Common mental disorders: Evaluating their impact on disability and the role of socioeconomic factors

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To Mariano and Juan

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De todo, quedaron tres cosas

De todo, quedaron tres cosas:
la certeza de que estaba
siempre comenzando,
la certeza de que
había que seguir
y la certeza de que sería
interrumpido antes de terminar.
Hacer de la interrupción un camino nuevo,
hacer de la caída, un paso de danza,
del miedo, una escalera,
del sueño, un puente,
de la búsqueda…un encuentro.

Fernando Pessoa

Abstract

The general aim of this Doctoral Thesis was to assess the association of common mental disorders with disability and socioeconomic factors. These factors were considered both as important consequences (or burdens) and also as potential determinants of the incidence of common mental disorders.

Data used in this Thesis came from two general population-based studies. For the analysis of socio-economic and role functioning burdens, we analyzed cross-sectional surveys from 10 European countries participating in the World Mental Health (WMH) Surveys. The WMH is a worldwide initiative launched by the World Health Organization to gather data on prevalence and correlates of mental disorders of the adult population (+18). The role of socioeconomic determinants was examined using data from the Netherlands Mental Health Incidence Study 2 (NEMESIS-2), a longitudinal study with two waves of data collection (baseline: 2007-9 and follow-up: 2010-12).

Common mental disorders were found to be important contributors to disability in Europe. In Spain, common mental disorders were associated with twice the amount of days with role-functioning limitations than other high income countries. Individuals with common mental disorders earned half of what individuals without common mental disorders did. Socioeconomic adversities, such as job loss and household income reductions, increased by two-fold the risk of incidence of mood disorders. Job loss increased the risk of incidence of mental disorders only among men and household income reductions did so only among women. Individuals with low functional status had twice the risk of developing an

incident mental disorder, particularly depression or anxiety, than individuals without low functional status.

This Doctoral Thesis shows that common mental disorders carry on important functional and socioeconomic burdens and, at the same time, these factors also contribute to their development. A better understanding of these bidirectional associations may help tackling the circle of disadvantage in which common mental disorders appears in its central axis.

Resum

L'objectiu general d'aquesta Tesis Doctoral va ser avaluar l'associació dels trastorns mentals comuns amb la discapacitat funcional i amb factors socioeconòmics. Aquests factors van ser considerats com conseqüències (o càrregues) i també com possibles determinants de la incidència d'aquests trastorns mentals.

Les dades utilitzades en aquesta Tesis van provenir de dos estudis de base poblacional. Per a l'anàlisi de les càrregues es van analitzar les enquestes transversals de 10 països europeus participants en la Iniciativa Mundial d'Enquestes de Salut Mental (WMH) de la Organització Mundial de la Salut que recull dades sobre prevalença i factors relacionats de trastorns mentals de la població adulta (+18 anys). Les factors determinants de la incidència es van examinar amb dades de l'estudi the Netherlands Mental Health and Incidence Study (NEMESIS-2), un estudi longitudinal amb dos moments de recollida de dades (basal: 2007-9 i seguiment: 2010-12). Els trastorns mentals freqüents són importants contribuents a la discapacitat funcional en Europa. A Espanya, els trastorns mentals es van

associar amb el doble de dies de discapacitat funcional que altres països de renda alta. Els individus amb trastorns mentals varen guanyar la meitat que els individus sense trastorns mentals. Les adversitats socioeconòmiques, com la pèrdua de la feina i la reducció d'ingressos de la llar, varen duplicar el risc de incidència dels trastorns d'estat d'ànim. La pèrdua de la feina va augmentar el risc en els homes, mentre que la reducció dels ingressos familiars ho va fer en les dones. Els individus amb baix funcionament al basal varen tenir el doble de risc de desenvolupar un trastorn mental incident, en particular depressió i ansietat, que els que no tenien baix funcionament.

Aquesta Tesis Doctoral mostra que els trastorns mentals freqüents comporten importants càrregues funcionals i socioeconòmiques i al mateix temps, aquest mateixos factors també contribueixen al desenvolupament d'aquests trastorns. Una millor comprensió d'aquestes associacions bidireccionals poden ajudar a fer front al cercle de desavantatge en el que els trastorns mentals comuns apareixen com eix central.

Preface

Mental health makes up an integral part of an individual's capacity to lead a fulfilling life, including the ability to form and maintain relationships, to study, work or pursue leisure interests, and to make day-to-day decisions about educational, employment, housing and many other choices. Disturbances to an individual's mental health can adversely compromise these capacities and choices, leading not only to diminished functioning at the individual-level but also broader welfare losses at the household and at the societal-level.[1]

A commonly used definition of mental health is … "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community".[1] Mental health includes one's emotional, psychological, and social well-being. It is influenced not only by individual characteristics or attributes, but also by the vast environment in which all live.

Pathways to mental-ill health are complex. Different contributing factors, such as life events, work environment, socioeconomic status, are among the main social determinants of mental health. [2-4] In turn, common mental disorders constitute not only a great emotional burden to the individual and families, but also a large financial burden to both individuals and society as a whole. [5-11]

The aim of this Thesis was to describe the impact of common mental disorders on disability at the individual-level and also using a broader public-health societal approach. In turn, the role of some socioeconomic

adversities of interest as well as low functional status, were analysed as determinants of the incidence of common mental disorders.

Thesis outline

Chapter 1 contains four sections: (i) the introduction, which has a general framework and a brief summary of both topics approached in this Thesis: the burdens of mental disorders, particularly in terms of role-functioning and loss of earnings; and the determinants, socio-economic adversities and low functional status; (ii) the rationale of the Thesis; (iii) the general and specific objectives of this Thesis; and, (iv) a general methodology section, in which both epidemiological studies used in this Thesis are briefly described.

Chapters 2 to 6 correspond to each of the five manuscripts, and they constitute the main body of this Thesis:

Chapter 2: Common health conditions and role limitation in three European Regions from a societal perspective
Chapter 3: Effects of common mental disorders and physical conditions on role functioning in Spain
Chapter 4: Association between annual earnings and mental disorders in Spain: individual and societal estimates
Chapter 5: Negative socioeconomic changes and mental disorders: a longitudinal study
Chapter 6: Low functional status as predictor of incidence of emotional disorders in the general population.

Chapter 7 presents a summary of the findings along with the discussion of the main results.

Chapter 8 is where the conclusions and implications are portrayed.

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CHAPTER 1

Introduction

1. General framework
2. Burdens of common mental disorders
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General Methodology

1. General framework

Epidemiological research has consistently shown that mental disorders play an important role in society. Between 10 to 25% of the adult general population in Western countries meet criteria for a mental disorder in a given year.[12] The combination of high prevalence, early onset, persistence, and impairment, is what makes mental disorders being among the major contributors to total disease burden.[13,14] Most of the burden attributable to mental disorders is disability-related.[15-20] According to The International Classification of Functioning, Disability and Health (ICF), health conditions lead to impairments at three level of functioning: body functions and structures, activity limitations, and participation restrictions.[21] In addition, the effect of health conditions at these levels may be influenced by environmental and personal factors. There is a large body of evidence showing that psychopathology is associated with functional limitations in many domains of life.[22-25]

Mental disorders are associated with high costs. In Europe, the total cost of mental disorders in 2011 was estimated to be around €461 billion (nearly € 1,000 per inhabitant).[7,26] Of those, almost half (48%) corresponded to indirect costs (those incurred due to sick leave, early retirement and premature death). Affective disorders, and especially unipolar depression alone, accounted for more than half of these indirect costs, indicating the considerable toll such disorders place on European social and work productivity. Reduced rates of labour force participation, [27,28] unemployment among those in the labour force, [29] and under-employment among those who are employed [30] are ways to measure indirect costs associated with mental disorders.

There is growing awareness of the role of employment and working conditions in promoting or hindering mental wellness and its corollary– mental illness.[31] Employment conditions (i.e., unemployment, precarious employment, informal employment) and working conditions (i.e., the organization of work, different environment hazards and the psychosocial environment) are important threats to mental health.[32,33] Material deprivation and socioeconomic inequalities, exposures which are closely related to deleterious employment conditions (e.g., poor nutrition, poverty, inadequate housing, physical environment, etc.) can have important and harmful effects on health, particularly on mental health.

The global economic crisis of 2009 has resulted in an increase of redundancies and job instability. [34-38] A higher proportion of workers are now employed under more precarious circumstances and fewer job losers can rely on generous termination payments to cushion the impact of sudden unemployment.[39] Therefore the mental health impact of socioeconomic changes such as job losses and income reductions become even more relevant within this contemporary macro-economic context.

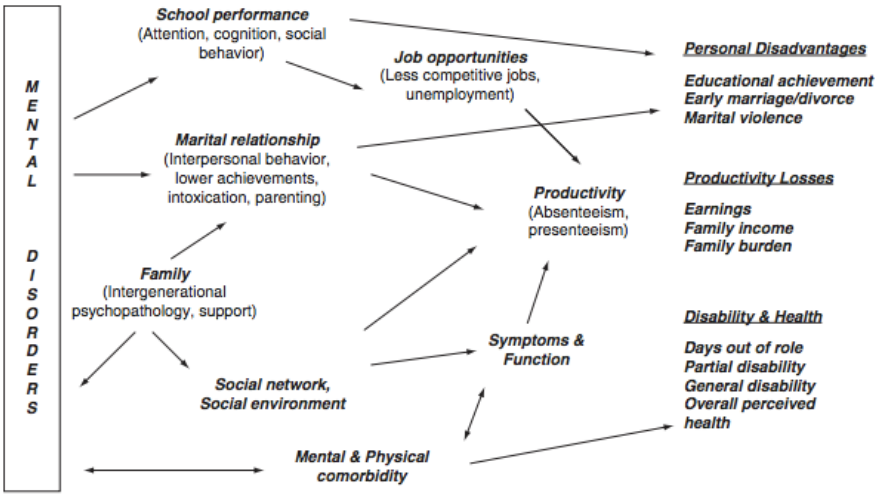
2. Burdens of common mental disorders

The World Health Organization (WHO) Global Burden of Disease (GBD) Study estimated in the mid-1990s that commonly occurring mental disorders such as major depression, anxiety, bipolar disorders, and substance use disorders were among the highest-ranked diseases in the world in terms of disease-specific disability.[14] Yet, at that time, descriptive psychiatric epidemiology with information on the prevalence, age of onset, health-care services use, etc of common mental disorders was scarce.[40]

In 2001, WHO launched one the largest mental health initiative worldwide with the objective of collecting epidemiological and comparable mental health data through population-based surveys.[41] The World Mental Health (WMH) Initiative surveyed 24 different countries of all over the world with over 121,000 respondents.

There are many burdens associated to mental disorders across the life course. In figure 1, the general framework used by the WMH study to address the different consequences of mental disorders is shown.[5] Within the WMH surveys initiative, these many burdens were considered in three major areas: (i) personal disadvantages (educational attainment, early marriage/divorce, marital violence), (ii) productivity losses (earnings, family income) and (iii) disability (days out of role, partial disability, overall perceived health) (see **Figure 1**).

Figure 1. WMH framework about burdens of mental disorders in the WMH surveys (*Source*: The Burdens of Mental Disorders, Global Perspectives from the WHO World Mental Health Surveys, 2013)



Data to analyze the burdens of common mental disorders came from the European Contribution to the WMH Surveys Initiative (EU-WMH) which included data from ten participating countries. The first European survey within the context of the WMH was the European Study of the Epidemiology of Mental Disorders (ESEMeD) which included data from six countries: Belgium, France, Germany, Italy, the Netherlands and Spain and it was conducted between 2001 and 2003. [42,43] Afterwards, four more countries were included: Bulgaria, Romania, Northern Ireland and Portugal. The data collection was carried out between 2003 and 2009. These are the 10 European countries analyzed in this Thesis.

2.1 Common mental disorders and disability

Common mental disorders are disabling [5,26] and they are major contributors to total disease burden.[13] Most of common mental disorders appear in early adulthood, severely impacting the life of the individual for years to come.[44] Thus, psychiatric and physical impairments associated to mental disorders generate a significant cost for sufferers as well as for their employers, third-party payers, caregivers and the society as a whole.[45-51] Unemployment, low incomes, and low work productivity including increased absences (i.e., full disability days) and reduced performance at work (i.e., partial disability days), are important indicators of the economic impact of mental disorders.[17,52-54] This is crucial information for occupational health policies and health priority setting in Europe.[32]

The measurement of disability across countries, populations and diseases is both necessary and challenging.[55] The WMH Initiative used a modified version of the WHO-Disability Assessment Scale (WHO-DAS) [56] as a general reliable measure of functioning and disability in major life domains within the ICF framework: (i) cognition, (ii) mobility, (iii) self-care, (iv) getting along, (v) work and daily functioning, and (vi) participation in society. The disruption of any of these domains due to an individual's health condition (i.e, mental disorders) would result in some form of disability.

In this Thesis the terms role-functioning limitations and disability are indistinctively used as synonyms, as they are referring to an impairment in the "work and daily functioning" domain. [23,57] Full and partial are adjectives used to distinguish when there is a complete or incomplete

ability of performing the domain, respectively. The measurement of both is important as disability should be understood as a continuum.[58]

2.2 Common mental disorders and earnings

The effect that mental disorders yield on personal earnings has been scarcely assessed as an indicator of the indirect cost of mental illness, partially because it entails technical and methodological difficulties.[59,60] Two techniques have been mainly used to describe the losses of earnings due to mental illness: (i) the friction cost, which assumed that productivity is a function of the average value of production per employee; and (ii) the tradition human capital approach, which considers that the economic losses associated with diminished productivity due to an illness can be measured by the reduced earnings after its onset.

In this Thesis, the human capital approach is used to estimate the loss of work productivity as a function of an individual's wage. Mental illness reduces the probability of employment, reduces income due to sick leaves and due to a higher likelihood of failure to obtain promotions or raises in salaries.[61,62] Previous evidence using WMH data of 19 countries showed that serious mental illness was associated with an enormous earning gap at individual and at societal-level [63]. For instance, in the United States, individuals with a serious mental illness earned US$16,306 less in a year in comparison to those without a serious mental illness. This gap was equivalent to 193.2 billion at the societal-level [64]. In China (Beijing and Shanghai), the earning gap was estimated to be about 0.2% of the GDP of both cities [49].

2.3 Individual and societal approaches - WMH Surveys

Burdens of mental health within the context of WMH surveys are reported at two levels of analyses: (i) individual-level and (ii) societal-level. It is important to consider both in evaluating the burdens of mental disorders, as they represent a complementary elaboration of the data.[5]

Individual-level estimates describe the relative importance of the disorders from the perspective of the individual, thus provide information on the magnitude of the personal disadvantage and suffering among individuals with the assessed conditions. In this Thesis, individual-level estimates were calculated following a standard WMH methodology, which is briefly explained here. In order to transform coefficients from the models into individual-level effects, simulation was used. This was done by generating two estimates for each respondent for each coefficient. The first estimate is based on the actual data, while the second estimate is based on a revision of the data in which all respondents are recorded not to have the predictor of interest. The first estimate is then subtracted from the second and the sum across respondents is divided by the number of respondents with the disorder of interest. The result of this calculation is interpreted as the average individual-level change in the outcome associated to that disorder.

On the other hand, the use of societal-level indicators is useful for public health purposes. The population attributable risk proportion (PARP) is the societal-level indicator used in WMH Surveys. PARP can be interpreted as the proportional reduction in the outcome (i.e., days with disability) that would have not occurred in the absence of the predictor disorders at the population level,[65] assuming that there is a causal relationship between the risk factor (i.e., health conditions) and the outcome (i.e, role-

functioning and earnings). PARP takes into account the prevalence of the health conditions in the population. In this Thesis, PARP's calculation was done following the same simulation process that was used for calculating the individual-level estimates. Then the first estimate is subtracted from the second and the sum across respondents is divided by the entire sample. Therefore, PARP can be interpreted as the proportion of instances of the outcome that would not have occurred in the absence of the predictor disorders at the population-level.

2.4. Research questions

What is the association between common mental disorders and physical conditions, and role-functioning limitations in the working-age population from Europe?

In chapter 2, a societal-level perspective is used to describe full and partial role-functioning limitations in the working-age population from three European regions: Central-Western, Southern and Eastern Europe. It is hypothesised that the contribution of commonly occurring health conditions to role-functioning limitations among the working-age European population will be high. Given the higher prevalence of physical conditions, they will be major contributors to role-functioning limitations in comparison with common mental disorders. Cross-regional comparisons are established.

What is the association between common mental disorders and physical conditions, and role-functioning limitations at the individual and at the societal-level in Spain?

In chapter 3, using both, societal and individual-level perspectives, the distribution of the number of days with either full or partial role-functioning limitations associated to commonly occurring health conditions in Spain is described. As a previous study using WMH Spanish data has found a low proportion of use of health-care services regarding emotional disorders in the country,[66] it is hypothesised that at individual-level, common mental disorders will have high number of days with role-functioning limitations. At the societal-level, physical conditions will contribute higher to both full and partial role-functioning limitations in comparison with common mental disorders, as they are much higher prevalent conditions in Spain.

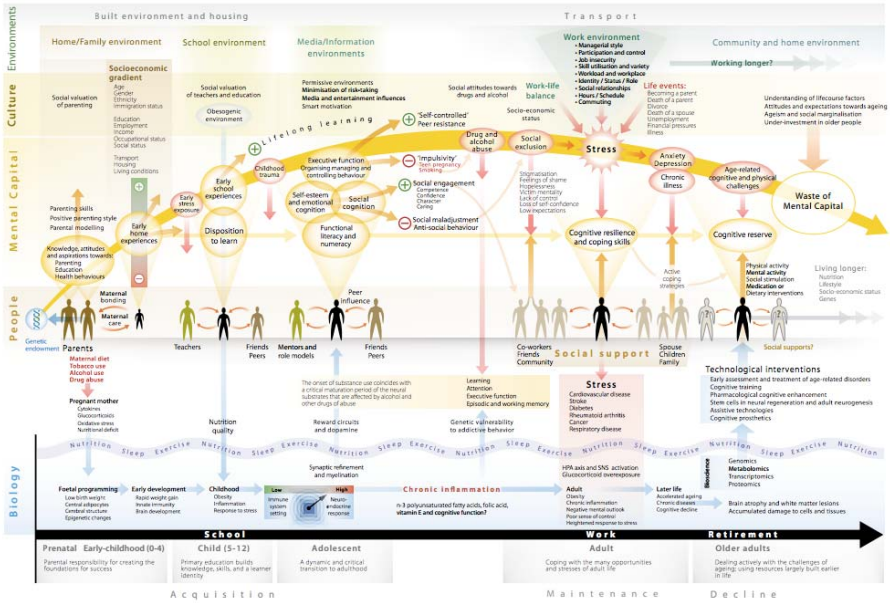
Is there an earning gap between individuals with and without serious mental illness in Spain? What is the extent of such earning gap at individual and at the societal-level?

In chapter 4, using both, societal and individual-level perspectives, the earnings gap between individuals with and without serious mental disorders is described. It is hypothesised that individuals suffering from serious mental illness will have lower earnings in comparison with individuals without serious mental illness. It is also hypothesised that the earnings gap at the individual-level will be substantial; while at the societal-level will be modest since the prevalence of serious mental disorders in Spain is low.[15]

3. Determinants of the incidence of common mental disorders

The capacity for individuals to develop and flourish over the life course is deeply influenced by several factors, including the immediate social surroundings and the socioeconomic circumstances in which they find themselves.[67] Pathways to mental-ill health are complex as many factors can act as contributors as well as determinants of mental health.[68] Most of the factors that have an influence on mental health act at different levels: biological, individual, community, society and environmental level. In figure 2, all these factors and levels are depicted, taking a life course approach (see **Figure 2).**

Figure 2. Synthetic view of the risks to mental health over the life course (*Source*: Foresight Mental Capital and Well-being Project, 2008).



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Anxiety and depression are common mental disorders that appear as a result of stress exposure generated by environmental, socioeconomic and physical stressors, among others.[69] These stressors may suddenly appear in life, and they are called stressful life events (e.g., death of a parent, divorce, job loss). These stressful life events have been seen associated with an increased risk of poor mental health outcomes, especially with depression.[70,71] Other more enduring life stressors, which can be seen as contextual or macro-economic determinants (e.g., material deprivation, socioeconomic inequalities, poverty, etc) have also been related with higher risk of mental disorders.[2,72-75]

3.1 Socioeconomic factors and common mental disorders

Job loss is a discrete stressful life event with multiple adverse consequences for physical and mental health.[75] Job loss affects the interaction between behaviour, cognition and emotion. It has an impact on the material and social contexts of life.[32] There is a large research literature documenting the impact of job loss and unemployment on mental health.[33,74,76,77] Among the adverse outcomes associated with job loss and income reductions, depression emerges as a prominent mental health outcome.[9,76,78,78-83]

Additionally, the deleterious mental health effects of negative socioeconomic factors are not equally distributed for men and women as they reflect their different positions in the household and in the labour market.[84-87] Men's traditional role as primary providers with subsequent stronger family's responsibilities (e.g., breadwinner model)[88] has been argued as a possible reason on the increased effects of unemployment on

their mental health. Conversely, the nurturant roles of women are thought could act as a buffer of adverse mental health outcomes.[84,89]

3.2 Functional status and common mental disorders

There is a large body of evidence showing that psychopathology is associated with functional limitations in many domains of life.[16,24,25,90,91] Yet the existence of an impaired functioning preceding the appearance of a full-blown disorder is often less studied.

Using population-based data from NEMESIS-1, Ormel et al.[92] showed that some level of disfunctioning may precedes the development of a full-blown mental disorder. However, important confounders of this relationship, such as socio-demographic characteristics and lifestyle factors, were not taken into account in studying this relationship.

On the other hand, there is a growing body of research aiming at study, the course and nature of unspecific somatic, bodily and functional complaints, for which a conventional pathology cannot be identified. These functional and unspecific complaints represent a high economic burden as they are related to sick leaves and to a high utilization of medical services.[93-95] These patients have higher levels of psychiatric comorbidities. However, in a recently published review,[96] 20% to 36% of patients reporting these unspecific complaints, did not have any full-blown mental disorder.

3.3 Research questions

Are job losses and household income reductions associated with an increased risk of common mental disorders? Is gender an effect modifier of the relationship between these negative socioeconomic changes and common mental disorders?

In chapter 5, it is hypothesised that those individuals who had lost their jobs and/or had experienced household income reduction will be at an increased risk of a common mental disorder. It is also hypothesised that the effects on mental health would be different in men and women, given that they have different positions in the household and in the labour market. Job loss would be the factor associated with an increased risk of incident mental disorders in men and household income reduction would be the one among women.

Is there an association between low functional status at baseline and the development of an emotional disorder?

In chapter 6, it is hypothesised that individuals reporting a low functional status at baseline will have a higher risk of an emotional disorder (i.e., any mood or any anxiety disorder) in the subsequent three years. In addition, having a previous mental disorder or a 12-month physical condition at baseline are hypothesised as possible effect modifiers on the relationship between functional status and emotional disorders.

Thesis rationale

Mental disorders are increasingly recognized as a major source of disability in the world.[13] A large associated economic burden has been reported and an increase in their magnitude it is forecasted. Nevertheless, population-based knowledge about the prevalence and distribution of mental disorders, their risk factors and their social and economic consequences is still limited.[43]

The World Mental Health (WMH) dataset contains comprehensive epidemiological population-based information on common mental disorders and its correlates. It has been assembled using a standardize protocol for sampling, interviewing, coding, and analysis, thus providing information which is highly comparable across countries, more so than previous epidemiological studies.[97-99] Comparable epidemiological information is necessary to help setting health policy across Europe as a whole and also at the country-specific level. Several mental health policy reforms are ongoing on European countries, especially in Eastern Europe. Successful policies must be based on valid and reliable knowledge of the relative efficiency of alternative organizational systems in order to reduce mental health disability.

In turn, while the WMH provides valuable information on the disability burdens associated to mental disorders, its cross-sectional nature limits inferences about the determinants of common mental disorders. The need of longitudinal data for establishing causality has partly precluded WMH investigators of examining predictors and risk factors of mental disorders. It is for this reason that I contacted the investigators of the Netherlands Mental Health and Incidence Study 2 (NEMESIS-2), a longitudinal

population-based study with a similar methodology, measurements and instruments as the WMH. Moreover, the longitudinal data collection time frame of the NEMESIS-2 encompassed the years of the global economic crisis in two waves: 2007/2009 and 2010/2012. During those years, the Dutch economy was hit by the crisis; therefore there were important socioeconomic changes in a relatively short period of time. This has allowed me to study important socioeconomic determinants in the incidence of common mental disorders. In addition, the research stay in the TRIMBOS Institute in Utrecht, the Netherlands, also allowed me to meet the requirements of the *Rio Hortega* contract granted by the *Instituto de Salud Carlos III*, which provided the main funding of this Thesis.

Objectives

The general aim of this Doctoral Thesis was to describe the impact of common mental disorders on disability at the individual-level and also using a broader public-health societal approach. In turn, the role of some socioeconomic adversities of interest as well as low functional status, were analyzed as determinants of the incidence of common mental disorders.

General objectives

- To describe the disability and economic burden associated to common mental disorders at the European level and at country-specific level in Spain.

- To examine socioeconomic and functioning-related factors of interest as determinants of the incidence of common mental disorders.

Specific objectives

1. To examine the number of days with role-functioning limitations attributable to common mental disorders and to physical conditions at the individual and at the societal-level.

2. To estimate the earnings gap between individuals with and without common mental disorders, at the individual and at the societal-level.

3. To analyze the association between negative socioeconomic changes, such as job loss and household income reductions, and the incidence of common mental disorders.

4. To assess low functional status as a predictor of the development of common mental disorders

General methodology

In order to address these objectives, two epidemiological datasets were used. For the first general objective, data from 10 European countries participating in the WMH Surveys Initiative (EU-WMH) was analyzed; while for the second, the first two waves of the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2) were examined. Following a brief description of both studies is displayed.

1. The European Contribution to the World Mental Health Surveys Initiative (EU-WMH)

1.1 Sample and design

The European Contribution to the World Mental Health Surveys Initiative (EU-WMH) is part of the World Mental Health Surveys Initiative launched by World Health Organization (WHO) in 2000. Cross-sectional household interview surveys of representative samples of the adult population (aged 18 years or older) were conducted in 10 European countries: Belgium, Bulgaria, France, Germany, Italy, the Netherlands, Northern Ireland, Portugal, Romania and Spain. The surveys were conducted between 2001 and 2009 as face-to-face interviews using computer-assisted personal interviewing (CAPI) except for Bulgaria that used the paper-and-pencil (PAPI) format. Response burden was reduced using a two-part interview process in all countries except for Romania. Part 1 included the core diagnostic assessment of mood and anxiety disorders and was administered to the whole sample. Part 2 was

administered to all respondents with a certain number of mood and anxiety symptoms and to a random proportion of those who have not, and included questions about disability, additional mental disorders and information on physical conditions. Part 2 individuals were weighted by the inverse of their probability of selection to adjust for differential sampling, and therefore provide representative data of the target adult general population. The EU-WMH total sample size was 37,289, ranging from 2,357 (Romania) to 5,473 (Spain). Response rates ranged from 45.9 % (France) to 78.6 % (Spain), with an overall weighted response rate of 63.4 %.

1.2 Instruments and measures

Mental disorders along with physical conditions were analyzed as predictors of disability. Mental disorders were also analyzed as predictors of earning losses. Mental disorders were assessed using the WHO Composite International Diagnostic Interview (CIDI) version 3.0.[100] CIDI 3.0 generates diagnoses of mental disorders according to definitions and criteria of both the International Classification of Diseases (ICD) and the Diagnostic and Statistical Manual of Mental Disorders (DSM), although only DSM-IV criteria are used in this Thesis. The following DSM-IV diagnoses were used: major depressive episode and any anxiety disorder (panic disorder and/or agoraphobia, social phobia, specific phobia, generalized anxiety disorder and post-traumatic stress disorder). Physical conditions were assessed with a checklist based on the U.S. National Health Interview Survey.[101]

Disability was assessed with a modified version of the WHO Disability Assessment Schedule 2.0 (WHO-DAS). Personal earnings after taxes per month were self-reported.

1.3 Ethics

WMH surveys were implemented according to widely accepted ethical standards, and independent country-specific ethic boards approved the study. Informed consents were obtained from participants.

2. The Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2)

2.1 Sample and design

NEMESIS-2 is a prospective study among Dutch-speaking subjects aged 18–64 years from the general Dutch population.[102] Three waves were planned with three year-intervals between the waves. The baseline wave of NEMESIS-2 (T0) was performed between 2007 and 2009 with 6,646 subjects interviewed (65.1% response rate). The second wave was performed between 2010 and 2012. All 6,646 participants were approached for follow-up (T1), of which 5,303 could be re-interviewed (80.4%. response rate, with those deceased excluded). The mean period between both interviews was 3 years and 7 days (1.102 days; sd=64). Attrition in the first two waves of NEMESIS-2 was 20.2% (n=1,343).[103]

A multistage, stratified random sampling procedure was applied to select 184 of the 443 existing municipalities. A random sample of addresses of private households from postal registers was drawn. Based on the most recent birthday at the first contact with the household, an individual aged 18 to 64 years with sufficient fluency in Dutch language was selected for a face-to-face interview (mean duration T0=95 minutes; T1=84 minutes).

All analyses were weighted for a post-stratification factor of the first wave and for a specific factor that accounted for the differences found among the respondent and non-respondent samples.

2.2 Instruments and measures

The outcome of both manuscripts using NEMESIS-2 data was the appearance of mental disorders between waves. Mental disorders were also assessed with CIDI 3.0.[100] The following DSM-IV diagnoses were used in the manuscripts: mood disorders (major depression, dysthymia, bipolar), anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, and generalized anxiety disorder), and substance use disorder (alcohol, drug abuse and dependence). New onset and recurrent cases were assessed as incident cases of mental disorders. Population at risk of suffering an incident mental disorder (i.e., not having any 12-month mental disorder) was selected at baseline.

The main factors analyzed as determinants of the appearance of mental disorders were on the one hand, job loss and household income reductions; and on the other hand, functional status at baseline. Job loss was assessed as follows: individuals were asked about having a paid job at T0 and at T1. Individuals that answered not having a paid job at T0 or those who had a paid job at T0, but were retired at T1 were excluded. The rest were considered as having lost their jobs between the two waves. At T1, respondents were asked whether their or their partner's income had changed since T0 (5-point scale, from substantially lower to substantially higher). If one of these incomes decreased substantially, this variable was regarded as 1, otherwise as 0. Functional status was assessed with the Physical (PCS) and the Mental Component Summaries (MCS) of the

Short Form-36 Health Survey version 1.[104] Disability days were the sum of the number of days absent from work plus the number of days with either quantitative or qualitative partial limitations while at work during the previous 30 days, collected with WHO-DAS 2.

2.3 Ethics

The Medical Ethics Review Committee for Institutions on Mental Health Care (METIGG) approved the study and respondents provided written informed consent.

Following a summary with the main characteristics of both studies is displayed.

Table 1. Main characteristics of EU-WMH and NEMESIS-2 studies

	EU-WMH [1]	**NEMESIS-2** [2]
Target	General population	General population
Design	Cross-sectional (2001-2009)	Longitudinal (2007/2009 – 2010/2012)
Country	Belgium, Bulgaria, France, Germany, Italy, the Netherlands, Romania and Spain	The Netherlands
Sample size	37,289	6,646 (T0), 5,303 (T1)
Rate response	63.4%	80.4%
Age-range	+18	18-64
Main measurements		
Mental disorders	CIDI 3.0 [3]	CIDI 3.0 [3]
Severity of mental disorders	Sheehan Disability Scales	
Physical conditions	Checklist (ref)	Checklist (ref)
Functional status		SF-36
Job loss		It was estimated based on the same question administered in T0 and T1 regarding having a paid job
Household income reduction		Reduction in household income since T0
Disability	WHO-DAS 2.0 [4]	WHO-DAS 2.0 [4]
Earnings	Personal earnings after taxes per month (pre-defined categories with different ranges of income)	

1. EU-WMH: European Contribution to the World Mental Health Surveys Initiative
2. NEMESIS-2: the Netherlands Mental Health and Incidence Study
3. CIDI 3.0: Composite International Diagnostic Interview verison 3.0
4. WHO-DAS 2.0: World Health Organization Disability Assessment Scale

CHAPTER 2

Common health conditions and role limitation in three European Regions: a public-health societal perspective

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ABSTRACT

Purpose
This study aims at describing the distribution of health-related role limitation in the European population aged 18-64 years and examining the contribution of common health conditions to role limitation using a public-health societal approach.

Methods
Representative samples of the adult general population (n=13,666) aged 18-64 years from 10 European countries of the World Mental Health (WMH) Surveys Initiative, grouped into three regions: Central-Western, Southern and Eastern. The Composite International Diagnostic Interview (CIDI 3.0) was used to assess mental disorders and standard checklists for physical conditions. Days with full and with partial role limitation in the previous month were reported (WHO-DAS 2). Population Attributable Risk Proportions (PARPs) of full and partial role limitation were estimated.

Results
Full role limitation was largely explained by health conditions (PARP=62.6%) in comparison with partial role limitation (46.6%). Chronic pain was the single condition that consistently contributed to explain both disability measures in all European Regions. Mental disorders were the most important contributors to full and to partial role limitation in Central-Western and Southern Europe, while in Eastern Europe were physical conditions, especially cardiovascular diseases. Lower prevalence estimates of mental disorders and lower contribution to role limitation was observed in Eastern Europe.

Conclusion
The contribution of common health conditions to role limitation in three European regions is high. There is a need of mainstreaming disability in the public health agenda to reduce the role limitation associated to largely avoidable common health problems. Cross-regional differences were found, yet further investigation to fully understand them is needed.

Key words: disability; societal perspective; common health conditions; mental disorders; physical conditions.

INTRODUCTION

Disability has become the most important component of the burden of disease, surpassing premature mortality.(1) In 2010, low back pain and major depressive disorders were ranked as the third and fourth leading causes of worldwide disability, after HIV/SIDA and road injuries, according to the number of Disability Adjusted Lost Years (DALYs). A DALY is a measure of health loss, mainly based on body functions, senses, cognition and ambulation. Although it helps to compare the relative magnitude of the disease burden across diseases, countries and time, it does not contain the welfare impact that different diseases have. This is particularly undesirable for some diseases, for instance mental disorders, as they have a large impact on functioning and quality of life.(2-5)

The World Mental Health (WMH) survey initiative was launched by the World Health Organization (WHO) in 2001 with the aim of collecting comparable epidemiological data on the burden of mental disorders in 24 countries around the world.(6) Recently, two WMH reports (7;8) have provided information on the individual and societal-level impact of the disability due to 19 common physical and mental conditions in the general population. By means of the modified version of WHO-Disability Assessment Schedule 2.0 (9), the full and the partial inability to perform daily activities, as measures of functional impairment, were assessed. Both reports have emphasized, in consistency with the Global Burden of Disease (GBD) 2010 study that back and neck pain, among physical conditions, and depression, among mental disorders, were the most burdensome non-communicable conditions worldwide. Information was delivered pooled by country groups according to income levels following the World Bank 2007 classification.(10) Twelve high-income level countries, of which 8 were European countries, contributed to the highest

share worldwide of full and partial disability due to common health conditions.

In Europe, nearly 42 million persons of working-age from 15 European countries (16.4%) reported to have a long standing health problem or disability in 2002.(11) However, good sources of data on disability exist only for some European countries (e.g., United Kingdom, Spain, France, and Portugal). Cross-country comparisons are limited due to methodological differences.(12) According to a report from the European Commission, definitions and criteria for determining disability widely differ across Europe. The first attempt of standardisation and harmonization of data on disability among European countries is currently being done by the European Health Interview Survey, 2008 (EHIS). This survey addresses, for the first time, the direct burden of health problems on the economic activity as they collect absenteeism days in the last 12 months. This is crucial information for occupational health policies and health priority setting that so far it was not systematically collected.(13)

As the data from EHIS are currently being analysed, so far there are not comparable information about the disability burden of common health conditions in the working population of Europe. This paper has two general objectives: first, to describe the distribution of disability in Europe in the population aged 18 to 64 years; and second, to examine the contribution of common health conditions to disability at a public-health societal approach. Particularly, we analyzed the contribution of common mental disorders and physical conditions on two distinct measures of disability: the complete inability (e.g., full role limitation) and the partial ability (e.g., partial role limitation) of performing daily activities in three European regions.

METHODS

Surveys method and samples

Cross-sectional household interview surveys of representative samples of the adult population (aged 18 years or older) were conducted in 10 European countries (Belgium, Bulgaria France, Germany, Italy, the Netherlands, Northern Ireland, Portugal Romania and Spain), participating in the European World Mental Health initiative (EU-WMH). Surveys were conducted between 2001 and 2009 as face-to-face interviews using computer-assisted personal interviewing (CAPI) except for Bulgaria that used the paper-and-pencil (PAPI) format. Response burden was reduced using a two-part interview process in all countries except for Romania. Part 1 included the core diagnostic assessment of mood and anxiety disorders and was administered to the whole sample. Part 2 was administered to all respondents with a certain number of mood and anxiety symptoms and to a random proportion of those who have not, and included questions about disability, additional mental disorders and information on physical conditions. Part 2 individuals were weighted by the inverse of their probability of selection to adjust for differential sampling, and therefore provide representative data of the target adult general population.

The EU-WMH total sample size was 37,289, ranging from 2,357 (Romania) to 5,473 (Spain). Response rates ranged from 45.9 % (France) to 78.6 % (Spain), with an overall weighted response rate of 63.4 %. For this particular work, the 13,666 individuals aged 18 to 64 years, who completed part 2 of the interview, were analysed.

Informed consent was obtained from all respondents. Procedures for obtaining informed consent and protecting human subjects were approved

and monitored for compliance by the Institutional Review Boards of the organizations coordinating the surveys in each country

European regions

The 10 countries were grouped into three regions according to the United Nations Statistic Division (14): (i) Central-Western Europe (Belgium, France, Germany, the Netherlands and Northern Ireland); (ii) Southern Europe (Italy, Portugal and Spain); and (iii) Eastern Europe (Bulgaria and Romania).

Measurements

Mental disorders

DSM-IV mental disorders were assessed using the WHO Composite International Diagnostic Interview (CIDI) (15), version 3.0. Six mental disorders were evaluated here, grouped into two main categories: Depressive disorder (major depressive episode), and any anxiety disorder (panic disorder and/or agoraphobia, social phobia, specific phobia, generalized anxiety disorder and post-traumatic stress disorder). Disorders, present in the 12-months before the interview, were considered as a way of increasing recall accuracy.

Physical conditions

Physical conditions were assessed with a checklist based on the U.S. National Health Interview Survey (16). Respondents were asked about a number of symptom-based conditions diagnosed by a health professional. Seven conditions or groups of conditions were included: arthritis, cardiovascular disorders (heart attack, heart disease, hypertension and stroke), severe headaches or migraines, insomnia, chronic pain (back or neck pain or other chronic pain), respiratory disorders (seasonal allergies,

asthma, chronic obstructive pulmonary disease, emphysema), and other physical conditions with low prevalence estimates (<2%), which included cancer, neurological diseases, diabetes, or digestive disorders (stomach or intestine ulcer or irritable bowel disorder). Physical conditions had also to be present in the previous 12 months.

Disability

Role limitation was assessed with a modified version of the WHO Disability Assessment Schedule 2 (WHODAS 2)(17). The number of days in the last 30 days in which they were totally unable to carry out their daily life activities (full role limitation), or in which they were only partially able to perform their daily life activities (partial role limitation), were both outcomes of this study. Partial role limitation was defined as a day in which respondents had either (a) to cut down on quantity of what they did, (b) to cut back on quality of what they did, or (c) it took extreme effort to perform as usual (for more information on the questions, see Bruffaerts et al.8). These three items were then aggregated to measure partial role limitation: 0.5*number of days people had to cut down + 0.5*number of days people had to cut back + 0.25 number of days they had extreme effort to perform as usual. The rationale behind was to have a full-work-loss day equivalent. If this sum exceeded 30, it was re-coded to equal 30 giving the sum a range from 0 to 30 days.

Statistical analysis

We used a two-part modelling approach (18) to separately assess both outcomes of this study: days with full and with partial role limitation associated with mental disorders and physical conditions, controlling for age, sex, employment status, education, marital status and country. A

logistic regression equation (19) was used first to predict the probability of reporting days with role limitations in the total sample; subsequently a GLM regression equation was used to predict the scores in those individuals reporting days with full and with partial role limitation. This approach is adequate in presence of a substantial proportion of respondents reporting no days with role limitations in the dependent variable. The best GLM specification for both outcomes was a normal distribution with an identity link function. Each model included the common health conditions, the covariates, and -to control for comorbidity- the number of conditions starting by two to avoid colinearity. For each of the outcomes, four models were built, one per subsample: (1) All the 10 countries together, (2) Central-Western countries, (3) Southern countries, and (4) Eastern countries.

Population Attributable Risk Proportions (PARP) as a societal-level measure

The Population Attributable Risk Proportions (PARP) can be interpreted as the expected proportion, at the population-level, of full and partial role limitation that can be avoided by either preventing or successfully treating one or more health conditions.

PARPs were calculated as follows: the predicted value of a health condition on the dependent variables (i.e., full and partial role limitation) was distributed across a number of coefficients from two distinct models, logistic and GLM. In order to produce a single term, the predicted values from the two models were multiplied and one predicted value (base estimate) of the outcome for each respondent was obtained. Then, predicted values were again estimated nine times based on the coefficients of the models, but each time assuming that one of the nine health conditions was no longer present (i.e., setting the corresponding

coefficient to zero). The predicted values from the two models were again multiplied to obtain one restricted estimate for each disorder. Then, PARPs were calculated using these two estimates (i.e., base and restricted estimates). The mean differences between these two estimates were averaged across the entire sample and then percentages were computed. The same procedure was used to calculate PARPs for the overall categories: any physical condition, any mental disorder, and any disorder. As it was reported by previous WMH papers, the number of days with either full or partial role limitation associated to a specific health condition (i.e., individual-level effects) was also estimated. These results are available upon request. Here, only societal-level estimates are presented (PARPs).

Data were weighted to account for known probabilities of selection as well as to restore age and gender distribution of the population within countries. An additional weight was added to restore the relative dimension of the population across countries. More information on sampling is detailed elsewhere.(20) The standard errors were calculated using the Jackknife Repeated Replication method, (21) implemented in a SAS macro (SAS Version 9.2).

RESULTS

Sample characteristics are displayed in **Table 1**. Regions were similar in gender distribution (about 50-51% were women) and in mean age (40.2 years). Overall, about one in ten individuals (9.5%) reported to have a full role limitation day and about one in five (18.0%) a partial role limitation day in the previous month.

Central-Western was the region in which a significant higher proportion of individuals reported full and partial role limitation days in the previous month (p value <0.001).

Prevalence of common health conditions

In **Figure 1**, prevalence estimates of commonly occurring health conditions by European Regions are shown. In general, half of the total sample (48.2%) had a common health condition. Central-Western Europe significantly reported the highest prevalence (51.1%) in comparison with Southern (45.8%) and Eastern Europe (42.7%). Overall, taking all physical conditions together, they were three times more prevalent than all mental disorders (43.9% vs. 11.9%, respectively). Significant differences across regions in the prevalence estimates of physical conditions and mental disorders were observed. Central-Western Europe showed the highest prevalence estimate when all mental disorders were taken together (14.3%), followed by Southern Europe (10.1%) and Eastern Europe (6.5%). Differences among the three regions were also observed for arthritis, with Eastern Europe showing a much higher prevalence (22.1%) in comparison with Central-Western and Southern Europe. Eastern Europe showed also marked differences in regards to cardiovascular diseases (15.1%) as a highly prevalent condition, and headache/migraine and chronic pain disorders as low prevalent conditions, in comparison with the other two regions.

Table 1. Sample characteristics of the population sample aged 18-64 years in the WMH surveys in the 10 European countries (EU-WMH).

	n	Age mean (se)	Females % (se)	Not married % (se)	High school or more % (se)	Non-employment % (se) [b]	Any mental disorder % (se)	Any physical condition % (se)	Any day with full role limitation disability % (se) [c]	Any day with partial limitation disability % (se) [c]
Central-Western	**5,493**	**40.6 (0.4)**	**49.8 (1.2)**	**32.0 (1.1)**	**92.7 (0.7)**	**26.5 (1.2)**	**14.3 (0.9)**	**45.7 (1.4)**	**12.5 (0.7)**	**22.8 (0.9)**
Belgium	863	40.0 (0.6)	49.7 (2.3)	30.6 (1.9)	77.1 (3.6)	27.0 (1.8)	13.8 (1.8)	43.9 (2.3)	10.4 (1.5)	26.0 (2.3)
France	1222	39.7 (0.5)	50.6 (1.9)	26.9 (1.7)	. (.) [a]	22.9 (1.6)	19.0 (1.7)	48.2 (2.3)	9.2 (1.4)	25.9 (1.9)
Germany	1097	41.5 (0.7)	49.3 (1.9)	36.3 (1.9)	97.6 (0.7)	29.0 (2.1)	11.3 (1.4)	44.3 (2.3)	8.3 (1.3)	17.2 (1.8)
N. Ireland	1387	39.3 (0.4)	49.8 (1.6)	39.6 (2.1)	96.1 (0.5)	25.9 (1.6)	18.1 (1.6)	48.9 (2.2)	17.0 (1.4)	18.1 (1.4)
The Netherlands	924	39.6 (0.6)	49.3 (2.3)	27.4 (2.9)	77.6 (1.6)	25.8 (2.9)	13.5 (1.1)	44.9 (2.9)	16.1 (2.2)	30.2 (2.7)
Southern	**4,780**	**39.7 (0.3)**	**50.0 (1.2)**	**34.2 (1.1)**	**50.0 (1.3)**	**34.1 (1.0)**	**10.1 (0.5)**	**41.5 (1.2)**	**7.6 (0.5)**	**17.0 (0.8)**
Italy	1466	40.4 (0.4)	50.0 (1.7)	34.1 (1.6)	47.3 (2.1)	32.9 (1.5)	7.9 (0.7)	43.2 (1.7)	8.0 (1.0)	16.1 (1.2)
Portugal	1757	40.7 (0.4)	50.7 (1.6)	31.7 (1.4)	62.6 (1.5)	28.0 (1.2)	21.2 (0.9)	48.9 (1.7)	8.0 (0.7)	17.9 (1.2)
Spain	1557	38.4 (0.5)	49.7 (2.0)	35.1 (1.8)	49.9 (1.7)	37.7 (1.9)	9.6 (0.9)	36.9 (2.0)	7.0 (0.8)	17.0 (1.8)
Eastern	**3,393**	**39.6 (0.3)**	**50.7 (1.3)**	**26.8 (1.1)**	**59.8 (1.5)**	**48.8 (1.4)**	**6.5 (0.5)**	**40.1 (1.1)**	**7.6 (0.5)**	**12.2 (0.7)**
Bulgaria	1682	41.1 (0.5)	50.0 (1.6)	24.0 (2.0)	73.9 (1.3)	37.9 (1.9)	8.6 (0.7)	35.3 (1.2)	5.7 (0.6)	16.2 (1.2)
Romania	1711	39.2 (0.4)	51.0 (1.7)	27.6 (1.3)	55.8 (1.8)	51.9 (1.7)	5.9 (0.6)	41.5 (1.4)	9.3 (0.8)	8.5 (0.7)
All countries	**13,666**	**40.2 (0.2)**	**50.0 (0.8)**	**32.2 (0.7)**	**69.7 (0.8)**	**31.7 (0.8)**	**11.9 (0.5)**	**43.4 (0.9)**	**9.5 (0.3)**	**18.0 (0.5)**
Comparison among all countries										
Chi squared (p value)		3.371 (.0004)	0.103 (0.9996)	6.880 (<0.01)	139.950 (<0.0001)	23.158 (<0.0001)	29.755 (<0.0001)	6.852 (<0.0001)	9.036 (<0.0001)	19.630 (<0.0001)
Comparison among regions										
Chi squared (p value)		1.937 (0.1441)	0.176 (0.8387)	12.003 (<0.0001)	301.939 (<0.0001)	67.438 (<0.0001)	27.680 (<0.0001)	5.061 (0.0068)	3.251 (<0.0001)	9.955 (<0.0001)

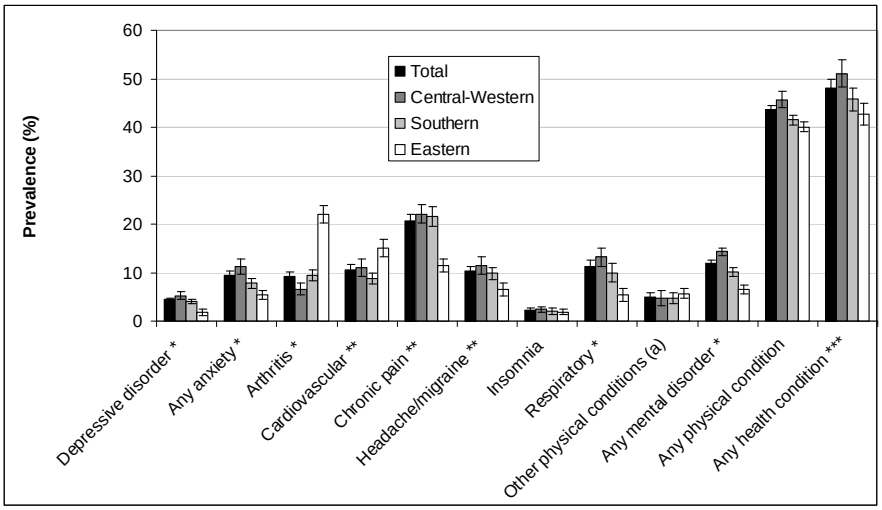
n unweighted, % weighted

[a] Education in France was collected differently from the other countries.

[b] Non-employees included students, unemployed, early retirement, permanently disabled, fulfilling domestic tasks and care responsibility.

[c] The proportion of individuals reporting either a full or a partial role limitation day in the previous month.

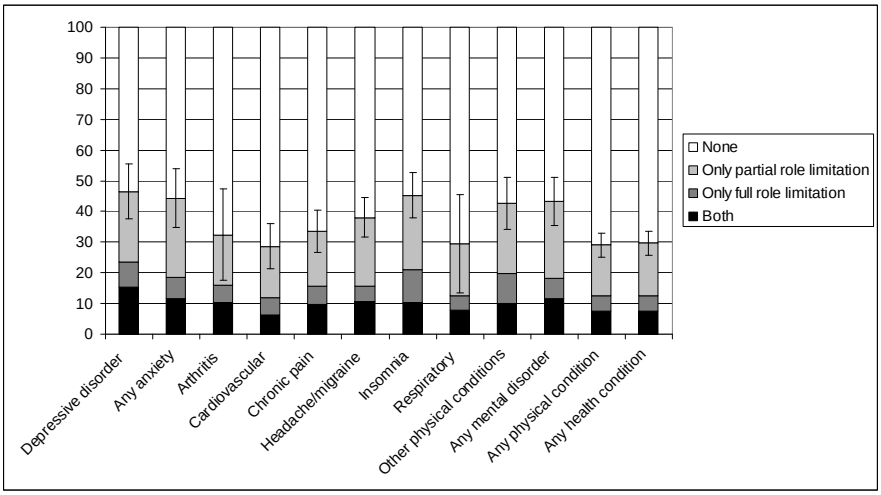
Figure 1. Prevalence rates and 95% Confidence Intervals of common health conditions by European regions (EU-WMH)



(a) Other physical conditions: cancer, neurological diseases, diabetes, or any digestive disorders (stomach or intestine ulcer or irritable bowel disorder).
* Statistically significant differences in prevalence estimates in all three European regions (95%CI does not overlap).
** Statistically significant differences in prevalence estimates Eastern Europe in comparison with Central-Western and Southern Europe (95%CI does not overlap).
*** Statistically significant differences in prevalence estimates Central-Western Europe in comparison with Southern and Eastern Europe (95%CI does not overlap).

In **Figure 2**, the distribution of the different categories of role limitation by each common health condition for the total sample is displayed. About 30% of individuals with any health condition reported some type of role limitation. Among those individuals reporting some role limitation, around 60% reported partial role limitation, 15% reported full and 25% reported both role limitations. The proportion of role limitation was significantly higher, especially at the expense of partial role limitation, among individuals with any mental disorder (43.3%), than among those with a physical condition (29.1%). According to specific disorders, both mental disorders, depressive and anxiety disorder, had a similar proportion of role limitation, while among physical conditions, insomnia and other physical conditions had the highest and cardiovascular and respiratory the lowest proportion of some role limitation.

Figure 2. Distribution of role limitation's categories by common health conditions (EU-WMH)



Error bars (95%CI) are calculated for total role limitation (full + partial + both)

In **Figure 3**, the contribution to full (**Figure 3a**) and to partial (**Figure 3b**) role limitation obtained from grouping all nine health conditions together and separately by all physical conditions and all mental disorders across three European regions using population attributable risk proportions (PARPs) are shown. In general, in the three European regions (black column), all nine health conditions significantly contributed more to explain full role limitation (62.6%; 95%CI=55.3%-69.9%) than partial role limitation (46.6%; 95%CI=40.3%-52.9%) at the population-level. This finding is suggesting that full disability is largely explained by health conditions in comparison with a smaller proportion of partial disability explained by these health conditions. This difference was not observed across regions as confidence intervals overlapped.

In **Figure 3a**, despite physical conditions being four-times more prevalent than mental disorders, the contribution of both to full role limitation was fairly similar. It is noteworthy though the lower contribution of mental disorders to full role limitation in Eastern Europe (white column) (9.8%; 95%CI=0.6%-19.0%) in comparison with the other two regions.

In **Figure 3b**, no statistically significant differences were observed across regions on the contributions from each type of disorder to partial role limitation. In Eastern Europe, physical conditions were also significantly higher contributors to partial role limitation (38.2%; 95%CI=29.0%-47.4%) in comparison with mental disorders (11.7%; 95%CI=3.5%-19.9%).

Figure 3a. **Full role limitation** expressed as Population Attributable Risk Proportions (PARPs) by European regions (EU-WMH)

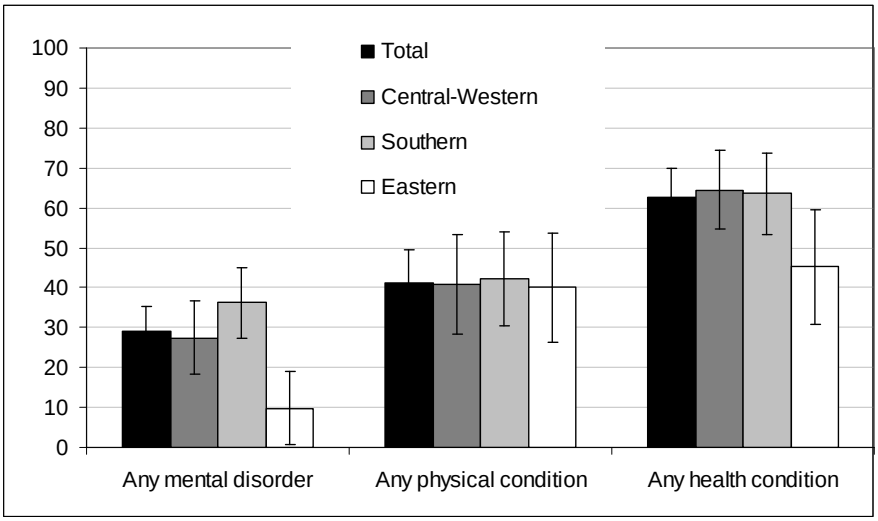
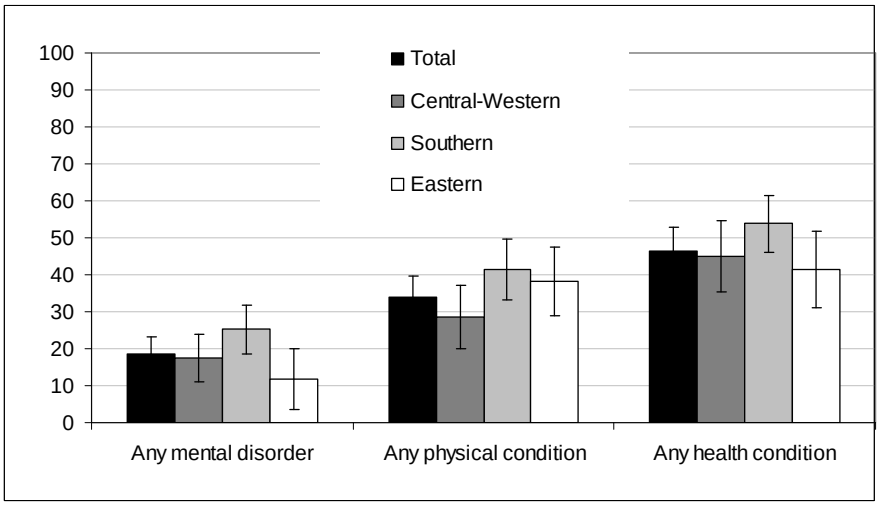


Figure 3b. **Partial role limitation** expressed as Population Attributable Risk Proportions (PARPs) by European regions (EU-WMH)



In **Table 2**, societal estimates of full and partial role limitation by specific health conditions as well as by all health conditions together and separately by all mental and all physical conditions across European Regions are shown. In Europe, anxiety, depression, chronic pain and other physical conditions were the health conditions that significantly contributed to explain full role limitation; and chronic pain, depression, arthritis, anxiety, insomnia, headache/migraines and other physical conditions significantly contributed to explain partial role limitation. In Central-Western and in Southern Europe, depression and anxiety were substantial contributors to full role limitation. In Southern Europe, both mental disorders also significantly contributed to partial role limitation. In Eastern Europe almost all physical conditions, particularly cardiovascular diseases and chronic pain, explained the highest share of full and partial role limitation. Lastly, it was noteworthy that chronic pain was the health condition that substantially and consistently contributed to full and to partial role limitation in all European regions.

Table 2. Population attributable risk proportion (PARP) of days with full and partial role limitation due to common health conditions by European region (EU-WMH)

	Total		Central-Western Europe		Southern Europe		Eastern Europe	
	PARP Full limitation % (se)	PARP Partial limitation % (se)	PARP Full limitation % (se)	PARP Partial limitation % (se)	PARP Full limitation % (se)	PARP Partial limitation % (se)	PARP Full limitation % (se)	PARP Partial limitation % (se)
Mental disorders								
Depressive disorder	12.7 (2.4)*	12.1 (1.7)*	8.9 (3.4)*	13.9 (2.5)*	24.4 (4.2)*	13.8 (2.9)*	3.5 (4.2)	1.8 (2.8)
Any anxiety	19.6 (3.9)*	7.6 (2.2)*	21.8 (5.1)*	4.4 (2.9)	16.8 (5.5)*	13.6 (3.1)*	6.7 (3.8)	9.4 (3.6)*
Physical conditions								
Arthritis	5.2 (2.8)	8.0 (1.9)*	4.6 (3.4)	6.2 (2.4)*	16.9 (5.4)*	14.9 (3.2)*	-19.3 (7.8)*	0.1 (2.7)
Cardiovascular	4.6 (3.2)	2.2 (1.6)	1.5 (3.4)	-1.1 (1.5)	3.7 (4.8)	5.0 (2.8)	17.5 (6.1)*	17.5 (5.7)*
Chronic Pain	15.3 (3.9)*	14.5 (2.8)*	15.6 (5.7)*	11.3 (3.6)*	12.6 (5.4)*	19.2 (4.7)*	18.0 (5.8)*	19.8 (5.0)*
Headache/migraine	3.6 (2.5)	4.3 (1.6)*	2.5 (3.1)	3.1 (2.1)	5.8 (4.7)	4.2 (2.8)	12.5 (5.4)*	6.5 (2.9)*
Insomnia	5.5 (2.7)*	5.0 (1.6)*	7.3 (4.7)	6.8 (2.3)*	2.1 (2.8)	1.4 (1.6)	4.6 (1.4)*	3.1 (1.9)
Respiratory	-0.4 (2.3)	2.5 (1.7)	2.0 (3.5)	2.0 (2.5)	-4.8 (3.5)	6.7 (3.1)*	-0.6 (3.1)	-5.5 (1.7)*
Other physical conditions	16.4 (3.6)*	3.0 (1.2)*	17.9 (4.4)*	2.6 (1.5)	13.5 (3.8)*	0.1 (2.2)	12.9 (8.2)	8.6 (3.3)*
Any mental disorder	**28.9 (3.3)***	**18.6 (2.4)*†**	**27.5 (4.7)***	**17.4 (3.3)***	**36.3 (4.5)***	**25.2 (3.4)***	**9.8 (4.7)*†**	**11.7 (4.2)*†**
Any physical condition	**41.2 (4.3)***	**33.9 (2.9)*†**	**40.8 (6.3)***	**28.5 (4.4)***	**42.3 (6.0)***	**41.3 (4.2)***	**40.0 (7.0)*†**	**38.2 (4.7)*†**
Any health condition	**62.6 (3.7)***	**46.6 (3.2)***	**64.5 (5.1)***	**45.1 (4.9)***	**63.6 (5.2)***	**53.8 (3.9)***	**45.2 (7.3)***	**41.5 (5.3)***

The societal predicted values for both outcomes come from a two-part modelling approach and were obtained by multiplying predicted values of the logistic (first part) and GLM (second part) equations. The estimates of both role limitation variables were calculated based on the actual data, and then under the counterfactual assumption that the condition no longer existed.
All models adjusted by age, sex, employment status, country, marital status, education and the number of conditions starting by two.
*Statistical significance <0.05; † Statistical significance <0.05 between any mental disorder and any physical condition

DISCUSSION

This paper provides for the first time high quality and comparable epidemiological data on full and partial role limitations associated with common health conditions in a working age population sample from three European regions. The societal perspective allowed us the identification of highly prevalent and disabling conditions to orient specific public health strategies in Europe. Three main findings are worth noting: (a) about two-thirds of the total full role limitation and about one-half of the partial role limitation, could be avoided by treating or successfully preventing these nine common health conditions; (b) chronic pain was the single condition that consistently and significantly contributed to explain both disability measures in all European Regions; (c) differences across regions were observed: depressive and anxiety disorders were important contributors to full and to partial role limitation in Central-Western and Southern Europe, while in Eastern Europe were cardiovascular diseases and headache/migraine. In addition, Eastern Europe was the region in which mental disorders contributed the lowest share of full and partial role limitation in comparison with the other two regions.

Our analysis was restricted to the population sample at working age (18-64), thus, while this is not a sample of workers, it is possible to interpret full and partial role limitation as proxy measures of absenteeism and presenteeism, respectively. According to our findings, common health conditions have a much larger impact on absenteeism than on presenteeism. This is because, in general, other non-health related factors frequently account for work performance. Work-related factors (e.g. shift work, physical work, employment position, among others) together with non work-related characteristics (e.g. family life, financial situation, adverse life events, among others) have shown to be also relevant in

explaining work performance.(22) Nevertheless, the proportion of reduced functioning explained by common and treatable health conditions is far from being negligible. Moreover, given that partial disability predicts future full disability, (23) our findings carry important policy-making implications. In a previous study (24) of over one million workers, the cost of the productivity losses (i.e., absenteeism and presenteeism) associated to common health conditions would be about 40% of the medical costs generated by those same health conditions. Thus, reducing the impact of prevalent disorders should be a priority in health occupational policies in all European regions.

Chronic pain, anxiety, and depression explained almost half of all health-related absenteeism reported in Central-Western (46.3%) and in Southern Europe (53.8%); and chronic pain, cardiovascular diseases and headache/migraines did so in Eastern Europe (48.0%). The most striking cross-regional difference was the low societal effect associated to mental disorders in Eastern Europe. Although WMH Surveys data are cross-nationally comparable as they were assembled using a standardized protocol for sampling, interviewing, coding and analysing, and also adjusted to the cultural demands of the different sampling sites, this difference deserves further inspection.(25) All health conditions which significantly contributed to full role limitation in each European region were respectively listed as top-ten highly disabling conditions in the 2010 GBD study, except for mental disorders. Major depressive and anxiety disorders ranked third and sixth as the most disabling conditions in both Eastern countries according to disability-adjusted life years. The fact that no societal effect attributable to mental disorders was observed in our study is intriguing. Similarities and differences between 2010 GBD study and WMH have been extensively discussed.(26) The notion of disability embodied in a DALYs is viewed as an expression of the poor health

associated with a particular illness, regardless of the context (environment) and of the functional capabilities of the individuals.(27) This is not in agreement with the concept posit by the International Classification of Functioning, Disability and Health, in which the interaction between environment and functional status is key in the definition of disability and it is not univocally related with a medical condition. Although we had expected that functional limitations associated with mental disorders at a societal-level (PARPs) would have revealed the substantial impact that mental disorders have on functioning, (4;5;8;28-30) this was not observed in the Eastern region. In ad-hoc analyses we investigated whether the report of role limitation (i.e., only full, only partial and both) among individuals with depressive and anxiety disorder from Bulgaria and Romania was different from the reported role limitation of individuals from Germany and Italy, as these were the countries in which the lowest prevalence estimates of mental disorders in Central-Western and in Southern Europe, respectively was observed. In Bulgaria, while individuals with mental disorders reported a fairly similar proportion of role limitation in comparison with Germany and Italy; in Romania, a significantly lower proportion of partial role limitation not only among individuals with depressive and anxiety disorders, but also in those with highly prevalent physical conditions, such as arthritis, cardiovascular diseases and chronic pain, was observed. Thus, we hypothesised that some measurement bias (i.e., a possible differential item functioning) (31) could have happened. Future research should address these country-specific differences in order to elucidate the true burden of common health conditions in Eastern European countries.

Limitations of the study

Three important limitations should be taken into account when interpreting our findings. First, only a limited number of common

conditions were included in the analysis. Burdensome conditions such as cancer and neurological disorders, among others, were pooled together in the analyses since models became unstable due to low prevalence estimates. Future research should include the above-mentioned conditions along with an expansion (e.g., substance use disorders) and disaggregation (e.g., anxiety disorders) of those already included. Second, while mental disorders were assessed with a well-established measure, (15) physical conditions were self-reported. Although there is evidence of good correspondence between self-reported (32) somatic conditions such as diabetes, heart disease and asthma, and general practitioner records, we might have underestimated the effect of physical conditions on role limitation. Third, Eastern Europe was the region with the lowest prevalence estimates of DSM-IV mental disorders and also, as it is mentioned above, where the lowest association with disability was observed. Such cross-regional variation in mental disorders prevalence should be interpreted with caution. An extensive discussion on cross-national variations in prevalence estimates of mental disorders in the WMH Surveys can be found at Kessler RC & Üstün, 2008.25 It remains possible that the accuracy of CIDI diagnoses could be lower than in the other two regions, given a greater reluctance on the part of respondents in Eastern countries to admit emotional problems to a stranger who comes to their home to carry out a survey. This issue would be supported by some evidence about stigma being a major problem in Eastern European countries.(33-35) It is also possible that the CIDI would not be completely adequate to capture psychopathological syndromes in some countries (25). A high proportion of sub-threshold cases with psychiatric treatment in countries with low prevalence estimates has been reported.(36)

Notwithstanding these limitations, these results are of importance to policy makers and health-care managers. Most of these common health

conditions are treatable, so the large role limitation impact associated to them might be avoidable. They are also important to researchers in disability as the magnitude and patterns by which common health conditions are associated to role limitation may help to raise hypotheses on the mechanisms involved, thus promoting investigation on causes of disability across different regions of Europe. Finally, the cross-regional differences in prevalence and in associated disability found in countries from Eastern Europe deserve further investigation.

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CHAPTER 3

Effects of common mental disorders and physical conditions on role functioning in Spain

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Barbaglia G, Duran N, Vilagut G, Forero CG, Haro JM, Alonso J. Effects of common mental disorders and physical conditions on role functioning in Spain. Gaceta Sanitaria. 2013 Nov-Dec;27(6):480-6. doi: 10.1016/j.gaceta.2013.03.006

CHAPTER 4

Association between annual earnings and mental disorders in Spain: individual and societal-level estimates

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CHAPTER 5

Negative socio-economic changes and mental disorders: a longitudinal study

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Barbaglia G, ten Have M, van Dorsselaer S, Alonso J, de Graaf R. Negative socio-economic changes and mental disorders: a longitudinal study. J Epidemiology Community Health 2014 *doi:10.1136/jech-2014-204184*
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CHAPTER 6

Low functional status as a predictor of incidence of emotional disorders in the general population

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Barbaglia G, ten Have M, van Dorsselaer S, Vilagut G, Alonso J, de Graaf R. Low functional status as predictor of incidence of emotional disorders in the general population. Quality of Life Research 2014 *(in press*)

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CHAPTER 7

Summary of findings and discussion

In this Thesis, the impact of common mental disorders on disability and the role of socioeconomic factors as their determinants were examined using large general population samples. Results regarding the five research questions formulated in the introduction will be summarized and discussed in this chapter.

1. Burdens of mental disorders

1.1 What is the association between common mental disorders and physical conditions, and role-functioning limitations in the working-age population from Europe?

Summary of findings

Commonly occurring health conditions were important contributors to role-functioning limitations among working-age individuals from three European regions.

About two-thirds (adjusted PARP=62.6%) of full role limitation and almost one-half (46.6%) of partial role limitation, could be avoided by treating or successfully preventing commonly occurring health conditions. Overall, physical conditions and common mental disorders showed a fairly similar contribution to full role limitation, despite the large difference in their prevalence estimates. Chronic pain was the only health condition that consistently contributed the most to role-functioning limitations in all European regions. Depressive and anxiety disorders were important contributors to full and to partial role limitation in Central-Western and Southern Europe, while in Eastern Europe, cardiovascular diseases, closely followed by headache/migraine, were also high contributors to both.

The lowest contribution of common mental disorders to role-functioning limitations was observed in Eastern Europe.

Discussion

This study provides important original information about role-functioning limitations among the working-age population in Europe. Our results are in line with previous reports.[17,19] When comparing our results (working-age individuals) with the WMH pooled data (general population) of twelve high-income countries, two main differences arise. First, a lower share of partial role limitation attributed to all health conditions was observed in Europe (i.e., 47% of the partial role limitation in Europe was attributable to health conditions in comparison with 60% in worldwide WMH pooled data). This difference might be explained by differences in both samples. First, working-age individuals (Europe), usually include healthier individuals. It is likely that among the working-age group other relevant non-health related factors come to play when referring partial role-functioning. For instance, work-related factors (e.g., shift work, physical work, and employment position, among others) together with non-work related characteristics (e.g., family life, financial situation) have shown to be relevant in explaining work performance.[32,128] Second, there was a much higher proportion of days with full role limitation explained by common mental disorders in Europe (28.9% SE=3.3), than WMH high-income countries (16.0%, SE=2.2). Our finding is of importance as suggests that mental disorders, despite of being relatively low-prevalent conditions among the working-age population, are found to be substantial contributors to work productivity losses in Europe.

Differences in prevalence estimates of the health conditions were found across European regions. Most relevant, there was a differential lower contribution to role-functioning limitations associated to mental disorders

in Eastern Europe in comparison with the other two regions. This finding is in contrast with results of the GBD Study.[13] Major depression and anxiety disorders ranked third and sixth as the conditions with the highest Disability Adjusted Life Years (DALYs) in the same Eastern countries. DALYs are the sum of years of life lost (YLL) plus years lived with disability (YLD). It is worth noting that in the estimation of DALYs for mental disorders, the YLL (e.g., mortality) component were considered zero, thus DALYs mainly included the disability component (i.e., YLD). While PARPs and DALYs are differently calculated, both can be used as public health indicators of burden.[105] The difference found in Eatsern countries deserves further inspection though. Nevertheless, such cross-regional difference has given rise to an important concern. It is possible that the accuracy of CIDI diagnoses could be lower in Eastern European countries, given a greater reluctance from respondents to admit emotional problems. Some recent evidence on stigma being a major problem in Eastern counties would support this assumption.[106-108]

Limitations were inherent to the cross-sectional design of the study, which precludes any claims of causality between health conditions and role-functioning limitation. In addition, some important burdensome conditions were not assessed (e.g., psychosis) and other low prevalent conditions were pooled together (e.g., cancer or neurological disorders) as statistical models became unstable.

1.2 What is the association between common mental disorders and physical conditions, and role-functioning limitations at the individual and at the societal-level in Spain?

Summary of findings

In Spain, at the individual-level, commonly occurring health conditions were associated with a high disability; 25 days per year with full and 27 days per year with partial role limitations. There was a similar number of days with full role limitation associated to common mental disorders and physical conditions. However, common mental disorders were associated with twice the number of days with partial role limitation.

At the societal-level, if the population was entirely unexposed to these health conditions of interest, days with full role limitation would be reduced by 73% and days with partial would be reduced by 41%. Depression was the only disorder that significantly contributed to both: full (15.7%) and partial role limitation (14.3%), despite a relatively low prevalence (i.e., 4.6%; SE=0.3). Physical conditions significantly contributed to partial role limitation instead of full, especially arthritis (20%), pain (11.3%) and anxiety (9.5%).

Discussion

In Spain commonly occurring health conditions were associated with additional entire week more per year with full role limitation in comparison to the general population of twelve high-income countries (i.e., 18 days per year with full role limitation). This finding is of importance as it is suggesting a high disability burden of individuals with commonly, most of the times, avoidable and preventable health conditions.

In Spain, common mental disorders were associated with 24 additional days with full and about 42 additional days with partial role limitation per year. That is twice the number of days estimated for the general population in high-income countries (11.3 days; SE=1.7 and 19.8 days; SE=1.2, respectively). In a previous Spanish study, it was described that almost half of individuals meeting criteria for a common mental disorder do not seek for help; and, among those who are treated; two-thirds do not received minimally adequate treatment.[109] So the high level of disability associated to mental disorders found can be explained by underuse of needed services. In addition, common mental disorders were associated with twice the number of days with partial role limitation than physical conditions. This finding is of importance as partial disability predicts later full disability.[110] Early recognition and effective treatment of common mental disorders may help to improve overall productivity.

At the societal-level, despite of Spain being a country with relatively low prevalence of mental disorders[15], common mental disorders explain a substantial proportion of role-functioning limitations (PARP for full =27.2%; and PARP for partial=20.7%, partial), between 40% to 25% more than general population of high-income countries (PARP for full =16.0%; and PARP for partial=14.9%). Depression was the condition explaining the highest share of full role limitation in Spain, and both, depression and anxiety, were important contributors to partial role limitations, similarly to the contribution from high-prevalent conditions in the country, such as arthritis and chronic back and neck pain.

A general limitation of these analyses was the inability of establish causation between commonly occurring health conditions and role-functioning limitations given the cross-sectional design of the study. A more specific limitation was the small sample size that reduced the

statistical power to find significant differences in some disorders (e.g., diabetes and respiratory diseases).

1.3 Is there an earning gap between individuals with and without serious mental disorder in Spain? What is the extent of such earning gap at individual and at societal-level?

Summary of findings

In chapter 4, a large earnings gap associated to serious mental disorders (SMD) was observed in Spain. Individuals with mental disorders earned less than half of what individuals without mental disorders did.

The mean expected earnings for individuals with SMD was 8,674€ and the mean observed earnings among them was 3,995€, the difference between both amounts was considered the earning gap at the individual-level. Having a SMD was associated with 55% lower earnings, in comparison with respondents with no mental disorders. This estimation was done taking into account relevant socio-demographic covariates. Additionally, respondents with SMD were less likely to report any earning than those without SMD (OR= 0.16; 95%CI= 0.07 to 0.34, $p < 0.001$).

Prevalence rates of any 12-month mental disorders were: mild 4.6%, moderate 3.8%, and serious 1.6%. The societal-level effect of the earnings gap was estimated at 1,400€ million. This estimation was obtained by projecting the individual gap to the active population aged 18 to 64 years, considering the prevalence of SMD in our sample.

Discussion

This was the first study in Spain addressing the association of mental disorders and earnings. Comparable data with the same methodological approach exist from Belgium[111] and United States[64], both based on the WMH surveys methodology. Having a SMD in Spain was associated with a huge earnings gap. In Spain an individual with a SMD earned 55% less, in United States was about 42% less per year, and in Belgium about 38% less in comparison with the expected earnings estimated for each country. Therefore, the earnings gap in Spain was considerably larger than in other high-income countries. This is of relevance as the mean expected earnings in Spain were the lowest (8,674€) in comparison with Belgium (15,720€) and United States (U$38,850). Three explanations may account for these expected earnings in Spain: (i) net personal earnings (i.e., after taxes) were collected; (ii) earnings were self-reported (it is known that individuals tend to underreport salaries); and (iii) there was 21.5% of missing values in the earnings variable. Missing values were imputed following a predictive mean matching method taking into account key variables (i.e., age, sex, employment status and education). So if the imputations were done with earnings which were already underreported, the expected values could have resulted in even smaller.

The projected estimate of this earnings gap at the societal-level was 1,400 million € in Spain, which represented 0.2% of the Spanish Gross Domestic Product (GDP) in 2002. This figure is in line with previous estimations on the indirect costs associated to loss of labour productivity in Spain (permanent disability-related costs = 1,500 million €).[112] In Belgium, the earnings gap associated to SMD at the societal-level was 0.7% and in United Sates was 1.6%. The most likely explanation is that a large part of these differences were explained due to differences in SMD

prevalence. While in Spain SMD prevalence estimate was 1.6% (SE=0.3), in Belgium was 4.9% (SE=1.0) and in United States was 6.5% (SE=0.06).

Certain limitations have to be taken in interpreting these results. Data are from 2002, thus an updated inference of those figures is both risky and difficult. This was the first study in Spain examining the earnings gap among individuals with mental disorders, thus replication using larger samples is needed. While this limitation affects the interpretation of absolute numbers (i.e., the amount of the earnings gap) it does not affect the comparability with other countries, as surveys were carried out contemporarily. On the other hand, substance use disorders were not considered in the Spanish data, while Belgium and Unites States did include them. Therefore, we expect an underestimation of the earnings gap in our sample, as those disorders have been associated with large social costs in Spain.[113]

2. Determinants of mental disorders

2.1 Are job losses and household income reductions associated with an increased risk of mental disorders? Is gender an effect modifier of the relationship between these negative socioeconomic changes and mental disorders?

Summary of the findings

In chapter 5, incident cases of mental disorders comprised both new onset as well as those recurrent cases of any mental disorder (lifetime minus 12-month). Negative socioeconomic changes were associated with an increased risk of incidence of common mental disorders, particularly mood disorders. Differences by gender were found.

After 3 years, 6.2% of the Dutch population had lost their job, 11% reported having a "substantial" household income reduction, and 12.2% had developed a mental disorder. Household income reductions significantly increased the risk of any mental disorder (adjusted OR [aOR]=1.77), particularly the risk of mood (aOR=2.24). Job loss significantly increased the risk of mood disorders (aOR=2.02). Gender modified these relationships: job loss only increased the risk of common mental disorders among men (aOR=3.04) and household income reductions only did so among women (aOR=2.32).

Discussion

Our results are in line with previous longitudinal population-based studies reporting an increased risk of mood disorders after socioeconomic changes.[83,114-116] The differential impact of these socioeconomic changes on mental health by gender was also consistent with previous studies.[84-

[86,117] Job loss was far much stressful for men and household income reduction was so for women. These results are suggesting a predominant breadwinner model in the Netherlands, in which men are still main primary earners.[118]

The mental health impact of negative socioeconomic changes such as job losses and household income reductions on workers from the general Dutch population should be understood within a contemporary macro-economic and labour market context.[119] During the years of the research period, the unemployment rate almost doubled in the Netherlands (from 3.3% in 2007 to 5.8% in 2012) [120]. We have calculated the proportion attributable risk proportion (PARP) that shows what percent of the incidence of mood disorders in the general population could have been attributed to job loss. We found that the rise in the unemployment rate during the research period has represented a 7% increase in the incidence of mood disorders at the population-level (adjusted PARP=7.0%; 95%CI=1.5-12.1), highlighting the importance of investments on social protection to fight the negative impact of the economic crisis on health. The Netherlands has a relatively strong social protection system. In 2011, the Netherlands ranked third, after Denmark and France, the country with the highest expenditure on social protection as a percent of the GDP.[121]

One important limitation of this study refers to the temporality between the occurrence of the socioeconomic adversity and the onset of the mental disorder. There was no availability of the date of occurrence of the socioeconomic adversities of interest. Thus in some cases the mental disorder could have appeared before. In addition, the pooling of new onset and recurrent cases assumes that similar mechanisms through which the effects of negative socioeconomic changes have operated in developing the mental disorder. Evidence on job losses associated to recurrent

episodes of depression and not with its onset exist,[122] thus we might have underestimated the risk of incidence. Therefore, further investigation with larger sample sizes using a disaggregated outcome is necessary.

2.2 Is there an association between low functional status at baseline and the development of an emotional disorder?

Summary of the findings

A low functional status, defined by two distinct measures of functioning, was associated with an increased risk of incidence of emotional disorders after three years. Emotional disorders were a pooled outcome formed by any mood or any anxiety disorders. Incident cases comprised both new onset as well as those recurrent cases of any mental disorder (lifetime minus 12-month). It is worth mentioning that the incidence of substance use disorders were not assessed as an outcome of this study, as it was not observed any relationship with functional status in previous studies [123,124] However, the presence of a substance use in the past 12 months at baseline was included as an adjusting variable in the models.

At baseline, 12.1% of the study sample had low Physical Component Score (PCS), 5.9% had low Mental Component Score (MCS) and 30.3% reported some disability day. The incidence of emotional disorders in 3 years was 9.1% (95%CI = 8.1-10.3). In the multivariable analysis, having low PCS or low MCS at baseline (PCS aOR=1.51, p value =0.02; MCS aOR= 1.90, p=0.002) or reporting more than 15 disability days (aOR=1.63, p=0.035) were significantly associated with 3-year incidence of emotional disorders. Having a previous mental disorder modified the relationship between MCS and incidence. Among those with a low MCS score, a

previous mental disorder considerably increased the risk of incident emotional disorders (aOR=2.72, p=<0.001).

Discussion

Using longitudinal population-based data, it was found that low functioning predicts the appearance of full-blown mental disorders. This finding is in line with previous cross-sectional studies conducted at the primary care level, in which functional unspecific complaints significantly increased the likelihood of mood or anxiety disorders.[125-127] Evidence from the general population level using longitudinal data is scarce. Ormel et al.[92], using data from NEMESIS-1 showed the existence of important psychosocial disfunctioning prior to the development of a major depressive episode. However, as the ICF framework points out, an impaired functioning results not only from illness, but also from the interaction with important contextual factors such as socio-demographic characteristics and lifestyle factors [21]. So, we have gone beyond by modelling the relationship between low functional status and incidence of emotional disorders including important confounders.

One relevant finding was that, among individuals with a low MCS at baseline, the risk of incidence of an emotional disorder was much higher than among those without a low MCS. This finding suggests that early intervention (i.e., early referral, effective treatment, etc.) should be provided to individuals with functional complaints within the emotional sphere.

One limitation of this analysis was that the origin of the low functional status was not considered. Whether occurred as a result of a previous mental disorder without full functional recovery or functional recovery was achieved but the level has remained low in comparison with

individuals with no previous mental disorders, or finally, low functional status at baseline could have occurred as a result of subthreshold symptoms of a new episode of the underlying mental disorder.

Nevertheless, implications for clinical practice can be drawn from these findings. Taking a risk approach on individuals with a previous psychiatric history and presenting functional complaints is advisable. From a wider societal perspective, this study adds evidence on the possible role of monitoring changes in health functioning at the general population aiming at establishing prevention strategies of mental health.

CHAPTER 8

Conclusions and implications

Conclusions

1. Burdens of common mental disorders

a. Our findings confirmed the hypothesis that commonly occurring health conditions are important contributors to role-functioning limitations. These health conditions should be addressed to substantially increase work productivity in Europe. Overall, physical conditions and common mental disorders showed a fairly similar contribution to total role limitation, despite the large difference in their prevalence estimates. This finding suggests the importance of considering functioning-related indicators to help priority setting of burdensome conditions in public health at the European level.

b. Cross-regional differences were found in Europe. In general, a much higher relevance of mental disorders as contributors to role-functioning limitations were found in Central-Western and Southern Europe in comparison with Eastern Europe in which chronic back and neck pain, cardiovascular and headaches/migraines were the most important contributors to role-functioning limitations in this region Although such differences deserve further study, health service provision should be re-oriented to adequately meet the disability burden of health conditions in order to increase work productivity in Europe.

c. In Spain, at the individual-level, there was a high number of days with role-functioning limitations associated to commonly occurring health conditions. Particularly, common mental disorders were associated with twice the number of days with full and partial role limitation than the number of days reported by other high-income countries. This finding

should be of concern, especially when taking into account the low percentage of use of services among individuals with common mental disorders in Spain. Efforts toward the recognition and removal of potential barriers (e.g., self-perceived stigma, discrimination) that individuals with common mental health disorders may face in their access to services and to effective treatments should be pursued in order to alleviate disability. Finally, common mental disorders were associated with almost twice as many days with partial role limitations than physical conditions. Given that partial disability predicts later disability, an early recognition and treatment of common mental disorders may help reducing such worsening.

d. In Spain, a country with a low prevalence of mental disorders, common mental disorders were substantial contributors to role-functioning limitations. In particular, depression was the health condition that significantly explained the highest share of the total full role limitation in the country. Depression and anxiety were also important contributors to total partial role limitation, comparable to the contribution of high-prevalent conditions, such as arthritis and chronic back and neck pain. There is an urgent need of public mental health strategies aiming at reducing the impact of common mental disorders at the societal-level. This should contribute to increasing overall productivity in the country.

e. In Spain, at the individual-level, a large earnings gap was found between individuals with and without serious mental disorders. Narrowing this gap is both necessary and fair. Interventions, such as those based on a social skills training or vocational rehabilitation models, might be effective in decreasing unemployment and improving job performance among people with serious mental illness.

f. At the societal-level, this earnings gap represented 1,400 million Euro, which correspond to a modest proportion of the Spanish GDP. However, to put some economic context, this proportion would correspond to the GDP of the Autonomous Cities of Ceuta and Melilla. Therefore, a considerable loss of economic productivity is associated with serious mental disorders in the country. Appropriate diagnosis, treatment and rehabilitation would help reducing such massive losses of productive human capital.

2. Determinants of incidence of common mental disorders

g. The mental health of males and females workers from a high-income country was negatively influenced by job loss and household income reductions. These negative socioeconomic changes were particularly increasing the incidence of mood disorders. Policies addressed to strengthening social protection and public mental health services may be helpful in diminishing the deleterious impact on the mental health of workers.

h. Gender differences were found in the relationship between negative socioeconomic changes and incidence of common mental disorders. While job loss was an important predictor of incidence of common mental disorders among men, household income reductions were more important among women. Differential family burdens borne by male and female workers may play a role in understanding such gender differences. Interventions aiming at the alleviation of the impact of the negative socioeconomic changes on mental health should take into account these gender differences.

e. Low functional status, at the general population level, was predicting the incidence of emotional disorders, after taking into account important socio-demographic characteristics and lifestyle factors. The risk was particularly high among those who had previous psychiatric history and at baseline presented functional complaints within the emotional sphere (i.e., sadness, tiredness, nervous). Therefore, especial attention should be paid to those individuals as they are at a much higher risk of developing a full-blown mental disorder. Early recognition and referral to mental health services of these individuals by general practitioners is advisable and should result in better mental health outcomes.

Implications

a. The high level of disability associated with common mental disorders, which are relatively low prevalent conditions in Europe in general, and in Spain in particular, suggests the need for effective mental public health policies. These policies should be oriented to improve the psychosocial rehabilitation, as a key component of mental health care, in a way of improving personal, social and working skills among individuals with common mental disorders. This implies the necessity of establish intersectoral strategies including not only mental health services, but also social and occupational services.

b. The reduction of barriers to access the use of services may also be important to diminish the high levels of disability found among those with common mental disorders in Spain. For instance, public anti-stigma

campaigns promoting education, understanding, and respect, could help to break down the barriers of ignorance, prejudice, or unfair discrimination that individual with common mental disorders may have. In addition, good clinical practice should be promoted. The prescription of effective treatments based on the best available scientific evidence should be promoted.

c. In Spain, it would also be important to establish more effective occupational measures aiming at incorporating individuals with serious mental disorders into the labour market. This would help reducing the individual disadvantages face by these individuals because of their disease and, at the same time, would contribute to improve work productivity in the country.

d. Another important implication from our findings is the relevance that social protection benefits have in reducing the mental health impact of sudden socioeconomic changes. Strengthening social protection especially targeting the most vulnerable populations (e.g,, women, low-educated, low-skilled individuals, among others) it is important as a way to avoid the social and health costs of rapid and unexpected changes that may offset the economic benefits that globalization carries out in high-income countries.

e. At the primary care level, early intervention in the form of early referral to mental health services and/or the prescription of effective therapeutic measures, on those patients with functional emotional complaints, especially those with past psychiatric history, should be advisable.

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