverse intermediate determinants, such as unemployment or living conditions, across subgroups of potential inequality variables such as age, sex, or social class, and then the relation to legal, labour market, and macroeconomic conditions affected by the economic crisis.

4.2. Structural and intermediary determinants in the current economic crisis

There are some empirical observations that specifically illustrate the role of structural determinants during the current recession. Regarding welfare state performance, Budhdeo et al. (75) recently observed in a study of European countries between 1995 and 2010 that decreased government healthcare spending was associated with increased mortality in both the short and long term. Similarly, excess cancer mortality was detected in the first years of the global recession in countries without universal health coverage, but not in countries with a universal health system (76). Finally, fiscal austerity has displayed short-, medium-, and long-term effects on increased suicide rates in older men in the Eurozone periphery (77).

Economic crises may affect mental health, suicide attempts, and suicide incidence through intermediate determinants, either by increasing risk factors or weakening protective factors. For example, crises contribute to increasing unemployment, poverty, financial hardship, and social
deprivation, but also commonly entail retrenchments in protective factors such as job security or unemployment benefits. These intermediate determinants are tightly linked to changes in structural policies, such as cuts in welfare protection programmes (78).

Among all the referred intermediate determinants, unemployment is the most widely studied in the research at both the individual and contextual level (24). Even in non-crisis settings, there is an unambiguous relationship between unemployment and excess morbidity and mortality, including suicide (79), suicide attempts (80), and mental health (81) —principal outcomes in this thesis. Acknowledging the causal relationships between employment status and psychological well-being (82), most research has focused on the role of unemployment during a crisis (83), and much attention has thus been paid to the mental health problems of unemployed men and women (84).

Fewer efforts have been devoted to the investigation of the mental health effects of economic crises on active workers, despite some research revealing that unemployment does not explain all the crisis-related changes in a population’s mental health (85,86). One example is a study in Korea reporting that as many as half of the suicides during a deep economic crisis occurred in the employed population (87). Recent evidence also suggests that research on additional individual and contextual factors that goes beyond the employment–unemployment dichotomy is required to understand mental health in times of economic recessions (88).

Another potential intermediate determinant is financial strain, which measures the current economic difficulties of the person and his or her family (89). Financial strain has been found to be a mediator of the individual health effects of unemployment, even to a more consistent degree than absolute and relative income (90). Financial strain has also been associated with greater psychosocial stress and greater risks of hazardous behaviours during the current crisis (91), thus illustrating how material determinants can bring about psychosocial and behavioural consequences.

Regarding psychosocial factors, social support has been reported to play a buffering role against the negative effects of the recession on mental health (92). For example, research on a previous crisis in Spain noted the relevance of the mechanisms of familial solidarity to protect its members from the fluctuations of economic and employment cycles (93).

In summary, beyond the specific hypothetical pathways outlined above, there is growing acceptance of the fact that economic crises are complex events that affect health and health-related behavioural patterns via various
and even opposing mechanisms (71). Such multi-variable pathways in the association between crises and mental health are driving forces for widening health inequalities (69).

5. National contexts and different responses to the crisis: The Spanish and Andalusian cases

After the onset of the crisis, governments across the globe responded with different economic and social policies in efforts to curb the impact of the crisis on the national economy. In Europe, the majority of countries progressively introduced severe austerity measures, such as tax increases, staff and salary reduction, and spending cuts, imposed by governments to reduce the financial deficit. The dramatic declines in social expenses contributed to restricted access to social services and benefits for the most vulnerable population groups, in some cases under the umbrella of financial adjustment promoted by the Troika (comprising the European Central Bank, International Monetary Fund [IMF], and European Commission) (94). All of these measures were implemented while ignoring the fact that no large economy has ever emerged from a crisis at the same time that it has imposed austerity (95). Even the IMF admitted in 2012 that austerity measures among wealthy countries to reduce their deficits had been causing far more economic damage than expected (96).

Thus, the consequences of the austerity measures on social benefits and public service provisions, together with the direct effects of the crisis — with rocketing unemployment rates, family indebtedness, and housing problems, among others — were intensified in a dangerous synergy in Spain and, in a similar way, in other Southern European countries. For instance, unemployment rose from 8.6% to 25.8% between 2007 and 2012 in Spain. At the same time, the health sector suffered a disproportionately large fraction of the austerity measures imposed by the government; for example, public health spending declined by 14% between 2009 and 2013, while total public spending fell by 6% (97). This decline in budget implied that health service provision and coverage in Spain were especially affected. As a specific example, the Royal Decree-Law 16/2012 (98) implemented in 2012 imposed budget reductions, introduced new co-payments for drugs, restricted access to coverage for undocumented migrants, and limited the rate of replacement for vacancies in the public sector to 10%, causing a deeper reduction of public health employees (94). Nevertheless, even with these considerable cuts in the Spanish health system’s finances, the principle of solidarity was not seriously shaken, and structural reforms were relatively mild compared
to other countries, for example, the United Kingdom (99).

An additional threat to population health and well-being are the increasing income inequalities detected, which may pose increased morbidity and mortality risks in the middle and long run (100,101). As a deleterious consequence of the crisis and the regressive fiscal policies implemented, Spain has become one of the most economically unequal countries in the European Union, with a Gini coefficient for income increasing from 30.9 in 2008 to 33.6 in 2012 (102).

Moreover, to fully assess the impacts of the crisis and austerity policies on health and health services, it is necessary to consider the decentralised organisation of the Spanish health system. In this sense, the degree of implementation of central austerity measures in our country has varied among different regions. Some regions, especially those ruled by a social-democrat government such as Andalusia, of special interest for this thesis, failed to observe centrally imposed austerity measures regarding health coverage. This might also reflect the fact that Andalusia exhibits specific social and historical features in comparison to other autonomous regions in Spain (103). It is the most populated region, with one of the lowest GDPs and health budgets per capita. Andalusia was also hit harder by the current crisis than most regions, as the associated burst of the real-estate bubble had a greater impact on regions with high construction activity and related employment (104).

Thus, it is relevant to study the impact of the current economic crisis in the population of Spain, and more specifically of Andalusia, a country and a region hit very hard by the crisis. Acknowledging the importance of contextual structural factors that configure a special territorial vulnerability, we have also considered the complexity of the pathways that lead from economic recession to health and health inequality, approaching diverse determinants and several outcomes, with a focus on mental health during the first years of the crisis.
Objectives

Overall objective

To study the impact of the economic crisis starting in 2008 on health and health inequalities in Spain and Andalusia, and the roles of socio-demographic factors in this association.

Specific objectives

Objective 1 (Paper 1)

The first objective was to examine the trends in mortality in Spain and Andalusia during the years before and after the emergence of the crisis.

The objective was addressed by the following aims: a) to analyse the trends in overall and cause-specific mortality by sex in relation to the economic crisis in Spain between 1999 and 2011; and b) to analyse the trends in socioeconomic inequalities in overall mortality in Andalusia in the period 2002-2010.

Objective 2 (Papers 1 and 2)

The second objective was to assess trends in suicidal behaviour in Spain and Andalusia during the years before and after the emergence of the crisis, and the roles of unemployment, age and sex for these trends.

The objective was addressed by the following aims: a) to assess the impact of the economic crisis on suicide in Spain between 1999 and 2011; b) to examine the trends in suicide attempts in Andalusia before (2003 and 2007) and during the economic crisis; and c) to explore the relation of suicide attempts to unemployment, age and sex.

Objective 3 (Paper 3)

The third objective was to assess the impact of the crisis on mental health, and the roles of unemployment, education, financial strain and social support for this association.

The objective was addressed by the following aims: a) To investigate in which ways the mental health of employed and unemployed is differently
affected by the economic crisis along the educational scale; b) and to
examine whether financial strain and social support explain the different
impact on mental health according to working status.

**Objective 4 (Paper 4)**

The fourth objective was to explore the impact of the crisis on inequalities in
healthcare utilisation, and the role of sociodemographic factors.

The objective was addressed by the following aims: a) to describe the
trends in horizontal inequality in the utilisation of health services in
Andalusia during the early years of the economic crisis; and b) to study the
contribution of demographic, economic and social factors to the difference in
utilisation.
Methods

1. Setting

1.1. The Spanish and Andalusian demographic and economic context

Spain is a south-western European country, with a population of 47 million inhabitants living in a territory of 550,000 square kilometres. The country is highly decentralised, administratively divided in 17 regions, denominated Autonomous Communities, and two Autonomous cities. Health services coverage is universal, functioning as a national health system, with some particularities among regions.

Spain is the fifth largest economy in the European Union, and the fourth largest in the Eurozone. The country has been especially affected by the economic crisis. GDP per capita compared to EU-28 was 101% in 2008 and decreased to 92% in 2012. Unemployment rates, always above the European average, increased sharply from 8% to 22% by 2011 (105). Besides causes related to the global economic crisis starting in 2008, the crisis hit very hard Spanish economy due to specific features of its growth model, largely based on the construction sector. The burst of the property bubble thus ended a period of growth of the brick-based economy connected to unsustainable development policies also rooted in social and cultural specificities.

This thesis has a specific emphasis on Andalusia, one out of the 17 autonomous communities in Spain. Andalusia is the fourth most populated region in Europe and the most populated in Spain, with about 8.5 million inhabitants and a population density of 96/km². Placed in the south of the country, it is divided into 8 provinces: Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga and Sevilla (Figure 2).

Although Andalusia has overcome much of its historical lag in recent decades, many of its social and economic indicators are still largely below the European and the Spanish averages, and the impact of the current recession has further increased the distance. For instance, the Andalusian purchasing power standards per inhabitant in percentage of the EU average were 79% in 2007, but decreased to 69% in 2012 (106), and the per capita GDP was 16,960€ in 2012, which is 25.5% lower than the Spanish average. Similarly, unemployment rose for both sexes, from 12.2% to 35.8% between 2006 and
2012 (107), and poverty rates increased from 29.5% in 2008 to 31.0% in 2012, well above the Spanish poverty rate of 22.2% (108).

Figure 2. European Union, Spain and Andalusia. Source: Eurostat (109)

Trends in GDP annual change and unemployment rate between 2005 and 2012 are provided in Figure 3.

1.2. The Andalusian health system

The Spanish health system is decentralized by autonomous community and each one of the regions has a high degree of autonomy. Only general policies such as foreign health affairs and legislation on medicinal products and medical devices are established at the state level (110), and as such it is
appropriate to consider Andalusia as a distinct health system, which is of particular relevance for objective 4.

Health coverage in Andalusia is provided on a universal basis. Visits to the General Practitioners (GPs) or paediatricians as well as consultations with specialists, including mental health services, emergency services and hospitalisation, are free of charge at the point of use. Co-payment is required only at ambulatory pharmacies, with exemptions for the elderly and the unemployed. The GP is the gatekeeper to access to specialists, who in turn are the gatekeepers for non-urgent hospitalisations.

Mental healthcare in Andalusia is integrated with the primary care network, and the specialised and emergency networks. Mental health services attend acute, middle and long-term mental therapies in a variety of facilities. Emergencies in Andalusia are attended at primary health care centres, at hospital emergency wards, or through mobile units. The public enterprise of health emergencies (Empresa Pública de Emergencias Sanitarias), EPES by its initials in Spanish, has a provincial level of organisation, and is in charge of coordinating the mobile units in case of life-threatening pre-hospital cases (111).
All primary health care and emergency services are publicly provided, and only 5% of publicly funded hospital services are privately delivered. Private health expenses represented 25% of health expenses in 2011, of which 6.3% were distributed through health insurance coverage and 18.7% through out-of-pocket costs.

Since the beginning of the economic recession, the Regional Health Authority budget decreased from 1,168€ per capita in 2008 to 997€ in 2013, the lowest per capita budget among the 17 Spanish autonomous communities. General practitioner consultations decreased about 16% between 2007 and 2012, while hospitalisation and surgical procedures decreased more slowly (-8.1% and -7.4%, respectively). In contrast, during the same period an increase in specialist consultation (7.9%) was observed, along with increase in non-hospital emergency attentions (11.2%) and a substantial growth in specialized mental health consultations in adults (38%) (112) (Table 1).

| Table 1. Selected annual indicators of Andalusian Health Service performance, 2007-2012. |
|-----------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|
| Per capita health budget (€)                  | 1'168         | 1'132         | 1'095         | 1'049         | 1'202         | 997           | -171           | -14.6          |
| GP consultations*                            | 51'209        | 51'074        | 50'794        | 44'943        | 43'655        | 42'957        | -8'251         | -16.1          |
| Paediatrician consultations*                 | 7424          | 7'451         | 7'873         | 7'174         | 7'342         | 6'992         | -432           | -5.8           |
| Specialist consultation*                     | 10'094        | 10'320        | 10'435        | 10'337        | 10'574        | 10'893        | -799           | 7.9            |
| Hospitalisations*                            | 558           | 554           | 538           | 528           | 525           | 513           | -45            | -8.1           |
| Non-hospital emergency attentions*           | 5'600         | 5'659         | 6'246         | 6'503         | 5'796         | 6'224         | -624           | 11.2           |
| Hospital emergency attentions*               | 3'600         | 3'527         | 3'600         | 3'476         | 3'513         | 3'314         | -285           | -7.9           |
| Surgical procedures*                         | 504           | 509           | 503           | 495           | 482           | 467           | -37            | -7.4           |
| Mental health consultations adults*          | 918           | 935           | 1'022         | 1'069         | 1'171         | 1'273         | -355           | 38.6           |

* Numbers in thousands

2. Specific methods for the four objectives

In an attempt to capture the diverse impacts of the current recession in particularly Andalusia, I used different methodological approaches and different outcomes, all of them employing secondary data from diverse and
underutilised sources: mortality registry, longitudinal population database, health emergencies registries and population health surveys. An overview of the aims, data sources, outcomes and analytical procedures employed in the four studies of the doctoral research is showed in Table 2.

Table 2. Overview of the studies.

<table>
<thead>
<tr>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
<th>Objective 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Paper 1)</td>
<td>(Papers 1 and 2)</td>
<td>(Paper 3)</td>
<td>(Paper 4)</td>
</tr>
<tr>
<td><strong>Aims</strong></td>
<td><strong>Data Sources</strong></td>
<td><strong>Main outcome</strong></td>
<td><strong>Analyses</strong></td>
</tr>
<tr>
<td>2a) To assess the impact of economic crisis on suicide.</td>
<td>Health Emergencies Public Enterprise Information System (SIEPES).</td>
<td>Age-adjusted suicide attempt rates by sex.</td>
<td>Excess numbers of attempts estimated through time regression analysis using negative binomial modeling.</td>
</tr>
<tr>
<td>2b) To examine the impact of the economic crisis on suicide attempts.</td>
<td>Official unemployment statistics.</td>
<td>Perceived mental health (Mental Component Score of SF-12 questionnaire)</td>
<td>Association between unemployment and suicide attempts rates through linear regression models with fixed effects.</td>
</tr>
<tr>
<td>2c) To study the relationship of unemployment, age and sex to suicide attempts before and during the economic crisis.</td>
<td>Andalusian Health Surveys 2007 and 2011-12.</td>
<td></td>
<td>Poisson regression models stratified by working status.</td>
</tr>
<tr>
<td>3a) To investigate in which ways the mental health of employed and unemployed is differently affected by the economic recession along the educational scale.</td>
<td></td>
<td></td>
<td>Change in horizontal inequality indices between periods (pre-crisis—crisis) using social class as a socioeconomic status indicator.</td>
</tr>
<tr>
<td>3b) To examine whether financial strain and social support explain the different impact on mental health according to working status.</td>
<td></td>
<td></td>
<td>Decomposition analysis of change in inequality between periods.</td>
</tr>
<tr>
<td>4a) To describe the trends in horizontal inequality in the utilisation of health services (GP, specialist, hospitalisation and emergency) during the early years of the economic crisis.</td>
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</tr>
</tbody>
</table>
Objective 1: Impact of the crisis on mortality and on educational inequalities in mortality (Paper 1)

In Paper 1 we studied a) the impact of the economic crisis on trends in general and cause-specific mortality in Spain before and after the onset of the crisis, as well as b) the potential impact of the crisis on educational inequalities in mortality in Andalusia.

Aim 1a methods

For the first aim, the sex-, age- and cause-specific deaths correspond to those published by the Spanish National Statistical Institute (INE) for the years 1999 to 2011. Rates were calculated and age-adjusted to the European standard population. Mortality was calculated for the entire population, as well as for the 15 to 64 age group and stratified by sex. In order to assess trend variations, segmented Poisson regression models were run (113), with age-adjusted rates as the dependent variable and the year of death as the independent one. Parameters estimates correspond to: (i) the time point in which significant changes occurred in the trend; and (ii) the extent of the change –increase or decrease– observed in each time interval, as indicated by the annual percent change (APC). Up to a maximum of 2 joinpoints and a statistical significance level of 0.05 were set in the models. Results are presented for 15 cause-of-death groups, corresponding to the larger chapters of the International Classification of Diseases (10th revision).

Aim 1b methods

For the second aim, the analyses were restricted to Andalusia rather than Spain as a whole, and were based on data available in the Longitudinal Database of the Andalusian Population (Base de Datos Longitudinal de la Población de Andalucía – BDLPA) (114), an integrative database originating from the 2001 census, which brings together information from diverse statistical and administrative source databases.

For this study, a longitudinal cohort spanning from 2002 to 2010 was constructed from the BDLPA. The cohort comprised 7.2 million citizens in 2001, and more than half a million deaths occurred in approximately 61 million of person-years of follow-up. Only individuals over 30 years of age were included. The variables selected were age, sex, cause of death, and the highest educational level achieved. Educational level was divided into five levels, according to the Spanish Society of Epidemiology classification: no
studies, primary education, basic secondary, complete secondary, and tertiary education (115).

The annual general mortality rates between 2002 and 2010 were calculated stratified by educational level and sex, age-adjusted to the standard European population. The APC of the adjusted rates of general mortality by educational level and gender were then estimated using joinpoint regression models. The measure of inequality used was the rate ratio (RR) with 95% confidence intervals, with tertiary education group used as the reference category.

**Objective 2: The impact of the economic crisis on suicidal behaviour and the role of unemployment (Papers 1 and 2)**

In our second objective we studied a) suicide mortality trends in Spain from 1999 to 2011 (Paper 1), b) the trend in the incidence of suicide attempts in Andalusia 5 years prior to and 5 years after the onset of the crisis, and c) the association of suicide attempts to unemployment, age and sex (Paper 2).

**Aim 2a methods**

First, due to their particular relevance with regards to the objective of this thesis, results for suicides were analyzed in the Spanish population using the same methodology described in the previous subsection.

**Aim 2b and 2c population and measures**

For the purpose of studying suicide attempts we used information extracted from the Health Emergencies Public Enterprise Information System (SIEPES). The SIEPES is a database that records information on health emergency calls in Andalusia. Patients (or families) in need of acute or life-threatening pre-hospital emergency assistance can dial the 112 or 061 phone numbers. All health emergency calls are channeled to and managed by a province-level Health Emergency Coordination Centre. This system has been expanding since 1990 and cover all the population homogeneously, both in urban and rural areas about ten years before the study period.

In our study, all cases between 2003 and 2012 of the suicide attempt code from the SIEPES registry concerning patients aged 15 to 64 were included, in order to cover five years prior to the crisis (2003–2007) and five years since it started (2008–2012). Information on sex, age, address, and type of attention provided was also retrieved. This information is collected initially
by the call taker if available, and in some cases it is completed by the emergency care team during medical assistance. Unemployment data were obtained from the Active Population Survey of the National Institute of Statistics (107).

Between 2003 and 2012, there were 32,468 calls coded as suicide attempts, of which 27,963 occurred in patients aged between 15 and 64. After discarding 1,859 for later cancellation by the user and 1,036 for absence of the patient when the mobile unit arrived, 25,068 remained. Finally, 688 cases were excluded because the sex coding was missing, resulting in 24,380 cases: 11,494 men and 12,886 women.

**Aims 2b and 2c analysis**

European standard population adjusted rates (per 10^5 population) were calculated for each year, province and sex, using population data from the Andalusian Institute of Statistics and Cartography. To evaluate possible change in rates, excess numbers of attempts from 2008 to 2012 were calculated for each sex using the historical trends of the five previous years through time regression analysis, using negative binomial modeling (aim 2b).

To assess the association between unemployment (percentage of unemployed) at the province level and suicide attempt rates (aim 2c), linear regression models with fixed effects stratified by sex were performed to remove potential confounding at the province level (61). In a second model, dummy variables for year were added in order to control for temporal trends. In both cases, robust estimations were calculated. In the results from the first model (without year adjustment), the coefficient of unemployment rates can be interpreted as a general nonspecific indicator of the statistical effects of the crisis on suicide attempts, and in the second model (adjusting for time trends), the estimate can be interpreted as specific statistical effects of the unemployment rates. All analyses were performed with Stata, version 13.

**Objective 3: Impact of the crisis on educational inequalities in mental health: differences according to working status (Paper 3)**

In our third paper we studied a) whether mental health changed differently in employed and unemployed from before to after the crisis along the educational level scale [a-1], thus influencing educational inequalities in mental health [a-2], and b) whether individual material and social conditions
explained educational inequalities in mental health before and after the crisis.

**Study population**

A repeated cross-sectional design was chosen, using two waves of the Andalusian Health Survey (116): 2007 for the pre-crisis period and 2011 (February 2011 to February 2012) for the crisis period. The Andalusian Health Survey has been carried out every 4 years since 1999. It uses a probabilistic multistage cluster and stratified sampling procedure. The survey includes non-institutionalized adults of 16 years and older. A design effect of 1.35 was used in sample size calculations. In 2007 there were 6511 people interviewed and 6507 in 2011–2012. Field substitution (117) was used during the survey process to compensate for non-response. Information on non-response in the first original sample was not available.

In this study the sample was limited to the population between 19 and 64 years who were employed or unemployed (see employment status below), which yielded 3210 individuals (2025 men and 1185 women) in 2007 and 3633 individuals (2147 men and 1486 women) in 2011–2012. Missing data were negligible for the variables included in the analyses. The period variable was based on survey year, which was categorized and labeled as pre-crisis (2007 survey) and crisis (2011 survey).

**Measures**

We used the Mental Component Score (MCS) of the Short Form Health Survey (SF-12) questionnaire as the outcome variable (118). The items of the SF-12 reproduce the two summary measures, physical and mental, of the SF-36 (see Appendix). Each item contributes to the scoring of both physical component summary and mental component summary (MCS-12). This 12-item scale has been adapted and validated for the Spanish population (119). We used the MCS as a dichotomous variable, categorising the first quintile (the 20% with lowest score) as poor mental health and the rest as good mental health. This led to a cut-off point of 47.3, an intermediate point between the previously used of 45 for screening of depressive disorder and 50 for any common mental disorders (120). Sensitivity analyses instead using a cut-off point of 49.8 (corresponding to the lowest quartile) were also performed, yielding virtually identical results (data not reported).

As exposures we included two socioeconomic status variables. Educational level was categorised as: no studies or incomplete primary; complete...
primary; secondary; and university studies. Financial strain was measured through a question on difficulties to make ends meet, which had been widely used in social and economic surveys (91). The variable was coded into three categories: great difficulty or difficulty to make ends meet; some difficulty; and ease.

Another exposure variable included was social support, measured by the Duke scale (121). It includes 11 items on a 5-point scale ranging from 1 to 5, which are summed up into an index, with higher total score indicating higher level of social support. This variable was dichotomised using a cut-off point at percentile 15 of the total score, as proposed for the Spanish population (122). This led to a threshold of equal or greater than 41 for good social support.

To examine differential impact of crisis on mental health by employment, employment status was used as a stratification variable. Employment status was measured by self-reported working status at the time of the interview, with unemployed including both workers without a current occupation and people in search of a first job. Other covariates included were sex; age in years, with five categories; main earner; cohabitation (yes/no); and partner’s working status.

Aim 3a analysis

We calculated the crude prevalence of poor mental health in all the categories of the variables in each period, stratifying by employment status. Chi-square tests were performed to assess mental health differences between periods in all the categories separately for employed and unemployed.

We estimated adjusted prevalence ratios (PR) of poor mental health using Poisson regression models. In order to address the general aim of examining the effects of crisis among employed and unemployed, all main analyses were also stratified by employment status and reported separately. In Model 1 we included the period variable and education, as well as sex, age, main earner condition, cohabitation and partner working status as adjustment variables.

To address aim 3a, an education*period interaction term was added in Model 2 and in the following models. Results in Model 2 and subsequent models are reported in two complementary ways. First, to study whether mental health changed differently from before to after the crisis along the educational level scale (aim 3a-1), PRs corresponding to the exponentiated linear combinations of the main effects coefficients and interaction
coefficients were estimated, with the period effect (PRs; pre-crisis vs crisis) reported within each educational category. Here, the reference is the prevalence of each educational category in the pre-crisis period.

Second, to study the change in educational inequalities in mental health (aim 3a-2), the educational level effects (PRs) are reported within each period. Here, the university studies educational group within each period (pre-crisis and crisis) is the reference category. Also to address aim 3a-2 in the final models we calculated the Relative Index of Inequality (RII) for educational level and poor mental health, to summarize the magnitude of educational inequalities within each period in one estimate. RII is a measure of relative health inequalities, based on the ranking of the socioeconomic variable, and is easily calculated by different regression methods (123).

**Aim 3b analysis**

Finally, to address the second aim, financial strain (Model 3) and social support (Model 4) were added.

In order to explore whether results were different for women and men, analyses were also rerun separately for each sex. Since estimates were similar in both sexes (data not provided), final analyses were only done on collapsed data to achieve more robust estimations, with sex only included as a covariate. Analyses were performed with Stata software version 13.

**Objective 4: Impact of the crisis on inequalities in utilisation of health services in Andalusia (Paper 4)**

Our aims were a) to describe the trends in horizontal inequality in the utilisation of health services in Andalusia during the early years of the economic crisis and, b) to attribute the changes in inequality to demographic, economic and social factors.

**Population**

The same design and data source as for Paper 3 was used; a repeated cross-sectional design with two waves of the Andalusian Health Survey (116): 2007 for the pre-crisis period and 2011 for the crisis period. There were 6511 people interviewed in 2007 and 6507 in 2011–2012. In this study, the sample was restricted to the population of age 25 and older, yielding 5011 individuals

**Measures**

All variables were measured through the questionnaire of this survey. We studied four outcome variables measuring different types of utilisation of health services (outcomes): family doctor (GP) consultation in the past two weeks; consultation with specialist in the past two weeks; hospitalisation in the last year; and emergency ward attention in the last year.

Social class (six levels) was used as the socioeconomic indicator to operationalize social inequality in healthcare. The indicator was obtained from the occupation –current or last position held if unemployed or retired– of the interviewed or of the head of the household if the index person had no occupation.

The variables of health needs included age, self-rated health, self-assessed mental health according to standardized mental component score of the SF-12 (119), presence of chronic diseases (none, at least one, two or three, and four or more), and having suffered an accident the previous year.

Non-need variables comprised educational level (8 categories), difficulty to make ends meet (5 categories), employment status, having private health insurance, size of the municipality of residence (4 categories), and province of residence.

**Aim 4a analysis**

Initially we compared the distribution of the independent variables by the 4 dependent variables in each period, separately for men and women. Chi-square tests were performed.

To address the aim, social class was used as socioeconomic ordering variable to calculate concentration index ($C$) for each health service outcome variable. The $C$ is related to the Gini concentration curve which plots the cumulative percentage of the healthcare utilisation variable on the y-axis and the cumulative percentage of socioeconomic variable ranked from poorest to richest (or lowest class to highest class) on the x-axis. The $C$ ranges between -1 and +1. It takes a value of 0 if healthcare utilisation distribution is equal. It has a negative value if the concentration curve lies above the line of equality,
which indicates a greater concentration of the health utilisation variable among the lower SES group. On the contrary, it takes a positive value if the concentration curve lies below the line of equality, which indicates a greater concentration of the healthcare utilisation among the higher SES group. Secondly, we measured horizontal inequality by estimating the $C$ for each utilisation variable, adjusted for need; what is known as horizontal inequality index (HII), whose value also ranges from -1 to +1 (124). An HII is interpreted similarly to the $C$, with a positive value indicating a distribution of healthcare utilisation in favour of the rich, and vice versa, given similar healthcare needs.

**Aim 4b analysis**

In a third step, we performed the decomposition of $C$ (125). As our healthcare utilisation variables were dichotomous, nonlinear models were used, following van Doorslaer et al. (126) and O'Donnell et al. (127).

Finally, in the fourth step, we decomposed the change in the $C$ between periods, pre-crisis and crisis. Wagstaff demonstrated that the changes of $C$ over time can be decomposed into the sum of changes in the contributions, using Oaxaca-type decomposition (125). Changes in the contribution of each variable were calculated this way and are reported both individually and pooled according variable groups.

All analyses were performed separately for men and women and for both periods: pre-crisis and crisis. We used Stata software version 13.

3. Ethical considerations

Ethical criteria were followed in all the stages of our research, although formal ethical evaluation was not required since our studies used publicly available anonymized secondary data. In general, the design and performance of each study was justified in a research protocol, and caution was taken to protect the confidentiality of personal information when applicable.

In our first study we used several sources. Mortality data from Spain was obtained from public domain information from the National Statistics Institute (INE), which is provided as aggregate data thus ensuring anonymity. Information from the Longitudinal Database of the Andalusian
Population was retrieved from the Andalusian Institute of Statistics and Cartography after the signature of a confidentiality agreement with the Provincial Health Authority in Cádiz, and anonymized data were used in the analyses.

For the second study, anonymized data were obtained after an agreement between the Health Emergencies Public Enterprise (EPES) and the above mentioned Provincial Health Authority in Cádiz.

In Papers 3 and 4 we used the Andalusian Health Survey, which is entirely subject to the Spanish legislation on data protection (128). After thorough information on the aims of the research, all participants gave their consent to be included in the study. In the data collection stage questionnaire information was unlinked from any personal identification information to guarantee anonymity. Additionally, as the national law provides, the file containing personal data held by the public authority, in our case the Autonomous Region of Andalusia, was registered in the General Data Protection Registry (129).
Results

I will here present a selection of the main findings of the research conducted to address the four objectives of this thesis.

In the first subsection, corresponding to objective 1, I report Spanish trends of general and cause-specific mortality before and after the onset of the crisis (aim 1a). This subsection also reports educational inequalities in general mortality between 2002 and 2010 in the main setting of this thesis, Andalusia (aim 1b) (Paper 1).

The second subsection displays analyses of suicide mortality trends, which are of particular importance for this thesis (aim 2a) (Paper 1), and moves on to suicide attempts in Andalusia during the years before and after the onset of the crisis (2003 to 2012) (aim 2b), and also the role of unemployment in this health outcome, by age and sex (aim 2c)(Paper 2).

Similar to the second study, the third subsection concerns mental health before and after the crisis, but expands the role of unemployment by examining the differential mental health impact of the crisis by employment status in the Andalusian population (aim 3a). This subsection also connects to the first study by assessing educational health inequalities before and after the crisis in Andalusia, but in mental health (Paper 3). The study additionally explore whether financial strain and social support explain the different impact according to working status and educational level (aim 3b).

Socioeconomic inequalities are also in the spotlight in the fourth subsection, where I present the changes in the inequality in healthcare utilisation in relation to the economic crisis in the Andalusian setting (aim 4a), and also an assessment of which factors underlie these changes (aim 4b) (Paper 4).

Objective 1: Impact of the crisis on mortality and on educational inequalities in mortality

Impact on overall and cause-specific mortality (aim 1a)

Taking all ages into consideration, general mortality of men and women in Spain decreased steadily in the period from 1999 to 2011, with annual percent changes (APC) of -2.44% and -2.20% respectively (Table 3). When looking at other cause-specific mortality, the largest decreases were observed for external causes, especially traffic accidents, which started to decrease in
2005 in men and in 2003 in women. Diseases of the nervous system, including Alzheimer’s disease, presented an APC of 1.61% in men and 6.73% in women, and were the only cause of death to display a significant upward trend.

When restricting the analyses to the 15 to 64 years age group, a significant APC of -1.13% was observed in male suicides, while in women there was a non-significant increase until 2003, followed by a significant decrease of -2.99% until the end of the study period. All-cause mortality showed a decreasing trend (APC in men of -2.45% until 2007 and -3.66% until 2011, and -1.77% in women in the whole period) similar to most cause-specific mortality rates, with the main exception being diseases of the nervous system.


<table>
<thead>
<tr>
<th>Causes</th>
<th>Rate x 10^5</th>
<th>Period 1</th>
<th>APC 1</th>
<th>Period 2</th>
<th>APC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>11.6</td>
<td>1999-2011</td>
<td>-1.70*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External</td>
<td>55.6</td>
<td>1999-2005</td>
<td>-2.16*</td>
<td>2005-2011</td>
<td>-6.32</td>
</tr>
<tr>
<td>Cancer</td>
<td>262.9</td>
<td>1999-2011</td>
<td>-1.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulatory</td>
<td>254.6</td>
<td>1999-2011</td>
<td>-3.61*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>109.4</td>
<td>1999-2011</td>
<td>-3.30*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nervous system</td>
<td>19.2</td>
<td>1999-2011</td>
<td>1.61*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All causes</td>
<td>850.0</td>
<td>1999-2011</td>
<td>-2.44*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>3.4</td>
<td>1999-2011</td>
<td>-2.21*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External</td>
<td>16.7</td>
<td>1999-2004</td>
<td>-0.64</td>
<td>2004-2011</td>
<td>-4.37*</td>
</tr>
<tr>
<td>Cancer</td>
<td>116.3</td>
<td>1999-2011</td>
<td>-1.18*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulatory</td>
<td>172.7</td>
<td>1999-2011</td>
<td>-3.90*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>41.6</td>
<td>1999-2011</td>
<td>-2.71*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nervous system</td>
<td>15.3</td>
<td>1999-2003</td>
<td>6.73*</td>
<td>2003-2011</td>
<td>1.17*</td>
</tr>
<tr>
<td>All causes</td>
<td>468.6</td>
<td>1999-2011</td>
<td>2.20*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

APC: Annual percent change; *p<0.05
Impact on educational inequalities in mortality in Andalusia (aim 1b)

The assessment of educational inequalities was restricted to the Andalusian region, where the general mortality trend also was significantly negative for both men and women in the study period; APC of -1.91% for men and -1.71% for women (Table 4). This decreasing trend was consistently observed across all educational levels, with the lowest APC in the lowest educational group, -1.08%. In the tertiary education group a significant change (p<0.05) was identified in the APC in 2007, from -1.80% to -4.07%.

Table 4. Trends in general mortality by educational level in Andalusia 2002-2010 in men and women aged 30 years and older, estimated by joinpoint regression analysis.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Rate$ \times 10^3$</th>
<th>Period 1</th>
<th>APC 1</th>
<th>Period 2</th>
<th>APC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No studies</td>
<td>1622.9</td>
<td>2002-2010</td>
<td>-1.08*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>1378.4</td>
<td>2002-2010</td>
<td>-1.26*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary-1$^{st}$</td>
<td>1284.1</td>
<td>2002-2010</td>
<td>-2.23*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary-2$^{nd}$</td>
<td>1200.5</td>
<td>2002-2010</td>
<td>-2.11*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>1079.3</td>
<td>2002-2007</td>
<td>-1.80*</td>
<td>2007-2010</td>
<td>-4.07*</td>
</tr>
<tr>
<td>Total</td>
<td>1401.6</td>
<td>2002-2010</td>
<td>-1.91*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Women**         |                   |           |        |          |        |
| No studies        | 883.7             | 2002-2010 | -0.81  |          |        |
| Primary           | 713.2             | 2002-2010 | -1.11* |          |        |
| Secondary-1$^{st}$| 656.4             | 2002-2010 | -1.84* |          |        |
| Secondary-2$^{nd}$| 593.0             | 2002-2010 | -1.09* |          |        |
| Tertiary          | 589.2             | 2002-2010 | -0.99  |          |        |
| Total             | 689.3             | 2002-2010 | -1.71* |          |        |

$*: Estimated rate for 2002; APC: Annual percent change; *p<0.05

Both in men and women an evident social gradient was observed in general mortality, with individuals in low educational groups showing a higher relative mortality throughout the entire period. In addition, from the year 2007 onwards, a numerical increase in educational inequality in mortality was observed in men; compared to men with tertiary education, men with no studies showed a rate ratio (RR) of 1.45 (95%CI: 1.38-1.52) in
2002 and a RR=1.67 (95%CI: 1.59-1.75) in 2010. In women, the inequalities instead remained numerically stable or even decreased; the less educated group showed an RR of 1.56 (95%CI: 1.43-1.71) in 2002 and 1.44 (95%CI: 1.34-1.54) in 2010, as compared to the reference category of tertiary education (Figure 4).

Figure 4. Trends in adjusted overall mortality rates ratios by educational level and sex in Andalusia 2002-2010. Andalusian Longitudinal Population Database. Tertiary education is used as the reference category.
Objective 2: Impact of the crisis on suicidal behaviour (Papers 1 and 2)

Impact on suicide mortality in Spain (aim 2a)

Suicide mortality showed a significant downward trend in all ages and both sexes in Spain, with annual percent changes (APC) of -1.70% in men and -2.21% in women in the period from 1999 to 2011 (Table 3). This trend mirrored the decrease in general mortality of men and women detected, with an APC of -2.44% and -2.20% respectively. These downward trends remained steady throughout the entire period.

Impact on suicide attempts in Andalusia (aim 2b)

Suicide attempt rates showed an increasing trend in Andalusia during the years prior to the onset of the crisis, in both women and men and both in young adults (aged 20 to 44 years) and mid-adults (aged 45 to 64 years). After the onset of the crisis, however, a sharp increase in rates was detected in all age and sex strata. Extrapolated from the pre-crisis trends, the crisis period 2008-2012 contained an excess of 4,989 (95%CI: 1,985-8,013) suicide attempts; 2,017 (95%CI: 87–3,987) in men and 2,972 (95%CI: 1,878-4,075) in women (see Figure 5).

![Figure 5](image.png)

Figure 5. Time trend analysis of excess numbers of suicide attempts in Andalusia between 2008 and 2012 in men (A) and in women (B). Vertical dash-dotted lines indicate the onset of recession.

In addition to the similar overall patterns across broad age groups, there was an age gradient during the whole period for both men and women, with consistently higher rates in the 40 to 44 age group, and lower rates in the 20 to 24 group. From age 45, the trends in suicide attempts decreased; that is,
the 45 to 49 age group showed lower rates than the 40 to 44 group, and the rest of the five-year age groups rates decreased gradually from there. This age gradient was initially small, widened slightly in the years before the onset of the crisis, and widened considerably after 2008, at the time of the onset of the crisis.

**Unemployment and suicide attempts (aim 2c)**

The second step of the analysis intended to examine the potential role of unemployment in the observed excess suicide attempt rates following the onset of the crisis.

Estimated across the whole period 2003-2012, each annual 1% increase in unemployment rate was associated with a rise of 1.81 units (95%CI: 1.51-2.11) in the rate of suicide attempts (per 10^5) in men and 2.27 (95%CI: 1.55-2.99) in women (Table 5). After adjusting for time trends, the model estimated that 1% increase in unemployment was related to an increase of 1.08 units (95%CI: 0.06-2.09) in suicide attempt rate in men, and to a non-significant rise of 0.49 units (95%CI: −1.23-2.21) in women (Table 5).

**Table 5. Linear regression fixed effects models for suicide attempt rates (x 10^5) regressed on unemployment rates (%) in Andalusia, for men and women.**

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>p</td>
<td>95%CI</td>
</tr>
<tr>
<td>Constant</td>
<td>3.79</td>
<td>0.15</td>
<td>-1.69 – 9.27</td>
</tr>
<tr>
<td>Unemployment</td>
<td>1.81</td>
<td>&lt;0.01</td>
<td>1.51 – 2.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>p</td>
<td>95%CI</td>
</tr>
<tr>
<td>Constant</td>
<td>-11.3</td>
<td>0.19</td>
<td>-29.6 – 7.03</td>
</tr>
<tr>
<td>Unemployment</td>
<td>2.27</td>
<td>&lt;0.01</td>
<td>1.55 – 2.99</td>
</tr>
</tbody>
</table>

Model 1=crude model; Model 2= adjusted for yearly trends

To estimate the number of cases of suicide attempts potentially associated with unemployment in men, we used the average 25.7% unemployment rate. Following our final model, this yielded an associated attempt rate of 27.8 × 10^5 (that is, 25.7 times 1.08, the coefficient for unemployment). Taking into consideration the average population in the period it gave an estimated
number of cases of 4,101 (95% CI: 228–7,935). As such, unemployment thus potentially accounted for 48.3% of the total 8,492 suicide attempt cases in the five initial years of the downturn.

**Objective 3: Impact of the crisis on educational inequalities in mental health (Paper 3)**

*Differential mental health impact of the crisis across employment and educational groups (aim 3a-1)*

Overall crude prevalence of poor mental health increased numerically from the pre-crisis (2007) to the crisis (2011-2012) period in both employment groups; from 17.1 to 19.0 in employed and from 22.6 to 26.1 in unemployed. However, neither of these numerical differences was statistically significant. The results of the Poisson regression models, with poor mental health regressed on pre-crisis/crisis period, education and other covariates are presented stratified by employment status in Tables 6 (employed) and 7 (unemployed).

In the initial Model 1 (adjusting for sex, age; main earner, cohabitation and partner’s working status), we found a non-significant 9–10 % increase in the adjusted prevalence of poor mental health from the pre-crisis to the crisis period, in both employment strata. Education was also independently associated to poor mental health in both employment strata.

Model 2 revealed a differential effect of the crisis by educational level, in both employed and unemployed. Specifically, in working people, the prevalence of poor mental health was significantly lower during crisis in the university study group compared to the pre-crisis period (PR = 0.73, 95%CI: 0.5–0.97), while it was higher in the other three lower education groups, significantly for secondary and complete primary studies. In contrast, the pattern was different in the unemployed people (Table 7); poor mental health prevalence was higher in the crisis period compared to pre-crisis period in the secondary studies group (PR = 2.09, 95%CI: 1.27–3.44), with a similar but non-significant ratio in the university group, while no significant or substantial changes in the two lower educational level groups were detected.
Table 6. Poisson regression models for prevalence ratios of poor mental health in employed Andalusian population.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PR</td>
<td>CI95</td>
<td>PR</td>
<td>CI95</td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td>Crisis/Pre-crisis</td>
<td>1.09</td>
<td>0.96-1.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>University</td>
<td>ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>1.08</td>
<td>0.91-1.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary complete</td>
<td>1.22</td>
<td>1.03-1.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary incomplete</td>
<td>1.45</td>
<td>1.20-1.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Period-Education</strong></td>
<td>Crisis/Pre-crisis – University</td>
<td>0.73</td>
<td>0.56-0.97</td>
<td>0.74</td>
<td>0.56-0.97</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Secondary</td>
<td>1.24</td>
<td>1.00-1.54</td>
<td>1.20</td>
<td>0.97-1.49</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Primary complete</td>
<td>1.25</td>
<td>1.00-1.56</td>
<td>1.19</td>
<td>0.95-1.48</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Primary incomplete</td>
<td>1.09</td>
<td>0.84-1.42</td>
<td>1.07</td>
<td>0.82-1.39</td>
</tr>
<tr>
<td><strong>Education – Pre-crisis</strong></td>
<td>University</td>
<td>ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>0.86</td>
<td>0.68-1.08</td>
<td>0.80</td>
<td>0.63-1.01</td>
</tr>
<tr>
<td></td>
<td>Primary complete</td>
<td>0.98</td>
<td>0.78-1.30</td>
<td>0.89</td>
<td>0.70-1.12</td>
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<tr>
<td></td>
<td>Primary incomplete</td>
<td>1.24</td>
<td>0.97-1.58</td>
<td>1.07</td>
<td>0.84-1.38</td>
</tr>
<tr>
<td><strong>Education – Crisis</strong></td>
<td>University</td>
<td>ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>1.44</td>
<td>1.11-1.88</td>
<td>1.30</td>
<td>1.00-1.70</td>
</tr>
<tr>
<td></td>
<td>Primary complete</td>
<td>1.66</td>
<td>1.27-2.18</td>
<td>1.43</td>
<td>1.08-1.88</td>
</tr>
<tr>
<td></td>
<td>Primary incomplete</td>
<td>1.84</td>
<td>1.36-2.49</td>
<td>1.56</td>
<td>1.15-2.11</td>
</tr>
<tr>
<td><strong>Difficulty to Make Ends Meet</strong></td>
<td>No difficulty</td>
<td>ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difficulty</td>
<td>1.16</td>
<td>1.00-1.35</td>
<td>1.12</td>
<td>0.97-1.30</td>
</tr>
<tr>
<td></td>
<td>Great difficulty</td>
<td>1.75</td>
<td>1.51-2.03</td>
<td>1.64</td>
<td>1.41-1.90</td>
</tr>
<tr>
<td><strong>Social Support</strong></td>
<td>Good social support /Low social support</td>
<td>0.49</td>
<td>0.43-0.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Models adjusted for sex, age, main earner condition, cohabitation and partner's working status. PR = Prevalence Ratio. CI95 = 95% Confidence Interval.
Table 7. Poisson regression models for prevalence ratios of poor mental health in unemployed Andalusian population.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PR</td>
<td>CI95</td>
<td>PR</td>
<td>CI95</td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td>Crisis/Pre-crisis</td>
<td>1.10</td>
<td>0.91-1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>University</td>
<td>ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>1.82</td>
<td>1.30-2.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary complete</td>
<td>1.55</td>
<td>1.11-2.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary incomplete</td>
<td>1.62</td>
<td>1.14-2.29</td>
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<td></td>
</tr>
<tr>
<td><strong>Period-Education</strong></td>
<td>Crisis/Pre-crisis – University</td>
<td>1.64</td>
<td>0.72-3.76</td>
<td>1.46</td>
<td>0.64-3.36</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Secondary</td>
<td>2.09</td>
<td>1.27-3.44</td>
<td>1.85</td>
<td>1.11-3.06</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Primary complete</td>
<td>0.79</td>
<td>0.59-1.07</td>
<td>0.74</td>
<td>0.55-1.00</td>
</tr>
<tr>
<td></td>
<td>Crisis/Pre-crisis – Primary incomplete</td>
<td>0.96</td>
<td>0.70-1.33</td>
<td>0.94</td>
<td>0.68-1.28</td>
</tr>
<tr>
<td><strong>Education – Pre-crisis</strong></td>
<td>University</td>
<td>ref</td>
<td></td>
<td>ref</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>1.43</td>
<td>0.58-3.51</td>
<td>1.28</td>
<td>0.52-3.19</td>
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<tr>
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<td>1.08-5.48</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td>ref</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Difficulty</td>
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<td>0.92-1.64</td>
<td>1.21</td>
<td>0.91-1.61</td>
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<td>1.46-2.48</td>
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<tr>
<td></td>
<td>Low social support</td>
<td>0.57</td>
<td>0.49-0.68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Models adjusted for sex, age, main earner condition, cohabitation and partner's working status. PR = Prevalence Ratio. CI95 = 95% Confidence Interval.
**Change in educational inequalities before and during the crisis (aim 3a-2)**

The pattern of changing educational inequalities in mental health among the employed and the unemployed was further illustrated by the relative index of inequality (RII) (aim 3a-2). Among employed, inequalities increased numerically from a relative equality as indicated by a non-significant RII=0.97 (95%CI: 0.76–1.43) in the pre-crisis period, to a substantial and significant inequality indicated by RII=1.57 (95%CI: 1.13–2.17) in the crisis period. Among unemployed, however, the RIIs were not significant in either period, but the point estimates rather suggested a pre-crisis pro-rich inequality of 1.56 (95%CI: 0.83–2.94) and a crisis pro-poor inequality of 0.76 (95%CI: 0.55–1.06).

**Assessing the role of financial strain and social support (aim 3b)**

The second part of this study took its point of departure in the patterns of mental health before and after crisis described above, and sought to examine the explanatory role of material and psychosocial conditions, as indicated by financial strain and social support, respectively.

Both financial strain and social support were strongly and independently associated with poor mental health, in both employed and unemployed. Nevertheless, the inclusion of these variables (Models 3 and 4) only reduced the PR for poor mental health among the unemployed, decreasing the effect size of crisis by 15 % in the university and secondary studies groups. The main proportion of this attenuation could be attributed to financial strain (Model 3). In contrast, no attenuation in the coefficients for any educational group was observed in the employed population (Table 7).

**Objective 4: Impact of the crisis on inequalities in the utilisation of health services in Andalusia (Paper 4)**

To first contextualize the general development of the utilisation of health services around the time of the onset of the crisis, frequency of visits or consultations to four types of health services — General Practitioners (GPs), specialists, hospitalisations, and emergency visits — during the crisis (2011-2012) was compared to the utilisation of these services before the crisis (2007). Results indicated that overall utilisation of health services increased slightly during the crisis period compared to the pre-crisis period, and this was seen for the majority of the studied types of utilisation. Bivariate analyses between each type of service and each of the determinants,
reflecting healthcare needs and non-need variables, showed that, in general, utilisation increased more frequently among young and middle aged men and women who reported good self-rated health and no chronic conditions, and did not belong to lowest socioeconomic strata.

**Horizontal inequality before and during the crisis (aim 4a)**

As a second step, horizontal equity before and during the crisis was operationalized as needs-adjusted socioeconomic inequalities in healthcare utilisation, estimated by the horizontal index of inequality (HII) for each of the four types of service and with social class as the socioeconomic indicator.

Results from before the crisis (2007) showed that for both women and men horizontal equity of utilisation differed considerably with respect to the type of service (see Figure 6). The most clear inequalities were found for GP consultations, which were concentrated among lower social classes (HII men: -0.1062, 95%CI: -0.1524 – -0.0600; HII women: -0.1390, 95%CI: -0.1231 – -0.0498); and for consultations with specialists which instead were more common in the upper classes (HII men: 0.1679, 95%CI: 0.0560 – 0.2800; HII women: 0.1073, 95%CI: 0.0227 – 0.1919). In contrast to these large horizontal inequities, emergency utilisation and hospitalisation displayed small and non-significant inequalities for both women and men.

![Figure 6. Horizontal inequality indices of social class-related inequalities in the utilisation of health services by period and sex. Andalusia, 2007 and 2011–2012.](image)

Moving on to the period during the crisis (2011-12) revealed changing patterns of horizontal equity from the pre-crisis to the crisis period, but in different directions depending on the type of health services. Visits to GP consultations changed from a clear pro-disadvantaged inequality towards a more favourable situation for the upper classes, although the inequality in favour of low SES groups persisted of a smaller magnitude for both sexes (HII men: -0.0490, 95%CI: -0.0909 – -0.0031; HII women: -0.0408,
95%CI: -0.0775 – -0.0042). In contrast to this pro-rich direction of inequalities in primary care, the other three types of services showed changes in the utilisation in favour of the lower classes. This was seen for specialist visits, which remained slightly but now non-significantly unequal in a pro-rich direction; with hospitalisation changing to a nonsignificant pro-poor inequality; and emergency care even presenting a significant inequality in favour of low SES groups for both sexes (HII men: -0.0469, 95%CI: -0.0889 – -0.0050; HII women: -0.0682, 95%CI: -0.1055 – -0.0309).

**Decomposing inequality in healthcare utilisation (aim 4b)**

The third step in the analysis sought to explore the underpinnings of the inequalities in the utilisation of health services described above, as a preliminary step to explore the underpinnings of the change of the inequalities. This was done by analysing the contributions of each variable to the overall concentration index \((C)\) of the four utilisation types by decomposition analysis, separately for the pre-crisis and crisis periods, respectively. This analysis had the added benefit of illustrating possible contributing factors that remain stable between periods and whose contributions to \(C\) therefore would not be detected in a simple decomposition of the change in inequalities (See figures 7 and 8).

![Decomposition Access Women](image)

**Figure 7. Decomposition of inequality in the utilisation of health services by period in women.**
Regarding GP consultations, both social class and educational level showed an important poor contribution only in the pre-crisis period, while the also high contribution of chronic conditions remained stable between periods, in women and men.

In relation to specialist attention, education provided a high contribution to C in the first period in women, while social class was the main contributor in men, though stable in both periods. Self-rated health contributed only in the first period and particularly in women, in contrast to mental health, which presented a pro-poor distribution in the crisis period.

Figure 8. Decomposition of inequality in the utilisation of health services by period in men.

Inequalities in hospitalisations in women were mostly underpinned by self-rated health, education and working status. Similarly, in men, self-rated health and education showed high contributions, in addition to social class, mainly in the first period.

Finally, concerning the use of emergency services, self-rated health, chronic conditions and age were the main contributors among women in the pre-crisis period, while social class and province of residence presented a substantial share in the crisis period. In contrast, in men, self-rated health and chronic conditions were important contributors in the pre-crisis period, while social class and education stood out in the crisis period.
Decomposing the change in inequality in healthcare utilisation between periods (aim 4b)

In the fourth and last step, corresponding to aim 4b, the change in social class inequalities in healthcare utilisation from before the crisis to during the crisis was decomposed.

The decomposition analysis of the change in healthcare use (Table 8) indicates that, overall, socioeconomic variables were the main contributors to the observed pro-rich change in visits to GP consultation for both sexes. In men, we also found a substantial contribution of health status in the same direction.

Table 8. Period change (2007-2011/12) in absolute contributions to concentration indices of social class related inequalities in access to health services by individual determinants and sex.

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP</td>
<td>GP</td>
<td>GP</td>
</tr>
<tr>
<td></td>
<td>Specialist</td>
<td>Specialist</td>
<td>Specialist</td>
</tr>
<tr>
<td></td>
<td>Hospitalization</td>
<td>Hospitalization</td>
<td>Hospitalization</td>
</tr>
<tr>
<td></td>
<td>Emergency</td>
<td>Emergency</td>
<td>Emergency</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
<td>0.0122</td>
<td>0.0104</td>
</tr>
<tr>
<td>Health status</td>
<td>Self-rated health</td>
<td>0.0289</td>
<td>0.0101</td>
</tr>
<tr>
<td></td>
<td>Mental health</td>
<td>-0.0078</td>
<td>0.0075</td>
</tr>
<tr>
<td></td>
<td>Chronic conditions</td>
<td>0.0141</td>
<td>0.0081</td>
</tr>
<tr>
<td></td>
<td>Accident</td>
<td>-0.0023</td>
<td>0.0027</td>
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<tr>
<td>Socioeconomic status</td>
<td>Social class</td>
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<td>0.0010</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>0.0168</td>
<td>-0.0178</td>
</tr>
<tr>
<td></td>
<td>DMEMeet</td>
<td>-0.0072</td>
<td>-0.0307</td>
</tr>
<tr>
<td></td>
<td>Working status</td>
<td>0.0092</td>
<td>0.0037</td>
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<tr>
<td>Insurance</td>
<td>Private insurance</td>
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<td>-0.0111</td>
</tr>
<tr>
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<td>-0.0139</td>
</tr>
<tr>
<td></td>
<td>Province</td>
<td>0.0139</td>
<td>0.0040</td>
</tr>
<tr>
<td>Unexplained</td>
<td>Unexplained</td>
<td>-0.0007</td>
<td>-0.0328</td>
</tr>
</tbody>
</table>

DMEMeet: Difficulty to make ends meet; pop.: population

In contrast, the change in inequality in visits to specialists in a less pro-rich direction was mainly underpinned by the change of the contribution of financial strain (difficulty to make ends meet) for men, and educational level, age and mental health for women. There was also a substantial contribution of self-rated health in a pro-rich direction, especially for women.
Furthermore, the pro-poor change in inequalities in the use of hospital inpatient care was to a considerable degree explained by social class and financial strain, in both men and women. Finally, regarding the pro-poor change in inequality in emergency attentions, the main contribution for women came from geographical factors, such as the province of residence and the size of the municipality. For both sexes, social class was also a relevant contributor to the change.
Discussion

This thesis examined the impact of the early phase of the economic crisis, starting in 2008, on health and health inequalities in Spain and Andalusia, with special focus on mental health and the roles of sociodemographic factors in these associations.

In the following sections, I will discuss the main findings concerning several outcomes, such as inequalities in mortality (Objective 1), suicide and suicide attempts (Objective 2), perceived mental health (Objective 3), and the utilisation of health services (Objective 4). I will conclude with a reflection on methodological issues of the studies performed.

The financial crisis and its consequences have been much in the spotlight in the years of preparing this thesis, and a considerable amount of scientific literature has been published on the impact of the current — and even previous — crises on health and health inequalities. This body of research was not available when the first papers of our study were written. Some parts of the new literature have deepened our understanding of the effects of the recession and the relationship of these outcomes with a diversity of social determinants, as well as associated factors in diverse geographical settings, whereas others have extended the time span for monitoring potential impacts of the crisis. As such, our findings have to be partially reinterpreted in the light of this new knowledge.

Objective 1: Impact of the crisis on mortality and educational inequalities in mortality

Impact on overall and cause-specific mortality (aim 1a)

No major changes in overall mortality trends or in cause-specific mortality trends were detected in the period 1999–2011 in Spain (suicide mortality, which is of particular interest for this thesis, will be discussed in the following subsection). The decreasing trends observed in the years prior to the onset of the crisis were maintained in the subsequent period. Thus, we found no support for the hypothesis that the crisis contributed to increased (or decreased) mortality in Spain.

The finding of unchanged all-cause mortality trends is consistent with research on previous recessions in Finland (130) or the current recession in
Spain (131). The latter study found a steady average annual percent change of -2.5% in under 75 mortality for both sexes in Spain between 1996 and 2011, which is comparable to the estimates of -2.4% and -2.2% obtained in our study for men and women, respectively. As such, our findings are in line with the current evidence suggesting no major impact of the crisis on general mortality in Spain.

To my knowledge, the only study performed in Spain on the relationship between regional trade cycle fluctuations and all-cause mortality data in the period from 1980 to 1997 (32) found a ‘pro-cyclical’ effect of the economic cycle on all-cause and non-suicide causes of mortality; that is, as the unemployment rate increased, mortality decreased. This pro-cyclical effect has been widely studied in previous research, especially in Europe (31,132) and North America (37). This apparent paradox may be attributed to the lower prevalence of various hazardous exposures in times of economic recession, such as traffic and occupational accidents, and consumption of alcohol, tobacco, and saturated fats, among others (133). For example, the sharp decline in employment in the Spanish construction sector after the burst of the ‘real estate bubble’ may have influenced this dip in mortality due to the reduction in the number of occupational lethal accidents (134). Since we did not find any indication of accelerated reduction in mortality in Spain, it is possible that such pro-cyclical effects offset any increase in mortality caused by the crisis, thus resulting in overall unchanged net mortality trends.

**Impact on educational inequalities in overall mortality in Andalusia (aim 1b)**

Although we found no impact of the crisis on overall mortality trends in Spain, the Andalusian part of the study including individual educational data showed that social inequalities in all-cause mortality increased among men but not women, with a remarkable increase from 2007. This was the first study in Spain analysing social inequalities in general mortality in relation to the economic crisis.

The finding of increased educational inequalities in mortality in men was rooted in a more substantial decrease in mortality rates in the highest versus the lowest education groups. This particular result suggests that the economic crisis has a discriminant effect on the more vulnerable groups in society, which further accentuates social inequalities in health.

However, an opposite situation was observed among women in which inequalities did not increase. In several studies carried out in different settings, the differential impact by socioeconomic status on men and women was inconclusive. For example, studies of the crisis in the 1990s in South
Korea reported a rise in relative and absolute inequality in both sexes (135). However, in contrast to our findings, it was Korean women with a low level of studies who were most affected by the crisis compared to the other groups. On the other hand, social class inequalities in a different direction were reported during the crisis in the 1990s in Japan, with a rise in the general mortality of executives and professionals when compared to manual workers (136). In contrast to previous studies conducted in the beginning of the 1990s, in Finland the growth of inequalities in mortality slowed down among men and women during the crisis period (40). Further research attributed this finding to the role of the generous unemployment insurance policy and the weak impact of the Finnish economic crisis on wages (130).

In contrast to our findings, a recent publication of a nationwide cohort study of the Spanish population (137) comparing pre-crisis and crisis mortality by socioeconomic status reported that all-cause mortality decreased more during the economic crisis than the previous period in low socioeconomic groups. However, this study differed methodologically from our study, which thus limits the comparability (138). Specifically, (i) the measure used to estimate the impact of the crisis was annual percent change of mortality rates, with no estimations of the change in relative inequalities among socioeconomic groups; (ii) the main socioeconomic indicators did not include educational attainment; and (iii) data were not disaggregated by region.

Taken together, these findings reinforce the idea that there is no simple explanation for the changes in inequalities in mortality, which are influenced by cause-specific mortality trends working in opposite directions and by the unique characteristics of combinations of each period and setting.

Objective 2: Impact of the crisis on suicidal behaviour

In this doctoral thesis, as previously stated, I approach the impact of the current recession on several stages of the suicidal process. Firstly, I discuss the main findings on the impact on suicide mortality in Spain (aim 2a; Paper 1), and secondly, the suicide attempt trend in Andalusia and its relation to unemployment (aims 2b and 2c; Paper 2).

Impact on suicide mortality in Spain (aim 2a)

In the present study, suicide mortality presented a decreasing annual change of -1.3% throughout the entire study period, both pre-crisis and crisis. This apparent lack of an impact of the crisis stands in contrast to numerous
European (60) and North American (44) studies reporting increased risk of completed suicides following the current crisis, mainly in men. For instance, in 2012 in Ireland suicide rates in men were 57% higher than if the pre-crisis trend had continued, while suicide rates in women were unchanged (139). Chang et al. (62) assessed the impact of the global crisis on suicide rates in 54 countries worldwide and reported an overall increase in suicide rates following the crisis, with a greater increase in suicide in men than women.

Some studies on suicide trends have also been conducted in the Spanish setting, which, overall, point in the same direction as the other European or North American literature, and contrast to the findings of the present study. One study on suicide mortality data from 2005 to 2010 detected an 8% increase in suicide mortality rate from 2008 and onwards (140). Another study (141), encompassing a longer study period of 2002–2012, observed two periods of increase, in 2008–2009 as well as in 2012, when suicide rates in men presented a considerable 14% annual increase. This discrepancy with our findings could be attributed to the different period of study. The first study’s time span ended in 2010, whereas our study finished in 2011, a year with a substantial decrease in rates. The second study expanded until 2012, covering the mentioned increase in men in that year. These apparently contradictory results demonstrate the sensitivity of the association to the length of the period of study, suggesting that these results need to be interpreted with caution.

**Impact on suicide attempts in Andalusia (aim 2b)**

Although we did not find any increased rates of suicide mortality in Spain (Paper 1), when it comes to suicide attempt rates in Andalusia (Paper 2), a sharp increase was found between 2008 and 2012 in both men and women, with the age group 35 to 54 being most affected. Moreover, suicide attempt rates were associated with unemployment rates in men, accounting for almost half of the cases during the five initial years of the crisis. In contrast, the substantial increase in suicide attempts in women could not be specifically associated with unemployment.

These findings are consistent with some previous research on the impact of the economic crisis on different stages of the suicidal process. In Ireland, a country hit hard by the crisis, increasing rates in the deliberate self-harm registry were reported after 2006, with successive 10% annual increases in suicide attempt rates in men during 2008 and 2009 (45). In a similar vein, a hospital-based study in northern Spain detected a twofold increase in suicide attempt rates concurring within the early years of the economic downturn (142). In contrast, in Iceland, a decrease in hospital admissions related to
suicidal behaviour in men was reported between 2008 and 2012, compared to an increased trend in the years prior to the onset of the crisis, which was associated with an unusual economic boom (143). The complexity of the phenomenon of suicide and context-specific culture could partly explain some diverging results (69). In this sense, it is important to note that Iceland did not implement drastic austerity measures in response to the acute economic crises (144).

Suicide attempts and unemployment (aim 2c)

Our results also support previous evidence that economic crisis indicators — represented in the present study by unemployment rates — are more strongly associated with suicide (58) and suicidal behaviour (145) in men than in women. We further found that the middle-aged population was the group most affected by the crisis, which is in accordance with other Spanish studies (83,146). This finding can possibly be understood from the notion that the working role has remained an essential component of hegemonic masculinity in Andalusia. Specifically, men are submitted to a more pronounced pressure tied to the breadwinner role, and unemployment and uncertainty about future employment may therefore have a stronger impact on their health than on women’s, who can better compensate because of their traditional family roles (147).

Regarding age, since mid-adulthood is a period in life when the financial burden of the family and young children may be marked, and during which one may not be established in the labour market, the threat of unemployment is the greatest. Bankruptcy of small businesses, evictions, and mortgage repayment difficulties have also been associated with an increase in the risk of depression in Spain (48), and it is the people in this age range who are frequently confronted with these financial crisis-related events. This role adherence may also contribute indirectly to an increased suicide risk by exercising a negative influence on mental health, social support, and help-seeking behaviour (148).

Divergence between suicide mortality and suicide attempts results

The apparent contradiction between the clear upward trend in suicide attempt rates on the one hand (objective 2) and the steady suicide mortality rates on the other (objective 1) in Andalusia during the beginning of the current economic crisis warrants particular consideration. First, it is possible that these disparate results could be attributed partly to underreporting of suicide mortality data, as mentioned above. Second, the time lag between the
onset of the crisis and mortality outcomes might differ from that of suicide attempts. Here it is worth pointing out that official mortality data indicate a rise in suicide cases in Spain during 2013 and 2014 (149), beyond the time span of our study, partly supporting our previous interpretations. Third, another possible explanation is that the gap is due to a rise in attempts with lower intentionality (150). Fourth, despite the fact that the service provision is universal, in the time span of the study accessibility to emergency calls might have increased for suicide-related episodes, thus increasing the demand beyond the baseline trend of the incidence rate. Fifth and last, as long as welfare protection programmes and services such as public health provision are still functioning adequately, they might have a buffering effect on serious or lethal mental health consequences of the crisis.

**Objective 3: Impact of the crisis on educational inequalities in mental health: differences between the employed and unemployed**

**Differential mental health impact of the crisis across employment and educational groups (aim 3a-1)**

Our findings concerning educational inequalities in mortality in Andalusia (aim 1b) point to increased inequalities just in men. Turning the focus to mental health, the third study suggests a differential effect of the economic crisis on mental health according to both employment status and educational level. Specifically, among the employed, the crisis seems to worsen mental health only in the intermediate educational groups, while high-educated working individuals improved their self-reported mental health. In contrast, among the unemployed, the crisis was associated with a negative effect on mental health in people with secondary studies, but not for the highest or lowest educated.

The first question this study sought to determine was whether mental health changed differently from before to after the crisis along the educational level scale in employed and unemployed. One possible interpretation of our results is that among working people, only those with higher educational attainment feel secure in times of crisis, whereas those in the lower education strata are more affected by job insecurity. Our results are consistent with a study in the US comparing mental health in 2006 and 2010 (151), which reported a similar ‘middle-class vulnerability’ during the economic downturn. The authors argue that the turbulent economic climate may have exacerbated the effect of job insecurity on mental health mainly
among middle class people who previously felt more or less in control of their careers.

Worse mental health in the crisis period among the unemployed with an intermediate level of studies could indicate that these educational groups are not prepared for the new and rapidly established economic context, in contrast to the lowest educated group, for which unemployment, particularly long-term unemployment, has historically been more prevalent. For example, individuals with higher education may have more positive expectations about their chances of finding a satisfactory job, thus easing their anxiety during unemployment (152). It has further been argued that the unemployed with university studies can consider working abroad or other possibilities. Indeed, some estimations indicate that more than half a million Spaniards have migrated to another European country since the beginning of the recession; most of them are young, and a great proportion has a university degree (153).

Interestingly, the intermediate education group was found to be doubly affected by the crisis, hit hard when both unemployed and employed. These results are in agreement with a study in Iceland that found that adults specifically in middle-income families suffered increased stress levels after the economic downturn (154). The authors argued that several factors such as decreasing purchasing power and a higher proportion of homeowners defaulting on their mortgages could play a role. Similarly to what happened in Spain and Andalusia, important inversions in high-priced real estate during the housing boom hit middle-income families most severely, thus resulting in economic insecurity and eventually leading to increased stress levels.

Change in educational inequalities before and during the crisis (aim 3a-2)

A second interesting finding is that educational inequalities in poor mental health emerged in the wake of the economic recession among the employed, while a reverse pattern of decreasing educational inequalities was seen among the unemployed. To my knowledge, this finding has not been reported in previous research, which, as mentioned above, has instead been mainly focused on the deteriorating effect of increasing unemployment (84). A recent study conducted in Spain detected an increase in educational mental health inequalities in men but not in women when comparing the 2006 and 2011 national health surveys (83). These results are partially in agreement with our research, although further comparisons of changes in
mental health during the crisis period could not be done, as data were not stratified by employment status.

The role of financial strain and social support (aim 3b)

A third finding indicates that financial strain may be partially mediating the effect of the crisis on mental health in the unemployed, and that social support is strongly associated with mental health in all population subgroups but is not a mediator of the crisis effect. A current lack of economic resources, which might be particularly pertinent for the unemployed, has indeed been found to influence mental health status \(^{(155)}\).

Similarly, social support has well-known ties to mental health independently from employment status, though not specifically during an economic downturn \(^{(156)}\). Thus, social support — mainly family support — could help explain the lack of correlation between high levels of unemployment and social distress that has been observed in other European countries. There is evidence from the current recession that informal networks in Andalusia and Spain continue to act as buffers against the risks of the labour market and lack of confidence in the state welfare policies \(^{(157,158)}\).

Objective 4: Impact of the crisis on inequalities in the utilisation of healthcare services

Building on the impact of the crisis on mortality (Objective 1) and on suicide attempts and mental health in Andalusia (Objectives 2 and 3), the fourth study set out to illustrate the impact of the crisis on social inequalities in healthcare utilisation in Andalusia (aim 4a), as well as to explain these changes in inequality (aim 4b).

In summary, the fourth study showed that needs-adjusted socioeconomic inequities in utilisation of these services either narrowed (general practitioner [GP] and specialist consultations) or increased in a pro-poor direction (hospital and emergency care). Decomposition analysis indicated that socioeconomic conditions explained a considerable portion of the change in inequity in visits to GPs by higher social classes, whereas both socioeconomic variables and health status were the main contributors to the pro-poor change in horizontal inequity observed in the other three utilisation outcomes.
Considerations on overall healthcare utilisation during the current crisis

Our results showed that the utilisation of several important health services did not decrease with the crisis in Andalusia. Similarly, in Spain, access to healthcare did not worsen between 2006 and 2012 but presented only a small decrease in GP consultations and no relevant changes in other access types (159). In contrast, in Greece, higher demand for public healthcare services as well as decreased demand for private services have been detected (160). Another study showed that the current crisis led to higher reductions in the utilisation of needed non-urgent services more in the US compared to four other high-income countries with national health systems (161). These divergent findings are in concordance with the conceptual model of this thesis (Figure 1) and with previous research reporting that changes in healthcare induced by economic downturns are mediated by the sociopolitical context and the base characteristics of the health system (162).

Impact on inequalities in GP consultations

There are few studies examining the impact of economic recession on healthcare utilisation inequalities (163). Even less is known about the underlying factors explaining these inequalities. To our knowledge, the study included in this thesis is one of the few publications in the public health domain on decomposing the change in inequality (125,164,165) and the first to do so evaluating the potential impact of the economic recession.

The observed pro-rich change in the use of GP consultations is an apparently surprising observation. In a study performed in Spain in 2006–2007, Crespo et al. detected pro-poor inequality in visits to GPs, which was attributable mainly to an unequal distribution of need factors (166). In our case, the need-factors contribution was not relevant, and the change in GP inequalities instead was rooted in the proportionally higher increase in utilisation by men and women from the middle and highest social classes and educational levels and a decrease in utilisation by lower income and education groups. As such, we may hypothesise that men and women from mid-high classes in Andalusia have been more exposed to stress and mental health problems related to unemployment and to the fear of job loss in the second period (167). As a consequence, they might have increased their demands for GPs, the gatekeepers to the health system.
**Impact on inequalities in specialist consultations**

Regarding specialist visits, we detected an unexpected reduction in pro-rich inequity. In contrast, the study by García Subirats et al. (159) reported an increase in social class inequalities in specialist visits from 2006 to 2011 in favour of high classes in the non-migrant Spanish population, but with no changes in any other utilisation variables. Concerning the change in specialist visit inequalities observed for men in the present study, it is noteworthy that the social class contribution remained stable between periods, thus with no contribution to the change in inequality. However, financial strain in men contributed to explain the change in inequality, mainly because men with no difficulties making ends meet reduced visits to specialists in the second period compared to their counterparts. As our study included access to both private and public specialists, we could not discriminate if the utilisation of out-of-pocket private services might have been reduced in the first group, a finding supported by the increase in GP utilisation, mostly public, by men with middle and high socioeconomic status.

**Impact on inequalities in hospitalisations and emergency attentions**

The finding of horizontal inequity in hospitalisations in favour of less-advantaged groups contrasts to a previous study at the national level, which reported no significant inequality in the access to hospitalisation and in associated factors in relation to the economic recession (159). Among the scarce literature on change in hospitalisations during recessions, a study conducted in Finland during the crisis of the mid-1990s described a slight pro-rich increase in inequality, although health system characteristics, such as co-payments for inpatient services, could limit the comparability of both studies (168).

Emergency attentions changed from a rather neutral to a significantly pro-poor inequity in the second period. In a study on emergencies during the crisis period in Spain, which, however, did not specifically examine inequalities, poor mental health and limitations for activities in daily living were related to an increase in utilisation, after controlling for sociodemographic and health variables (169). In our study, we observed an increase in the use of emergencies in relation to poor mental health, but mental health’s contribution to inequality was meagre compared to the pro-poor contributions of socioeconomic status for men and geographical variability for women.
**Overall considerations on impact of crises on inequalities in healthcare utilisation**

Taken together, the reduction of inequities and the pro-poor direction of changes observed in most utilisation types are consistent with the buffering role of a public health system with universal health coverage against the detrimental effects of the crisis. This withstanding capacity has seemingly been carried through despite the imposed restrictions in budgets, mainly executed by reducing staff and transferring some costs to the people. Our results thus support previous evidence indicating that the population is more vulnerable to economic downturns when healthcare use is contingent on financing changes, relying on out-of-pocket payments (76,170).

Additionally, indications of an accelerated deterioration of health services are increasingly noticeable. After what could be labelled a period of ‘doing the same with less’, the prolonged austerity policies in Andalusia and Spain may have enlarged the access barriers and reduced the quality of services, eventually leading to harm to patients (171). Moreover, empirical data from Spain reveals a rapid increase in the number of patients on surgical waiting lists since the middle of 2011 and a threefold rise in the rates of the population unsatisfied with the performance of the health system between 2011 and 2014 (172). This is further supported by qualitative studies based on the opinions of physicians, showing their concern for what the effect will be on the vulnerable groups and for how much the system can resist in the long run (173).
Methodological considerations

Some limitations relevant for several of the studies are presented in the first subsection, followed by specific methodological issues on the validity of each of the four studies.

Common limitation

As noted above regarding suicide mortality in Spain, the plausibility of a lag time between the exposure to the crisis and the emergence of outcomes has to be considered, since some effects are certain to appear later after the conclusion of our study period (174). This limitation applies to mortality and morbidity outcomes, as well as healthcare utilisation parameters. However, all four studies have considered not less than four years since the onset of the crisis, thus satisfying one of the minimum quality thresholds of three years post-crisis period proposed by some authors (53).

Suicide mortality

Among the limitations that must be pointed out are those concerning the quality of mortality statistics, especially suicide statistics. Suicide underreporting has been shown to be high worldwide (175), Spain included (176), which would be expected to lead to underestimated rates in the study. Nevertheless, Spain was one of only 12 countries meeting the benchmark in an assessment of the quality of suicide data in 31 European countries (177).

Moreover, the death certification procedures have not changed in the time span covered in the study, which would be expected to protect against differential misclassification due to time period. In the end, the degree to which information bias contributed to biased trend estimates is unknown. Exploring other existing data sources concerning suicides and suicide attempts was therefore advisable, and thus this thesis was expanded with a study based on complementary data on suicide attempts provided by the emergency services (objective 2).

Suicide attempts

Emergency services data appear to be sensitive to changes in mental health that might not be captured by official data on suicide mortality (176) or self-harm-related hospitalisations (45). Nevertheless, another potential limitation of our research is that even though the public emergency health service covers the entire population with no limits for access, a proportion of patients is first attended at hospital or primary care emergency units and
thus not included in our sample. However, no relevant changes in this on-call health service use was detected in the period of study; the utilisation of emergency services increased steadily during the period, with the fraction of suicide attempts increasing more rapidly than the total number of emergencies attended (data not shown). Moreover, similar increasing patterns were detected in different age groups and across provinces, indicating the consistency of the data source.

Regarding generalisability, evidence from published studies to date indicates that our findings from southern Spain are in accordance with the suicide attempt rate increases detected in several northern Spanish regions (142,146), which suggests the results can be generalised to the entire country, with a necessary caveat owing to methodological specificities.

It is also necessary to point out that when addressing aim 2b — to analyse the association between unemployment and suicide attempt rates measured at the province level with an ecological design — the results obtained cannot be interpreted on the individual level without committing an ecological fallacy.

Finally, the analyses followed the methodology of several recent investigations performed on suicide mortality and unemployment in the early years of the current crisis in other European countries (59) and the US (61). Although complementary analyses including GDP in the model (data not shown) did not find any significant association between GDP and suicide attempts, other plausible pathways not considered in this paper, such as unemployment benefits or job precariousness rates, might be of importance.

**Population survey studies (Objectives 3 and 4)**

Two waves of the Andalusian Health Survey four years apart were used, and the design was as such unable to capture variations in the intensity of the crisis that could have occurred between the two time points. This repeated cross-sectional design, used for both objectives 3 and 4, has several limitations, including not supporting causal inference. For example, when considering the lower prevalence of poor mental health among the employed in the university education group during the crisis, we cannot rule out the possibility of reverse causation, that is, that people in this group with pre-existing poorer mental health who were working prior to the crisis are more likely to lose their jobs during the economic downturn, thus improving the average perceived mental health of those in the university group still employed during the second period. Because of these limitations, the associations detected should be interpreted with caution (178).
Another potential source of uncertainty could be the representativeness of our samples. To assess this issue, we analysed the distribution of key variables in the sample and in the population. For instance, the proportion of unemployed in the sample was 39.3% in the crisis period, which corresponded fairly well to the official unemployment statistics of 35.9% unemployment in the region by the end of 2012. As such, the study population appears to be reasonably representative of the Andalusian population, at least when it comes to labour market indicators of specific relevance for these studies.

Nevertheless, this uncertain representativeness is of special concern in the study on inequalities in the utilisation of health services. It is plausible that the data source did not identify inequalities in healthcare use in population groups more frequently under-represented in population health studies based on household surveys, such as migrants and people facing eviction or at risk of social exclusion (179). At least the last two conditions were more prevalent in the crisis than in the pre-crisis period and are also related to social class inequalities. This under-representation could have introduced some bias into our results in case these conditions were also related to differential service utilisation rates.

Concerning the validity of subjective indicators of financial distress used in objective 3, there is a possibility that individuals changed their reference point when their assessment of difficulty to make ends meet was performed during the crisis period. It is unfortunate that the Andalusian Health Survey does not include information on individual unemployment protection or benefits, as these variables have been reported in previous research as potential buffers of deleterious effects of unemployment on mental health (180). Other unobserved labour market factors are job precariousness and part-time work, which are important for mental health (181) and also increasingly prevalent in Spain after new labour market regulations implemented during the present austerity period.

The four utilisation outcomes used to address objective 4 are widely used in the literature on health services and inequalities (182,183). However, they only assess the amount of services used by the population, thus ignoring a plausible deterioration in the quality of performance, such as due to reduction in healthcare personnel or to an increase in waiting times for surgery or GP or specialist consultation, which have been more frequently reported, especially since 2011. Since indicators of quality of service are usually unavailable on population health surveys, this poses a limitation that requires further investigation in other studies.
Conclusions

This thesis has focused on the impact of the economic crisis starting in 2008 on health and health inequalities in Andalusia, a Spanish region with very high structural unemployment. The findings provide relevant information on diverse health outcomes and also help unravel the differential impacts of the crisis by sociodemographic characteristics, as well as some tentative suggestions of explanatory pathways. Finally, findings on the impact on inequality in health services utilisation are highlighted.

Overall impact of the crisis on population health

The results for Spain indicate that the general and most cause-specific mortality trends did not change with the start of the crisis, but rather a sustained decrease was observed between 1999 and 2011 in both men and women. The trends of completed suicide similarly showed a steady decline in both sexes and were thus not affected with the onset of the economic crisis. In contrast to suicide mortality, when it comes to suicide attempts, we detected rapidly increasing rates in both women and men.

Differential impact of the crisis on population health

Despite the finding of a lack of the effect of the crisis on mortality, the relative educational inequality in all-cause mortality increased from the year 2007 onwards in men as a consequence of a lower decline in mortality rates in the lowest compared to the highest education groups. This suggests a differential impact of the crisis in the Andalusian male population, with less favourable consequences for the less-educated men, but with no educational differences among women.

When it comes to suicide attempts, the middle-aged population was the one most affected by the crisis. Moreover, those with secondary studies presented more vulnerability for poorer mental health in times of economic recession compared to previous periods. Taken together, these findings suggest that the crisis did not hit people equally, but that the impact instead is at least partly dependent on intertwined social conditions.

Explaining the impact of the crisis on population health

This thesis gives some indications as to which factors could be involved in explaining the impact of the crisis on population health parameters. For example, the increasing suicide rates among men but not women were associated with rising unemployment rates. These findings may reflect how
the significance of labour market position, and thus the impact of the crisis, is tied to gender roles and life course stage and has important implications for employment, health, and social policies.

Our research also detected a partial mediating role of financial strain in the effects of a crisis on poor mental health among the unemployed. Good social support appears to buffer poor mental health in all subgroups in our context, but not specifically during a crisis period. Taken together, these findings suggest that the effect of an economic crisis on mental health is influenced by complex interactions between employment status and socioeconomic variables that must be considered to target appropriate interventions.

**The impact of the crisis on inequalities in health service utilisation and explaining factors**

Quite unexpectedly, unequal socioeconomic access to health services in Andalusia did not increase during the initial years of the economic recession. Rather, in almost all utilisation outcome variables studied, a change was detected towards greater equality or inequality in favour of the low socioeconomic status groups. Only visits to GPs changed to a more favourable distribution for higher socioeconomic status groups, and our findings suggest that this change is due to greater utilisation of the upper classes to this service. Social class, financial strain, and self-rated health were the most important determinants of the change in inequality in health service utilisation. Our results thus suggest that, at least in the early years of the recession and cuts in allowances and benefits, health services have been a promotive factor for social resilience in Andalusia.
Policy and research implications

The results of this thesis, in accordance with the increasing body of knowledge on the impact of the economic crisis on health, may have important implications in the design of policy measures addressed to offset the effects of the crisis and austerity on health and health inequalities in Spain and Andalusia.

1. Our findings may help us to understand the need to foster social policies that are addressed to both the unemployed and the general population. As previous research has also established, when the social security system is more comprehensive, unemployment is less likely to affect mental illness and suicide (35). The increase in social expenditure, not specifically public health expenditure, has also been associated with a decline in total mortality in Europe in past decades (74). Thus, in contrast to prevailing trends in Spain during the current crisis, social welfare benefits offered by the central and regional governments (unemployment benefits, social programmes) are key to alleviate the impact of the economic crisis on health and health inequalities.

2. Public universal healthcare services, including accessible and responsive primary care services, are essential to support people at risk and prevent mental health effects (48). The combination of findings of this study suggests the crucial role of primary care teams in preventing suicide by detecting suicidal thoughts in high-risk groups such as the unemployed and providing patients with the appropriate counselling, treatment, or referral (184). There is a challenge to increase access to primary care and mental health services for unemployed men. However, although universal healthcare coverage in Spain has been guaranteed so far for the vast majority, it is currently increasingly compromised due to austerity policies affecting financing cuts and staff reductions (185).

3. Active labour market programmes have proved to be a central strategy to help people retain or recover jobs to offset the deleterious effect of unemployment, especially on mental health (78).

4. In the Andalusian and Spanish settings, social and family networks have proved effective to partially offset the negative impact of financial strain, indebtedness, or housing problems associated with labour market downturns (157). In this sense, family support programmes might be an
effective strategy to contribute to counteracting the mental health effects of the crisis.

5. Beyond the necessary overall strategies like effective labour market programmes and reinforcement of current social networks, the identification of more vulnerable subgroups such as secondary studies, both employed and unemployed, poses a challenge for social services and social safety nets (186), which are more frequently oriented to lower socioeconomic brackets.

The comprehensive view on the relationship of the crisis to health and health inequalities gained through the work of this thesis allows me to point out some areas that might be useful as a framework for future research:

1. There is a need for research to gain insight on the effect of social contexts on the association between macroeconomic change and health (inequalities) outcomes, mainly from a gender perspective. We agree with some authors on the relevance of making the political and economic context visible in order to understand the multiple and variable effects on health inequalities. As such, further qualitative research is strongly recommended to better understand the underlying mechanisms in these associations.

2. We also need more empirical studies that investigate the mechanisms between crisis and health. Further research is required on factors other than unemployment, such as financial strain, evictions, or indebtedness, which could influence the effect of the current recession on people’s health. Research on the impact of the crisis on social inequalities in health should be considered in more structural terms. There is a paucity of research on the effects of economic recessions on health inequality analysing simultaneously both structural and intermediary determinants. When unemployment and alternative factors such as income, educational attainment, or social support have been considered in investigations, they have been studied separately. As a result, little is known about the joint or independent roles of these factors and the pathways by which they affect different population groups.

3. It is vital to provide quality mortality data from official statistics that incorporate public health variables. Governments should provide accurate data on health outcomes as quickly as for economic indicators (53). In
particular, it is recommended to improve the quality of the suicide and suicidal behaviour data, as well as studies assessing the validity of the current records.

4. As more comprehensive data of higher quality become available, it will be possible to study the potential lag effects of the crisis. There is a great need for studies that cover a more extensive time period. This is also linked to the lack of longitudinal studies and therefore the scarcity of longitudinal data, which, ultimately, are necessary to approach the complex relationship between recession and health and health inequalities.

5. Finally, research should not only be restricted to monitoring the impact of the crises on health inequalities but should also move towards clearly uncovering the consequences of the ruling neoliberal development model on these inequalities more broadly (187).
Appendix

SF-12 HEALTH SURVEY

INSTRUCTIONS: This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Please, answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

1. In general, would you say your health is:

   □ Excellent
   □ Very good
   □ Good
   □ Fair
   □ Poor

The following items are about activities you might do a typical day. Does your health now limit you in these activities? If so, how much?

2. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf

3. Climbing several flights of stairs

During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

4. Accomplished less than you would like

5. Were limited in the kind of work or other activities
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

6. **Accomplished less than you would like**

7. Didn’t do work or other activities as carefully as usual

8. **During the past 4 weeks**, how much did pain interfere with your normal work (including both work outside the home and housework)?

   - Not at all
   - A little bit
   - Moderately
   - Quite a bit
   - Extremely

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question please give the one answer that comes closest to the way you have been feeling. How much of the time during the past four weeks...

9. have you felt calm and peaceful?

10. did you have a lot of energy?

11. did you feel downhearted and blue?

12. **During the past 4 weeks**, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc)?

   - All of the time
   - Most of the time
   - Some of the time
   - A little of the time
   - None of the time
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81


