Originally published as:

Maske, U.E., Buttery, A.K., Beesdo-Baum, K., Riedel-Heller, S., Hapke, U., Busch, M.A.
Prevalence and correlates of DSM-IV-TR major depressive disorder, self-reported diagnosed depression and current depressive symptoms among adults in Germany
(2016) Journal of Affective Disorders, 190, pp. 167-177.

Prevalence and correlates of DSM-IV-TR major depressive disorder, self-reported diagnosed depression and current depressive symptoms among adults in Germany

Ulrike E. Maske[1,2], Amanda K. Buttery[1,3], Katja Beesdo-Baum[4,5], Steffi Riedel-Heller[2], Ulfert Hapke[1], Markus A. Busch[1]*

[1] Robert Koch Institute, Dept. of Epidemiology and Health Monitoring, Berlin, Germany

[2] Institute for Social Medicine, Occupational Health and Public Health, University of Leipzig, Leipzig, Germany

[3] Faculty of Life Sciences and Medicine, King's College London, London, United Kingdom

[4] Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Germany

[5] Behavioral Epidemiology, Technische Universität Dresden, Dresden, Germany

***Corresponding author:**

Dr. Markus Busch

Robert Koch Institute, Dept. of Epidemiology and Health Monitoring

General-Pape-Str. 62-66, D-12101 Berlin, Germany

Email: buschm@rki.de, Tel: +49-30-18745-3546, Fax: +49-30-18745-3211

Abstract

Background: While standardized diagnostic interviews using established criteria are the gold standard for assessing depression, less time consuming measures of depression and depressive symptoms are commonly used in large population health surveys. We examine the prevalence and health-related correlates of three depression measures among adults aged 18-79 years in Germany.

Methods: Using cross-sectional data from the national German Health Interview and Examination Survey for Adults (DEGS1) (n=7987) and its mental health module (DEGS1-MH) (n=4483), we analysed prevalence and socio-demographic and health-related correlates of a) major depressive disorder (MDD) established by Composite International Diagnostic Interview (CIDI) using DSM-IV-TR criteria (CIDI-MDD) in the last 12 months, b) self-reported physician or psychotherapist diagnosed depression in the last 12 months, and c) current depressive symptoms in the last two weeks (PHQ-9, score ≥10).

Results: Prevalence of 12-month CIDI-MDD was 4.2% in men and 9.9% in women. Prevalence of 12-month self-reported health professional-diagnosed depression was 3.8% and 8.1% and of current depressive symptoms 6.1% and 10.2% in men and women, respectively. Case-overlap between measures was only moderate (32-45%). In adjusted multivariable analyses, depression according to all three measures was associated with lower self-rated health, lower physical and social functioning, higher somatic comorbidity (except for women with 12-month CIDI-MDD), more sick leave and higher health service utilization.

Limitations: Persons with severe depression may be underrepresented. Associations between CIDI-MDD and correlates and overlap with other measures may be underestimated due to time lag between DEGS1 and DEGS1-MH.

Conclusions: Prevalence and identified cases varied between these three depression measures, but all measures were consistently associated with a wide range of adverse health outcomes.

Keywords: Major depressive disorder, CIDI, depressive symptoms, PHQ-9, diagnosis, correlates, general population

Abbreviations

CIDI	Composite International Diagnostic Interview
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, 4th edition
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision
DEGS1	German Health Interview and Examination Survey for Adults (DEGS1)
DEGS1-MH	Mental health module of DEGS1
MDD	Major depressive disorder
PHQ-9	Patient Health Questionnaire nine item depression scale
SES	Socio-economic status

Introduction

Depression is one of the most common mental disorders and a leading cause of years of life lost due to disability and disease burden worldwide (Ferrari et al., 2013; Murray et al., 2012; Whiteford et al., 2013; Wittchen et al., 2011). Reliable data on the prevalence and consequences of depression in the general population are needed to estimate disease burden, inform healthcare policy and develop preventive strategies.

A key challenge in obtaining reliable population estimates of depression arises from how the term depression is defined and used in the literature. The generic term depression is commonly used to describe a broad spectrum of diverse conditions which share the common characteristic of disturbed mood. These conditions may range from isolated depressive symptoms of short-duration, through dysthymia or subthreshold depressive disorders, to major depressive disorders with variable severity and duration (American Psychiatric Association, 2013; Angst and Merikangas, 1997; Ayuso-Mateos et al., 2010). Accordingly, measurement instruments range from simple self-rating scales to screen for current depressive symptoms without differential diagnosis, such as the Patient Health Questionnaire nine-item depression scale (PHQ-9) (Kroenke et al., 2001; Löwe et al., 2002), to fully-structured diagnostic interviews such as the World Health Organisation (WHO) Composite International Diagnostic Interview (CIDI) (Kessler et al., 1998) to assess for major depressive disorder (MDD) using the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2013) criteria. In addition to these different approaches, population surveys in the US (Reeves et al., 2011), Canada (Betancourt et al., 2014), Germany (Busch et al., 2013; Buttery et al., 2014; Maske et al., 2014) and other countries frequently employ questions about the history of health professional-diagnosed depression to capture the reality of clinical practice and the communication of depression diagnosis experienced by respondents.

CIDI-defined major depression is the gold standard for estimating the burden of clinical depression in general populations (Haro et al., 2006; Wittchen et al., 1998). However, due to

time constraints or specific research objectives, shorter and simpler measures are commonly used in health surveys and general population samples. For example, sub-threshold depressive symptoms are important to measure from a public health perspective as they are associated with functional impairment (Rapaport et al., 2002) and other adverse health outcomes (Rodriguez et al., 2012).

The aim of this study is to provide up-to-date information on the burden of depression in the general adult population in Germany by considering three different measures of depression. We examine the prevalence of MDD according to DSM-IV-TR criteria in the last 12 months as assessed by CIDI interview, self-reported physician- or psychotherapist-diagnosed depression in the last 12 months and current depressive symptoms in the last two weeks (PHQ-9 score) in a nationwide population-based study of adults aged 18-79 years. As these three measures must be clearly distinguished with regard to the underlying construct and the time frame, Table 1 shows an overview of their main features. Associations of all three measures with a range of socio-demographic characteristics and health-related correlates, including self-rated health, somatic comorbidity, indicators of impairment and functioning and health service use are examined.

Methods

Study design and sample

The German Health Interview and Examination Survey for Adults (DEGS1, field work 2008-2011) and its mental health module (DEGS1-MH, field work 2009-2012) were conducted to obtain comprehensive information about the health of the non-institutionalized population aged 18-79 years in Germany. The design, objectives and methods of DEGS1 and DEGS1-MH have been described in detail elsewhere (Gößwald et al., 2013; Jacobi et al., 2015; Jacobi et al., 2013; Kamtsiuris et al., 2013; Scheidt-Nave et al., 2012). In brief, a random sample of persons aged 18 to 79 years stratified for sex, age and geographical location was selected using two-stage clustered random sampling (stage 1: 180 sample points from all German municipal communities; stage 2: participants from local population registries of those sample points) and supplemented by former participants of the previous German National Health Interview and Examination Survey 1998 (Kamtsiuris et al., 2013; Scheidt-Nave et al., 2012). For DEGS1-MH, all DEGS1 participants with complete assessment (interview and examinations) aged 18 to 79 years were eligible who had consented to being re-contacted for the mental health module, who had sufficient language skills and who were available during the assessment period (Jacobi et al., 2015; Jacobi et al., 2013).

In DEGS1, data was collected by self-administered written questionnaire, standardized physician-administered computer-assisted personal interview (CAPI) and a range of physical, laboratory and other measurements. In DEGS1-MH, in-depth information on mental disorders including MDD was collected by a fully-structured standardized computer-assisted interview (CIDI). The median time lag between DEGS1 and DEGS1-MH was 6 weeks (interquartile range, 5-25 weeks).

DEGS1 was approved by the federal and state commissioners for data protection and by the ethics committee of Charité-Universitätsmedizin Berlin (No. EA2/047/08). DEGS1-MH was

additionally approved by the ethics committee of the Technische Universität Dresden (No. EK174062009). All participants provided written informed consent prior to interview.

Measures of depression

MDD in the last 12 months based on diagnostic criteria of the DSM-IV-TR was assessed in DEGS1-MH with a modified German version of the CIDI (DIA-X/M-CIDI) (Jacobi et al., 2013; Wittchen and Pfister, 1997). The CIDI is an internationally established, standardized computer-assisted psychiatric interview for the assessment of 12-month and lifetime diagnoses of mental disorders using the diagnostic criteria of the DSM-IV (Kessler and Ustun, 2004; Wittchen, 1994; Wittchen et al., 1998). A diagnosis of CIDI-MDD in the last 12 months (12-month CIDI-MDD) is based on the nine DSM-IV-TR symptoms (criterion A), which are assessed with 30 single questions. CIDI-MDD is defined as the presence of at least five of the nine depression symptoms, of which at least one is depressed mood or decreased interest or pleasure on almost every day for most of the time over a period of two weeks or longer during the last 12 months. MDD diagnosis also requires distress or impairment associated with these symptoms (DSM-IV criterion C) and absence of DSM-IV exclusion criteria which are: 1) symptoms due to physical illness, injury or accident, 2) symptoms due to medication, drugs or alcohol, 3) symptoms are explained by grief, and 4) lifetime manic or hypomanic episodes.

Self-reported health professional-diagnosed and communicated depression was defined as a previous diagnosis of depression made by a physician or psychotherapist within the last 12 months. In the physician-administered CAPI participants were asked: “Have you ever been diagnosed with depression by a physician or a psychotherapist?” and, if affirmed, “Was the depression present during the last 12 months?” (Busch et al., 2013).

Current depressive symptoms were assessed with the self-administered German version of the PHQ-9 (Kroenke et al., 2001; Löwe et al., 2002), which measures the presence and

frequency within the last two weeks of the nine DSM-IV symptoms for depressive disorders (DSM-IV criterion A). Based on reported frequencies of symptoms, scores of 0 ("not at all "), 1 ("several days"), 2 ("more than half the days") or 3 ("nearly every day") points are assigned to each item. Scores for individual items are summed (range 0 - 27 points). A score of 10 or more points indicates current depressive symptoms (Kroenke et al., 2001; Löwe et al., 2002).

Other measures

In DEGS1, socio-demographic variables included age, sex and marital status (dichotomized into married and living with partner versus separated, divorced, widowed or single). Self-perceived levels of social support were assessed using the Oslo-3 Social Support Scale (OSS-3) and categorized as poor (3–8 points), moderate (9–11 points) and strong support (12–14 points) (Dalgard et al., 2006). Socio-economic status (SES) was classified as low, middle and high using an index based on information on education, occupational status and net household income (Lampert et al., 2013). Community size was determined based on official administrative municipal codes for the place of residence and categorized into rural (<5,000 inhabitants), small town (5,000 to <20,000 inhabitants), medium-sized town (20,000 to <100,000) and large town (≥100,000 inhabitants) (Kamtsiuris et al., 2013).

Self-rated health was measured using the first question of the German version of the Short Form 36 (SF-36 version 2) (Ellert and Kurth, 2013; Ware, 2000) and dichotomized as poor or fair versus good, very good, or excellent.

Self-reported physician-diagnosed chronic somatic conditions were assessed in DEGS 1 by the CAPI and included lifetime diagnoses of coronary heart disease (CHD) (myocardial infarction or other CHD), stroke, heart failure, chronic renal disease, cirrhosis of the liver, osteoarthritis, osteoporosis, Parkinson's disease and cancer. In addition, the presence of hypertension, diabetes, dyslipidaemia, epilepsy, rheumatoid arthritis, gout, bronchial asthma, hepatitis, gastric-duodenal ulcer and inflammatory bowel disease in the last 12 months was

recorded. The total number of physician-diagnosed conditions (range 0-19) was grouped into none, one, and two or more chronic somatic conditions.

Physical functioning (PF) and social functioning (SF) were assessed in DEGS1 using SF-36 sub-scales (Ellert and Kurth, 2013; Ware, 2000). Established methods were used to calculate PF and SF scores (range 0-100), with higher values indicating better functioning (Ellert and Kurth, 2013; Ware JEJ et al., 2007).

In DEGS1-MH, the number of days with limitations in daily life activities due to physical or mental health problems in the past four weeks was assessed. Participants were asked on how many days during the past four weeks they were a) totally limited and b) at least mildly limited in daily life activities by physical or mental health problems. The total number of activity limitation days was calculated by summing the numbers of days with total limitation (counted as 1) and mild limitation (counted as 0.5). The total number of days was truncated at a maximum of 28 days.

The number of sick leave days from work in the last 12 months was assessed in DEGS1 among participants younger than 65 years in employment by self-administered questionnaire.

Healthcare use was recorded in DEGS1 by self-reports of any episodes of hospital admission for at least one night in the last 12 months and the number of outpatient visits to any primary care or specialist physician in the last 12 months.

Statistical analysis

All analyses were conducted for men and women separately. The prevalence of CIDI-MDD in the last 12 months, self-reported health professional-diagnosed depression in the last 12 months and current depressive symptoms were calculated as percentages with 95% confidence intervals (95% CI) of the total number of men and women with valid data.

Participants with missing data on the three depression measures were excluded from respective analyses. Prevalence was stratified by socio-demographic characteristics. Differences in prevalence were considered statistically significant if 95% CI did not overlap. The percentage of case-overlap for the three measures was calculated as formal concordance and agreement analyses between the three depression measures were not considered appropriate due to conceptual differences between the measures (clinical MDD, self-reported health professional-diagnosed depression, current depressive symptoms) and the different time frames used in their assessment (12 months versus two weeks).

Associations between the three depression measures (dependent variables) and SES and community size (independent variables) were examined with multiple logistic regression analyses adjusting for age, marital status, social support and the number of chronic somatic conditions (and community size and SES, respectively). Participants with missing data on covariables were excluded from further analyses of associations.

Associations between health-related correlates (dependent variables) and the three depression measures (independent variables) were examined using a variety of regression methods. Logistic regression models were used for binary outcome variables (poor/fair self-rated health; any sick leave days in the last 12 months; any hospital admission in the last 12 months; any activity limitation day in the last four weeks). Linear regression models were used for continuous outcome variables (SF-36 PF and SF scales). Multinomial logistic regression was used for the number of chronic somatic conditions. For count outcome variables, negative binomial regression was used without (number of outpatient physician visits) or with zero-inflation (number of sick leave days; number of activity limitation days) based on testing for zero-inflation with the Vuong test. Regression analyses were adjusted for age, SES, marital status, social support, number of chronic somatic conditions (except in analyses on the number of chronic conditions), and physical functioning (except in analyses on the number of chronic conditions, PF and SF).

In sensitivity analyses, we examined the influence of time lag between DEGS1 and DEGS1-MH on the association between CIDI-MDD and correlates assessed in DEGS1 by including interaction terms of CIDI-MDD and the number of weeks between examinations in quartiles into relevant regression models. Additionally, the number of weeks of time lag between examinations was included as a covariable in separate models. No significant interactions were found and the inclusion of time lag did not materially change effect estimates (detailed results not reported).

All analyses were conducted with a weighting factor which accounts for the complex sampling design and which corrects deviations in the sample from the population structure (as of 31 Dec 2010) with regard to age group, sex, region and nationality, as well as community type and education (Kamtsiuris et al., 2013). For all analyses using the DEGS1-MH subsample, a similar weighting factor was calculated which additionally accounts for eligibility and participation in DEGS1-MH (Jacobi et al., 2013). To take into account the weighting as well as the correlation of participants within a community, confidence intervals were determined with survey procedures in STATA 12.1.

Results

DEGS1 comprised a total of 7987 participants aged 18 to 79 years (4198 women, 3789 men). Among those with complete assessment (n=7115), 6027 fulfilled the inclusion criteria for DEGS1-MH and of these, 4483 participated in DEGS1-MH with full psychiatric assessment with the CIDI (2340 women, 2143 men). Table 2 shows characteristics of DEGS1 and DEGS1-MH participants by sex. Compared to men, women were less likely to have high SES, had lower levels of physical and social functioning, reported higher numbers of activity limitation days due to physical or mental health problems in the last four weeks and reported higher numbers of outpatient physician visits in the last 12 months.

Prevalence of CIDI-MDD, self-reported diagnosed depression and current depressive symptoms

Of 7987 DEGS1 participants, 3583 men (94.6%) and 3940 women (93.9%) had valid data on current depressive symptoms, and 3757 men (99.2%) and 4142 women (98.7%) had valid data on self-reported health professional-diagnosed depression in the last 12 months. Of 4483 DEGS1-MH participants, 2103 men (98.1%) and 2305 women (98.5%) had valid data on 12-month CIDI-MDD.

Table 3 shows the prevalence of all three depression measures by socio-demographic characteristics. For all measures, a significantly higher prevalence was found among women. Prevalence of 12-month CIDI-MDD, self-reported health professional-diagnosed depression in the last 12 months and current depressive symptoms was 4.2%, 3.8% and 6.1% in men and 9.9%, 8.1% and 10.2%, respectively, in women.

Of those participants with CIDI-MDD in DEGS1-MH, 33.0% had self-reported health professional-diagnosed depression and 39.3% had current depressive symptoms in DEGS1. Of those with self-reported health professional-diagnosed depression in DEGS1, 45.1% had current depressive symptoms and 37.2% had CIDI-MDD in DEGS1-MH. Of those with

current depressive symptoms in DEGS1, 31.9% had self-reported health professional-diagnosed depression and 32.4% had CIDI-MDD in DEGS1-MH.

Prevalence established by all three measures varied by age but there was no consistent age-related pattern across measures. In both sexes, current depressive symptoms were most prevalent in the age group 18-34 years and decreased thereafter. Prevalence of CIDI-MDD in women was also highest in those aged 18-34 years, while in men it was highest in those aged 45-54. For both measures, confidence intervals of prevalence estimates overlapped widely across age groups. By contrast, the prevalence of self-reported health professional-diagnosed depression was lowest among men and women aged 18-34 years, then rose and peaked in the 55-64 year age group and subsequently declined. This peak in late middle age was more pronounced and statistically significant among women.

Prevalence of all three measures in women and of self-reported health professional-diagnosed depression in men was significantly higher among those who were not married and living with partner compared to those married and living together. There was also a significant relationship between poor social support and higher prevalence across the three measures in both sexes, albeit weaker in men than in women.

Association with socio-economic status and community size

Table 4 shows the results of adjusted logistic regression models examining the associations between SES and community size and the three measures. There were no significant associations between SES or community size and CIDI-MDD. Low SES was associated with significantly higher odds of self-reported health professional-diagnosed depression for women and current depressive symptoms for both men and women. With regard to community size, men living in mid-sized or large towns had significantly higher odds of self-reported health professional-diagnosed depression compared to those living in small towns.

Men and women living in mid-sized or large towns had higher odds of current depressive symptoms.

Health-related correlates

Table 5 shows the results of adjusted regression analyses examining the associations between the three depression measures and health-related correlates.

The odds of poor/fair self-rated health was most notably increased in men (odds ratio (OR) 8.6) and women (OR 5.3) with current depressive symptoms. Having two or more chronic somatic conditions was associated with CIDI-MDD among men, but no statistically significant relationship was found among women. However, having two or more chronic somatic conditions was significantly associated with self-reported health professional-diagnosed depression and current depressive symptoms for both men and women.

The strength of the associations of depression according to the three measures with PF and SF was lower for women than for men and was comparatively lower for CIDI-MDD than the other two measures. CIDI-MDD was associated with increased odds of any activity limitation days and the number of activity limitation days in the last four weeks in men and women.

Among participants younger than 65 years and in employment, all three measures were associated with a higher number of sick leave days in the last 12 months for both sexes. However, none of the three measures were associated with any sick leave day in men, while only CIDI-MDD was not associated with any sick leave days in women. Concerning health service utilisation, depression according to all three measures was associated with more outpatient physician visits (rate ratio (RR) 1.3-2.5) in the last 12 months in both sexes and with higher odds of hospital admission (OR 1.9-2.1) in the last 12 months among men.

Discussion

This nationwide population-based study examined the prevalence and burden of MDD according to DSM-IV-TR assessed with the CIDI, self-reported health professional-diagnosed depression in the last 12 months and current depressive symptoms in a representative sample of adults aged 18-79 years in Germany. Prevalence estimates and identified cases varied between the three measures, but all measures were consistently associated with a wide range of adverse health outcomes.

Prevalence of CIDI-MDD, self-reported diagnosed depression and current depressive symptoms

We found that the total prevalence of CIDI-MDD was similar to the prevalence of self-reported health professional-diagnosed depression among men (4.2% vs. 3.8%) and only slightly higher among women (9.9% vs. 8.1%). However, the notably different patterns of prevalence across age groups and the moderate case-overlap (33% of CIDI-MDD reported health professional-diagnosed depression and 37% of health professional-diagnosed depression had CIDI-MDD) highlights that these measures identify different depression cases. The divergence may be explained by the different concepts underpinning the measures. CIDI-MDD assesses the presence of diagnostic criteria according to the DSM-IV-TR in the last 12 months, while self-reported health professional-diagnosed depression relies on several assumptions. These include: 1) the diagnosis was correct, 2) the health professional informed the person of the diagnosis or applied treatment (Wittchen et al., 2000b), 3) the person remembered the diagnosis at the survey interview and 4) the person informed the interviewer of the diagnosis, who might not do so due to fear of stigmatization (Schomerus and Angermeyer, 2008). Diagnosis of depression in routine clinical care in Germany is commonly based on ICD-10 criteria, which has a slightly lower threshold (4 instead of 5 symptoms required) than DSM-IV-TR- based CIDI-MDD. Findings from a meta-analysis

investigating general practitioner (GP) diagnosis rates in primary care indicate that these health professionals may be good at ruling out depression in most people who are not depressed but correctly diagnose depression less frequently (Mitchell et al., 2009).

Prevalence of current depressive symptoms (PHQ-9 ≥10) was highest for both men (6.1%) and women (10.2%) compared to the other two measures, but more pronounced in men than in women. Even though the PHQ-9 refers to the briefer time frame of two weeks, this high prevalence is not unexpected, as it covers sub-threshold depressive symptoms; does not require the presence of any of the two core symptoms of depression (depressed mood or loss of interest or pleasure); and does not allow for differential diagnosis (e.g. bipolar disorder) or the exclusion of normal bereavement. Therefore, the PHQ-9 is likely to identify more participants as cases than the other two measures.

The 12-month prevalence of CIDI-MDD of 4.2% in men and 9.9% in women is comparable to international data on depression in western countries including the US and other Western countries (Kessler et al., 2015). In particular, it is similar to estimates in the National Comorbidity Survey Replication (NCS-R) for the general adult population in the USA (4.9% in men and 8.6% in women) (Kessler et al., 2003) using similar methods to measure MDD and to results from the DEGS1-MH predecessor study, the German National Health Interview and Examination Survey 1998 (GNHIES98) Mental Health Supplement (5.5% in men and 11.2% in women) (Jacobi et al., 2004a)).

Our prevalence estimates for self-reported health professional-diagnosed depression (men: 3.8%, women 8.1%) are consistent with a contemporary Germany-wide telephone survey reporting prevalence estimates of 4.7% in men and 8.3% in women (Buttery et al., 2014). However, our prevalence estimates are lower than an analysis of claims data for all people in Germany with statutory health insurance (about 88% of the general population) reporting a higher 12-month prevalence of diagnosed depression of 6.4% in men and 12.8% in women (Erhart and von Stillfried, 2012). Conversely, another study of claims data including 6 Million people across Germany found even higher prevalence with 8.8% in men and 17.8% in

women (Melchior et al., 2014). However, Melchior and colleagues (2014) considered inpatient diagnoses in their analyses highlighting how meaningful comparisons are limited due to methodological differences in sample populations.

Our estimates of current depressive symptoms are slightly higher than a previous nationwide population based study from Germany estimating prevalence of 5.3% in men and 8.9% in women using the same PHQ-9 based definition of depressive symptoms (Rief et al., 2004). However, differences may be due to change over time and methodological differences in the age range of the sample (14-93 years), and alternate statistical approaches in estimating prevalence. Our findings are similar to findings from the Behavioral Risk Factor Surveillance System (BRFSS) in the US, reporting a prevalence of 6.8% in men and 10.5% in women using the PHQ-8 (Strine et al., 2008).

Socio-demographic correlates

For all three measures, women had a significantly higher prevalence than men, overall and in specific age groups, consistent with national and international comparative studies and systematic reviews (Jacobi et al., 2004b; Kessler and Bromet, 2013; Reeves et al., 2011; Wittchen et al., 2010). A variety of bio-physiological, psychosocial and behaviour-related explanations have been described for these sex differences (Grigoriadis and Robinson, 2007; Parker and Brotchie, 2010). Concerning self-reported diagnosed depression, sex-specific help-seeking behaviour due to different extents of stigmatization and sex-specific reporting of symptoms should be considered as additional explanations (Hammer et al., 2013; Latalova et al., 2014; Möller-Leimkühler, 2002).

The prevalence according to all three measures varied with age in both men and women but no consistent age-related pattern was found. The prevalence of current depressive symptoms was highest in the youngest age group and decreased thereafter, as was the prevalence of CIDI-MDD in women. Among men, the prevalence of CIDI-MDD was highest in

the youngest age group and in those aged 45-54 years. An age-related decrease of prevalence has been reported for CIDI-MDD in developed countries (Kessler et al., 2010) and for current depressive symptoms in the USA (Strine et al., 2008). In contrast, prevalence of self-reported health professional-diagnosed depression was higher in middle and older age groups and highest among those aged 55-64 years. This is consistent with other surveys from the USA (Strine et al., 2008) and Germany (Erhart and von Stillfried, 2012; Maske et al., 2013). These age-related patterns may partly be explained by biographical influences, the differential impact of stress and resilience factors in different age groups, higher proportions of atypical types of depression that are less likely to be identified by the used measures or simply age-related information bias (Busch et al., 2013; Mauz and Jacobi, 2008; Wittchen et al., 2010). Also, age-related differences in the use of health care services may influence the prevalence of self-reported diagnosed depression as older people may come into contact with their GP due to other physical complaints (Higashi et al., 2007) and the GP may briefly refer to psychosocial factors (Holvast et al., 2012) thereby providing an opportunity for mental health assessment. Furthermore, older people may be more inclined to report that mental health problems have been discussed (Holvast et al., 2012) and communicate a diagnosis of depression to interviewers.

Our results confirm established associations between marital status and social support and depression with high level of consistency across the three measures investigated (Grav et al., 2012; Kessler and Bromet, 2013). We found no statistically significant relationship between low SES and CIDI-MDD consistent with previous national data which showed trends in a social gradient with CIDI-MDD but no statistically significant associations in adjusted analyses (Jacobi et al., 2004b). However, low SES was associated with significantly higher odds of self-reported health professional-diagnosed depression for women and current depressive symptoms for both men and women. These findings are consistent with previous research showing that low SES is associated with an increased risk of depression and other mental disorders (Bromet et al., 2011; Lorant et al., 2003; World Health Organisation, 2000).

We found no significant association between community size and CIDI-MDD differing from previous studies reporting inverse relationships between urban living environment and mental health (McKenzie et al., 2013; Paykel et al., 2003). This may be due to alternate methodological approaches and how we adjusted for a larger number of important cofounders in our analyses than these previous studies. However, we found that men living in mid-sized or large towns had higher odds of self-reported health professional-diagnosed depression, and men and women living in mid-sized towns had significantly higher odds of current depressive symptoms compared to those living in small towns.

Health-related correlates

Overall, we found strong relationships between all three measures and self-rated health status, which is considered a valid predictor for mortality (DeSalvo et al., 2006), consistent with other studies in primary care settings (Ambresin et al., 2014).

Our findings of associations between somatic comorbidity and depression are consistent with previous surveys of self-reported diagnosed depression for the general adult population in Germany (Maske et al., 2013) and depressive symptoms in primary care settings (Gunn et al., 2012). In the USA in the NCS-R study, associations between CIDI-MDD and having a higher number of somatic comorbidities were reported for the overall study population (Gadermann et al., 2012; Kessler et al., 2010). In our data, an association with a higher number of somatic comorbidities was found in men, but not in women suggesting that physical and mental health may be more closely aligned in men than women and highlight the importance of sex-specific analyses. Our analyses showed an inverse associations of all three measures with physical and social functioning, confirming previous associations between SF-36 scales and CIDI-MDD (Wittchen et al., 2000a) in the general population as well as with PHQ-9 measures (Martin et al., 2006).

In relation to sick leave and health service utilization, we found strong associations between the number of sick leave days in the past 12 months and all three measures. People with CIDI-MDD had significantly higher numbers of days with some or full impairment due to mental health and physical problems in the past four weeks. These findings support previous suggestions that depression is a substantially disabling mental disorder with regard to years lived with disability (Wittchen et al., 2011) and days out of usual role (Kessler and Bromet, 2013) and has strong associations with health care utilization (Bhattarai et al., 2013). Research has reported a higher number of sick leave days due to common mental disorders for women than for men (Dietrich and Stengler, 2013), which is consistent with our results for current depressive symptoms and self-reported diagnosed depression among men and women and for CIDI-MDD among men. Furthermore, all measures were associated with significantly increased odds of hospital admission for men, but not in women. For CIDI-MDD, this gender difference may be explained by the relatively lower somatic comorbidity experienced by women as compared to men in our study. In general, gender-related role differences may also contribute to this finding, e.g. women may be less likely to receive inpatient therapy due to childcare responsibilities.

Implications for research and clinical practice

The results of this study emphasize the importance of specificity in depression measurement tools for use in both research and clinical practice for assessing, reporting and interpreting information about depression. Our results demonstrate that different depression measures identify different individuals as cases. This has implications for researchers and emphasizes the need for precise selection of measures of depression in clinical and population studies. Greater detailed description of depression measures and their specific limitations in study reporting is warranted from our findings.

In clinical practice where a rigorous diagnostic assessment is not possible due to logistic or time constraints, self-report assessments such as the PHQ-9 may be very useful for depression screening. Elevated scores should be taken seriously given the strong and consistent associations with many adverse health correlates found in this study and patients should be followed up for confirmation of diagnosis or referred for more rigorous and differential diagnostic assessment.

Limitations

Several methodological limitations should be considered in interpreting these findings. First, persons with severe depression are likely to be underrepresented in DEGS1 and DEGS1-MH, therefore prevalence may be underestimated for all three measures. Second, the time lag between DEGS1 and DEGS1-MH should be considered when interpreting the results on CIDI-MDD and correlates from DEGS1, as this may have resulted in underestimation of associations. Third, even among participants with 12-month CIDI-MDD who had their DEGS1-MH assessment shortly after DEGS1 the last depressive episode may have been outside the time period of some health-related correlates (e.g., SF36-PF subscale investigating functioning in the previous 4 weeks) potentially resulting in an underestimation of respective associations. The same may apply to health professional-diagnosed depression. Finally, recall bias may have influenced some measures, such as self-reported health professional-diagnosed depression in the past 12 months and data related to health service utilization.

Conclusions

The results presented confirm a high prevalence of 12-month CIDI-MDD, self-reported health professional-diagnosed depression in the last 12 months and current depressive symptoms in men and women in Germany and demonstrate that estimates and identified cases vary

widely between these three distinct measures. This has important implications for clinical practice and future research, highlighting the need for specificity in assessing, reporting and interpreting depression in populations as prevalence estimates are used to inform and impact on health care policy and preventive strategies. Female gender, lack of partnership and social support are significant correlates of depression according to all three measures analysed. Low SES was associated with current depressive symptoms but not 12-month CIDI-MDD for both men and women. Overall, depression according to all three measures largely demonstrated consistent associations with a wide range of adverse health outcomes including lower self-rated health, lower physical and social functioning, high somatic comorbidity (except for women with 12-month CIDI-MDD), higher number of sick leave days or activity limitation days (CIDI-MDD) and higher utilization of health services. These findings call for effectively targeted interventions to reduce the burden associated with depression diagnoses or depressive symptoms.

Acknowledgements

DEGS1 and DEGS1-MH were funded primarily by the German Ministry of Health (Bundesministerium für Gesundheit, BMG) (grant numbers for DEGS1-MH: 1368-1124 and 1501-54401). Supplementary funding for DEGS1-MH was provided by the Technische Universität Dresden, and by the Foundation for Mental Health (Stiftung Seelische Gesundheit) inaugurated by the German Association for Psychiatry, Psychotherapy and Psychosomatics (Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde, DGPPN).

Conflict of interest

The authors declare that they have no conflicts of interest.

Contributors

UEM and MAB designed the study, wrote the protocol, interpreted the results and wrote the first draft of the manuscript. UEM prepared and analyzed the data. AKB, KBB, SRH and UH contributed to the interpretation of results and writing the manuscript. All authors contributed to and have approved the final manuscript.

References

Ambresin, G., Chondros, P., Dowrick, C., Herrman, H., Gunn, J.M., 2014. Self-rated health and long-term prognosis of depression. Annals of family medicine 12, 57-65.

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders, Fith Edition (DSM-5). American Psychiatric Association, Washington, DC.

Angst, J., Merikangas, K., 1997. The depressive spectrum: diagnostic classification and course. Journal of affective disorders 45, 31-39; discussion 39-40.

Ayuso-Mateos, J.L., Nuevo, R., Verdes, E., Naidoo, N., Chatterji, S., 2010. From depressive symptoms to depressive disorders: the relevance of thresholds. The British journal of psychiatry : the journal of mental science 196, 365-371.

Betancourt, M.T., Roberts, K.C., Bennett, T.L., Driscoll, E.R., Jayaraman, G., Pelletier, L., 2014. Monitoring chronic diseases in Canada: the Chronic Disease Indicator Framework. Chronic diseases and injuries in Canada 34 Suppl 1, 1-30.

Bhattarai, N., Charlton, J., Rudisill, C., Gulliford, M.C., 2013. Prevalence of depression and utilization of health care in single and multiple morbidity: a population-based cohort study. Psychological medicine 43, 1423-1431.

Bromet, E., Andrade, L.H., Hwang, I., Sampson, N.A., Alonso, J., de Girolamo, G., de Graaf, R., Demyttenaere, K., Hu, C., Iwata, N., Karam, A.N., Kaur, J., Kostyuchenko, S., Lepine, J.P., Levinson, D., Matschinger, H., Mora, M.E., Browne, M.O., Posada-Villa, J., Viana, M.C., Williams, D.R., Kessler, R.C., 2011. Cross-national epidemiology of DSM-IV major depressive episode. BMC medicine 9, 90.

Busch, M.A., Maske, U.E., Ryl, L., Schlack, R., Hapke, U., 2013. Prevalence of depressive symptoms and diagnosed depression among adults in Germany: results of the German Health Interview and Examination Survey for Adults (DEGS1). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56, 733-739.

Buttery, A.K., Mensink, G.B., Busch, M.A., 2014. Healthy behaviours and mental health: findings from the German Health Update (GEDA). European journal of public health.

Dalgard, O.S., Dowrick, C., Lehtinen, V., Vazquez-Barquero, J.L., Casey, P., Wilkinson, G., Ayuso-Mateos, J.L., Page, H., Dunn, G., Group, O., 2006. Negative life events, social support and gender difference in depression: a multinational community survey with data from the ODIN study. Social psychiatry and psychiatric epidemiology 41, 444-451.

DeSalvo, K.B., Bloser, N., Reynolds, K., He, J., Muntner, P., 2006. Mortality Prediction with a Single General Self-Rated Health Question. Journal of general internal medicine 21, 267-275.

Dietrich, S., Stengler, K., 2013. [Sickness absence and disability due to psychiatric disorders from a gender perspective - a systematic literature review]. Gesundheitswesen (Bundesverband der Arzte des Offentlichen Gesundheitsdienstes (Germany)) 75, e74-94.

Ellert, U., Kurth, B.M., 2013. Health related quality of life in adults in Germany: results of the German Health Interview and Examination Survey for Adults (DEGS1). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56, 643-649.

Erhart, M., von Stillfried, D., 2012. Analyse regionaler Unterschiede in der Prävalenz und Versorgung depressiver Störungen auf Basis vertragsärztlicher Abrechnungsdaten, URL: http://www.versorgungsatlas.de/fileadmin/ziva_docs/Bericht_Depressionen_20120529.pdf (09.02. 2015).

Ferrari, A.J., Charlson, F.J., Norman, R.E., Patten, S.B., Freedman, G., Murray, C.J., Vos, T., Whiteford, H.A., 2013. Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. PLoS Med 10, e1001547.

Gadermann, A.M., Alonso, J., Vilagut, G., Zaslavsky, A.M., Kessler, R.C., 2012. Comorbidity and disease burden in the national comorbidity survey replication (ncs-R). Depression and anxiety 29, 797-806.

Gößwald, A., Lange, M., Dölle, R., Hölling, H., 2013. The first wave of the German Health Interview and Examination Survey for Adults (DEGS1). Recruitment of participants, fieldwork, and quality assurance. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56, 611-619.

Grav, S., Hellzen, O., Romild, U., Stordal, E., 2012. Association between social support and depression in the general population: the HUNT study, a cross-sectional survey. Journal of clinical nursing 21, 111-120.

Grigoriadis, S., Robinson, G.E., 2007. Gender issues in depression. Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists 19, 247-255.

Gunn, J.M., Ayton, D.R., Densley, K., Pallant, J.F., Chondros, P., Herrman, H.E., Dowrick, C.F., 2012. The association between chronic illness, multimorbidity and depressive symptoms in an Australian primary care cohort. Social psychiatry and psychiatric epidemiology 47, 175-184.

Hammer, J.H., Vogel, D.L., Heimerdinger-Edwards, S.R., 2013. Men's help seeking: Examination of differences across community size, education, and income. Psychology of Men & Masculinity 14, 65.

Haro, J.M., Arbabzadeh-Bouchez, S., Brugha, T.S., De Girolamo, G., Guyer, M.E., Jin, R., Lepine, J.P., Mazzi, F., Reneses, B., Vilagut, G., 2006. Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health surveys. International journal of methods in psychiatric research 15, 167-180.

Higashi, T., Wenger, N.S., Adams, J.L., Fung, C., Roland, M., McGlynn, E.A., Reeves, D., Asch, S.M., Kerr, E.A., Shekelle, P.G., 2007. Relationship between number of medical conditions and quality of care. The New England journal of medicine 356, 2496-2504.

Holvast, F., Verhaak, P.F., Dekker, J.H., de Waal, M.W., van Marwijk, H.W., Penninx, B.W., Comijs, H., 2012. Determinants of receiving mental health care for depression in older adults. Journal of affective disorders 143, 69-74.

Jacobi, F., Hofler, M., Strehle, J., Mack, S., Gerschler, A., Scholl, L., Busch, M.A., Hapke, U., Maske, U., Seiffert, I., Gaebel, W., Maier, W., Wagner, M., Zielasek, J., Wittchen, H.U., 2015. Twelve-months prevalence of mental disorders in the German Health Interview and Examination Survey for Adults - Mental Health Module (DEGS1-MH): a methodological addendum and correction. International journal of methods in psychiatric research.

Jacobi, F., Klose, M., Wittchen, H.U., 2004a. Psychische Störungen in der deutschen Allgemeinbevölkerung: Inanspruchnahme von Gesundheitsleistungen und Ausfalltage. Bundesgesundheitsbl - Gesundheitsforsch - Gesundheitsschutz 47, 736-744.

Jacobi, F., Mack, S., Gerschler, A., Scholl, L., Hofler, M., Siegert, J., Burkner, A., Preiss, S., Spitzer, K., Busch, M., Hapke, U., Gaebel, W., Maier, W., Wagner, M., Zielasek, J., Wittchen, H.U., 2013. The design and methods of the mental health module in the German Health Interview and Examination Survey for Adults (DEGS1-MH). International journal of methods in psychiatric research 22, 83-99.

Jacobi, F., Wittchen, H.U., Holting, C., Hofler, M., Pfister, H., Muller, N., Lieb, R., 2004b. Prevalence, co-morbidity and correlates of mental disorders in the general population: results from the German Health Interview and Examination Survey (GHS). Psychological medicine 34, 597-611.

Kamtsiuris, P., Lange, M., Hoffmann, R., Schaffrath Rosario, A., Dahm, S., Kuhnert, R., Kurth, B.M., 2013. The first wave of the German Health Interview and Examination Survey for Adults (DEGS1): sample design, response, weighting and representativeness. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56, 620-630.

Kessler, R.C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., Rush, A.J., Walters, E.E., Wang, P.S., National Comorbidity Survey, R., 2003. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). JAMA : the journal of the American Medical Association 289, 3095-3105.

Kessler, R.C., Birnbaum, H.G., Shahly, V., Bromet, E., Hwang, I., McLaughlin, K.A., Sampson, N., Andrade, L.H., de Girolamo, G., Demyttenaere, K., Haro, J.M., Karam, A.N., Kostyuchenko, S., Kovess, V., Lara, C., Levinson, D., Matschinger, H., Nakane, Y., Browne, M.O., Ormel, J., Posada-Villa, J., Sagar, R., Stein, D.J., 2010. Age differences in the prevalence and co-morbidity of DSM-IV major depressive episodes: results from the WHO World Mental Health Survey Initiative. Depression and anxiety 27, 351-364.

Kessler, R.C., Bromet, E.J., 2013. The epidemiology of depression across cultures. Annual review of public health 34, 119-138.

Kessler, R.C., Sampson, N.A., Berglund, P., Gruber, M.J., Al-Hamzawi, A., Andrade, L., Bunting, B., Demyttenaere, K., Florescu, S., de Girolamo, G., Gureje, O., He, Y., Hu, C., Huang, Y., Karam, E., Kovess-Masfety, V., Lee, S., Levinson, D., Medina Mora, M.E., Moskalewicz, J., Nakamura, Y., Navarro-Mateu, F., Browne, M.A., Piazza, M., Posada-Villa, J., Slade, T., Ten Have, M., Torres, Y., Vilagut, G., Xavier, M., Zarkov, Z., Shahly, V., Wilcox, M.A., 2015. Anxious and non-anxious major depressive disorder in the World Health Organization World Mental Health Surveys. Epidemiol Psychiatr Sci, 1-17.

Kessler, R.C., Ustun, T.B., 2004. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). International journal of methods in psychiatric research 13, 93-121.

Kessler, R.C., Wittchen, H.-U., Abelson, J.M., McGonagle, K., Schwarz, N., Kendler, K.S., Knäuper, B., Zhao, S., 1998. Methodological studies of the Composite International Diagnostic Interview (CIDI) in the US national comorbidity survey (NCS). International journal of methods in psychiatric research 7, 33-55.

Kroenke, K., Spitzer, R.L., Williams, J.B., 2001. The PHQ-9: validity of a brief depression severity measure. Journal of general internal medicine 16, 606-613.

Lampert, T., Kroll, L., Muters, S., Stolzenberg, H., 2013. Measurement of socioeconomic status in the German Health Interview and Examination Survey for Adults (DEGS1). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 56, 631-636.

Latalova, K., Kamaradova, D., Prasko, J., 2014. Perspectives on perceived stigma and self-stigma in adult male patients with depression. Neuropsychiatric disease and treatment 10, 1399-1405.

Lorant, V., Deliege, D., Eaton, W., Robert, A., Philippot, P., Ansseau, M., 2003. Socioeconomic inequalities in depression: a meta-analysis. American journal of epidemiology 157, 98-112.

Löwe, B., Spitzer, R.L., Zipfel, S., Herzog, W., 2002. Gesundheitsfragebogen für Patienten (PHQ-D). Komplettversion und Kurzform. Testmappe mit Manual, Fragebögen, Schablonen. 2. Auflage. Pfizer, Karlsruhe.

Martin, A., Rief, W., Klaiberg, A., Braehler, E., 2006. Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. General hospital psychiatry 28, 71-77.

Maske, U.E., Busch, A.M., Jacobi, F., Riedel-Heller, S.G., Scheidt-Nave, C., Hapke, U., 2013. [Chronic Somatic Conditions and Mental Health Problems in the General Population in Germany. Results of the National Telephone Health Interview Survey "German Health Update (GEDA)" 2010]. Psychiatrische Praxis 40, 207-213.

Maske, U.E., Scheidt-Nave, C., Busch, M.A., Jacobi, F., Weikert, B., Riedel-Heller, S.G., Hapke, U., 2014. [Comorbidity of Diabetes Mellitus and Depression in the General Population in Germany.]. Psychiatrische Praxis.

Mauz, E., Jacobi, F., 2008. [Mental disorders and social inequalities in three birth cohorts]. Psychiatrische Praxis 35, 343-352.

Melchior, H., Schulz, H., Härter, M., 2014. Faktencheck Gesundheit: Regionale Unterschiede in der Diagnostik und Behandlung von Depressionen. Bertelsmann Stiftung, Gütersloh.

Mitchell, A.J., Vaze, A., Rao, S., 2009. Clinical diagnosis of depression in primary care: a meta-analysis. Lancet 374, 609-619.

Möller-Leimkühler, A.M., 2002. Barriers to help-seeking by men: a review of sociocultural and clinical literature with particular reference to depression. Journal of affective disorders 71, 1-9.

Murray, C.J., Vos, T., Lozano, R., Naghavi, M., Flaxman, A.D., Michaud, C., Ezzati, M., Shibuya, K., Salomon, J.A., Abdalla, S., Aboyans, V., Abraham, J., Ackerman, I., Aggarwal, R., Ahn, S.Y., Ali, M.K., Alvarado, M., Anderson, H.R., Anderson, L.M., Andrews, K.G., Atkinson, C., Baddour, L.M., Bahalim, A.N., Barker-Collo, S., Barrero, L.H., Bartels, D.H., Basanez, M.G., Baxter, A., Bell, M.L., Benjamin, E.J., Bennett, D., Bernabe, E., Bhalla, K., Bhandari, B., Bikbov, B., Bin Abdulhak, A., Birbeck, G., Black, J.A., Blencowe, H., Blore, J.D., Blyth, F., Bolliger, I., Bonaventure, A., Boufous, S., Bourne, R., Boussinesq, M., Braithwaite, T., Brayne, C., Bridgett, L., Brooker, S., Brooks, P., Brugha, T.S., Bryan-Hancock, C., Bucello, C., Buchbinder, R., Buckle, G., Budke, C.M., Burch, M., Burney, P., Burstein, R., Calabria, B., Campbell, B., Canter, C.E., Carabin, H., Carapetis, J., Carmona, L., Cella, C., Charlson, F., Chen, H., Cheng, A.T., Chou, D., Chugh, S.S., Coffeng, L.E., Colan, S.D., Colquhoun, S., Colson, K.E., Condon, J., Connor, M.D., Cooper, L.T., Corriere, M., Cortinovis, M., de Vaccaro, K.C., Couser, W., Cowie, B.C., Criqui, M.H., Cross, M., Dabhadkar, K.C., Dahiya, M., Dahodwala, N., Damsere-Derry, J., Danaei, G., Davis, A., De Leo, D., Degenhardt, L., Dellavalle, R., Delossantos, A., Denenberg, J., Derrett, S., Des Jarlais, D.C., Dharmaratne, S.D., Dherani, M., Diaz-Torne, C., Dolk, H., Dorsey, E.R., Driscoll, T., Duber, H., Ebel, B., Edmond, K., Elbaz, A., Ali, S.E., Erskine, H., Erwin, P.J., Espindola, P., Ewoigbokhan, S.E., Farzadfar, F., Feigin, V., Felson, D.T., Ferrari, A., Ferri, C.P., Fevre, E.M., Finucane, M.M., Flaxman, S., Flood, L., Foreman, K., Forouzanfar, M.H., Fowkes, F.G., Fransen, M., Freeman, M.K., Gabbe, B.J., Gabriel, S.E., Gakidou, E., Ganatra, H.A., Garcia, B., Gaspari, F., Gillum, R.F., Gmel, G., Gonzalez-Medina, D., Gosselin, R., Grainger, R., Grant, B., Groeger, J., Guillemin, F., Gunnell, D., Gupta, R.,

Haagsma, J., Hagan, H., Halasa, Y.A., Hall, W., Haring, D., Haro, J.M., Harrison, J.E., Havmoeller, R., Hay, R.J., Higashi, H., Hill, C., Hoen, B., Hoffman, H., Hotez, P.J., Hoy, D., Huang, J.J., Ibeanusi, S.E., Jacobsen, K.H., James, S.L., Jarvis, D., Jasrasaria, R., Jayaraman, S., Johns, N., Jonas, J.B., Karthikeyan, G., Kassebaum, N., Kawakami, N., Keren, A., Khoo, J.P., King, C.H., Knowlton, L.M., Kobusingye, O., Koranteng, A., Krishnamurthi, R., Laden, F., Lalloo, R., Laslett, L.L., Lathlean, T., Leasher, J.L., Lee, Y.Y., Leigh, J., Levinson, D., Lim, S.S., Limb, E., Lin, J.K., Lipnick, M., Lipshultz, S.E., Liu, W., Loane, M., Ohno, S.L., Lyons, R., Mabweijano, J., MacIntyre, M.F., Malekzadeh, R., Mallinger, L., Manivannan, S., Marcenes, W., March, L., Margolis, D.J., Marks, G.B., Marks, R., Matsumori, A., Matzopoulos, R., Mayosi, B.M., McAnulty, J.H., McDermott, M.M., McGill, N., McGrath, J., Medina-Mora, M.E., Meltzer, M., Mensah, G.A., Merriman, T.R., Meyer, A.C., Miglioli, V., Miller, M., Miller, T.R., Mitchell, P.B., Mock, C., Mocumbi, A.O., Moffitt, T.E., Mokdad, A.A., Monasta, L., Montico, M., Moradi-Lakeh, M., Moran, A., Morawska, L., Mori, R., Murdoch, M.E., Mwaniki, M.K., Naidoo, K., Nair, M.N., Naldi, L., Narayan, K.M., Nelson, P.K., Nelson, R.G., Nevitt, M.C., Newton, C.R., Nolte, S., Norman, P., Norman, R., O'Donnell, M., O'Hanlon, S., Olives, C., Omer, S.B., Ortblad, K., Osborne, R., Ozgediz, D., Page, A., Pahari, B., Pandian, J.D., Rivero, A.P., Patten, S.B., Pearce, N., Padilla, R.P., Perez-Ruiz, F., Perico, N., Pesudovs, K., Phillips, D., Phillips, M.R., Pierce, K., Pion, S., Polanczyk, G.V., Polinder, S., Pope, C.A., 3rd, Popova, S., Porrini, E., Pourmalek, F., Prince, M., Pullan, R.L., Ramaiah, K.D., Ranganathan, D., Razavi, H., Regan, M., Rehm, J.T., Rein, D.B., Remuzzi, G., Richardson, K., Rivara, F.P., Roberts, T., Robinson, C., De Leon, F.R., Ronfani, L., Room, R., Rosenfeld, L.C., Rushton, L., Sacco, R.L., Saha, S., Sampson, U., Sanchez-Riera, L., Sanman, E., Schwebel, D.C., Scott, J.G., Segui-Gomez, M., Shahraz, S., Shepard, D.S., Shin, H., Shivakoti, R., Singh, D., Singh, G.M., Singh, J.A., Singleton, J., Sleet, D.A., Sliwa, K., Smith, E., Smith, J.L., Stapelberg, N.J., Steer, A., Steiner, T., Stolk, W.A., Stovner, L.J., Sudfeld, C., Syed, S., Tamburlini, G., Tavakkoli, M., Taylor, H.R., Taylor, J.A., Taylor, W.J., Thomas, B., Thomson, W.M., Thurston, G.D., Tleyjeh, I.M., Tonelli, M., Towbin, J.A., Truelsen, T., Tsilimbaris, M.K., Ubeda, C., Undurraga, E.A., van der Werf, M.J., van Os, J., Vavilala, M.S., Venketasubramanian, N., Wang, M., Wang, W., Watt, K., Weatherall, D.J., Weinstock, M.A., Weintraub, R., Weisskopf, M.G., Weissman, M.M., White, R.A., Whiteford, H., Wiebe, N., Wiersma, S.T., Wilkinson, J.D., Williams, H.C., Williams, S.R., Witt, E., Wolfe, F., Woolf, A.D., Wulf, S., Yeh, P.H., Zaidi, A.K., Zheng, Z.J., Zonies, D., Lopez, A.D., AlMazroa, M.A., Memish, Z.A., 2012. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 380, 2197-2223.

Parker, G., Brotchie, H., 2010. Gender differences in depression. International review of psychiatry (Abingdon, England) 22, 429-436.

Rapaport, M.H., Judd, L.L., Schettler, P.J., Yonkers, K.A., Thase, M.E., Kupfer, D.J., Frank, E., Plewes, J.M., Tollefson, G.D., Rush, A.J., 2002. A descriptive analysis of minor depression. The American journal of psychiatry 159, 637-643.

Reeves, W.C., Strine, T.W., Pratt, L.A., Thompson, W., Ahluwalia, I., Dhingra, S.S., McKnight-Eily, L.R., Harrison, L., D'Angelo, D.V., Williams, L., 2011. Mental illness surveillance among adults in the United States. Morbidity and mortality weekly report. Surveillance summaries (Washington, D.C. : 2002) 60, 1-29.

Rief, W., Nanke, A., Klaiberg, A., Braehler, E., 2004. Base rates for panic and depression according to the Brief Patient Health Questionnaire: a population-based study. J Affect Disord 82, 271-276.

Rodriguez, M.R., Nuevo, R., Chatterji, S., Ayuso-Mateos, J.L., 2012. Definitions and factors associated with subthreshold depressive conditions: a systematic review. BMC Psychiatry 12, 181.

Scheidt-Nave, C., Kamtsiuris, P., Goesswald, A., Hoelling, H., Lange, M., Busch, M.A., Dahm, S., Doelle, R., Ellert, U., Fuchs, J., Hapke, U., Heidemann, C., Knopf, H., Laussmann, D., Mensink, G.B., Neuhauser, H., Richter, A., Sass, A.C., Schaffrath Rosario, A., Stolzenberg, H., Thamm, M., Kurth, B.M.,

2012. German health interview and examination survey for adults (DEGS) - design, objectives and implementation of the first data collection wave. BMC public health 12, 730.

Schomerus, G., Angermeyer, M.C., 2008. Stigma and its impact on help-seeking for mental disorders: what do we know? Epidemiology and Psychiatric Sciences 17, 31-37.

Strine, T.W., Mokdad, A.H., Balluz, L.S., Gonzalez, O., Crider, R., Berry, J.T., Kroenke, K., 2008. Depression and anxiety in the United States: findings from the 2006 Behavioral Risk Factor Surveillance System. Psychiatric services (Washington, D.C.) 59, 1383-1390.

Ware, J.E., Jr., 2000. SF-36 health survey update. Spine 25, 3130-3139.

Ware JEJ, Kosinski M, Bjorner BJ, Turner-Bowker DM, Gandek B, ME, M., 2007. User's manual for the SF-36v2 health survey (2nd edn). Quality Metric Incorported.

Whiteford, H.A., Degenhardt, L., Rehm, J., Baxter, A.J., Ferrari, A.J., Erskine, H.E., Charlson, F.J., Norman, R.E., Flaxman, A.D., Johns, N., 2013. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. Lancet 382, 1575-1586.

Wittchen, H.-U., 1994. Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): a critical review. Journal of psychiatric research 28, 57-84.

Wittchen, H.U., Carter, R.M., Pfister, H., Montgomery, S.A., Kessler, R.C., 2000a. Disabilities and quality of life in pure and comorbid generalized anxiety disorder and major depression in a national survey. International clinical psychopharmacology 15, 319-328.

Wittchen, H.U., Jacobi, F., Klose, M., Ryl, L., 2010. Depressive Erkrankungen, Gesundheitsberichterstattung des Bundes. Robert Koch-Institut, Berlin.

Wittchen, H.U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jonsson, B., Olesen, J., Allgulander, C., Alonso, J., Faravelli, C., Fratiglioni, L., Jennum, P., Lieb, R., Maercker, A., van Os, J., Preisig, M., Salvador-Carulla, L., Simon, R., Steinhausen, H.C., 2011. The size and burden of mental disorders and other disorders of the brain in Europe 2010. European neuropsychopharmacology : the journal of the European College of Neuropsychopharmacology 21, 655-679.

Wittchen, H.U., Lachner, G., Wunderlich, U., Pfister, H., 1998. Test-retest reliability of the computerized DSM-IV version of the Munich-Composite International Diagnostic Interview (M-CIDI). Social psychiatry and psychiatric epidemiology 33, 568-578.

Wittchen, H.U., Pfister, H., 1997. DIA-X-Interviews: Manual für Screening-Verfahren und Interview; Interviewheft Längsschnittuntersuchung (DIA-X-Lifetime); Ergänzungsheft (DIA-X-Lifetime); Interviewheft Querschnittuntersuchung (DIA-X-12 Monate); Ergänzungsheft (DIA-X-12Monate); PC-Programm zur Durchführung des Interviews (Längs-und Querschnittuntersuchung); Auswertungsprogramm. Swets und Zeitlinger, Frankfurt.

Wittchen, H.U., Winter, S., Höfler, M., Spiegel, B., Ormel, H., Müller, N., Pfister, H., 2000b. Häufigkeit und Erkennensrate von Depression in der hausärztlichen Praxis. Fortschritte der Medizin 118, 22-30.

World Health Organisation, 2000. Cross-national comparisons of the prevalences and correlates of mental disorders. WHO International Consortium in Psychiatric Epidemiology. Bulletin of the World Health Organization 78, 413-426.

Table 1: Overview over the three depression measures

Measure	Method	Features and areas of application
Major depressive disorder according to DSM-IV-TR criteria	Composite International Diagnostic Interview (CIDI)	• Assessment: fully-structured clinical diagnostic interview (face-to-face CAPI interview) • Time frame: last 12 months • Gold standard for assessing 12-month MDD according to DSM-IV criteria in clinical and epidemiological studies • Allows for in-depth analyses on MDD subtypes, onset of episodes, analyses beyond threshold diagnosis • Considers diagnostic exclusions on a lifetime basis (bipolar disorder, substance-induced depression, depression due to a general medical condition, bereavement)
Diagnosed depression in clinical practice	Self-reported depression diagnosis made by physician or psychotherapist	• Assessment: physician-administered interview questions (face-to-face CAPI interview): “Has a physician or psychotherapist ever diagnosed you with depression?”. If the answer was yes: “Was the depression present during the past 12 months“ • Time frame: last 12 months • Measure for health surveys about mental disorders as identified and treated in routine clinical care (in Germany: ICD-10 based) • Influenced by service utilization, severity, comorbidity and treatment status
Current depressive symptoms based on DSM-IV-TR criterion A	Patient Health Questionnaire nine-item depression scale (PHQ-9) sum score ≥10 points	• Assessment: self-administered questionnaire with 9 items • Time frame: last 2 weeks • Measure of current depressive symptoms in clinical and epidemiological studies and in health surveys • Brief tool for screening and measuring severity of depressive symptoms and syndromes in clinical practice • No diagnostic exclusions possible

Table 2 Characteristics of DEGS1 and DEGS1-MH participants by sex. Figures are weighted population estimates expressed in percent (95% confidence interval), unless otherwise indicated.

	DEGS1		DEGS1-MH	
	Men n=3,789	**Women n= 4,198**	**Men n=2,143**	**Women n=2,340**
	49.7 (48.2-51.1)	50.3 (48.9-51.8)	49.2 (47.2-51.1)	50.8 (48.9-52.8)
Age group (years)				
18-34	26.4 (24.8-28.1)	25.2 (23.6-26.8)	24.1 (21.5-26.8)	24.7 (22.6-27.0)
35-44	18.6 (17.1-20.2)	17.7 (16.2-19.2)	18.6 (16.3-21.2)	17.9 (15.8-20.1)
45-54	21.3 (19.9-22.7)	20.3 (18.9-21.9)	21.3 (19.1-23.6)	20.6 (18.6-22.8)
55-64	15.6 (14.2-17.1)	15.9 (14.8-17.1)	16.0 (14.2-17.9)	15.6 (13.9-17.5)
65-79[a]	18.1 (17.0-19.3)	21.0 (19.7-22.3)	20.1 (18.2-22.1)	21.2 (19.3-23.3)
Marital status				
Married and living with partner	62.3 (59.9-64.6)	58.9 (56.7-61.1)	61.6 (58.3-64.8)	57.3 (54.1-60.4)
Separated, divorced, widowed, or single	37.7 (35.4-40.1)	41.1 (38.9-43.3)	38.4 (35.2-41.7)	42.7 (39.6-45.9)
Social support				
Poor	12.3 (10.9-13.9)	11.6 (10.4-12.9)	12.1 (10.0-14.4)	11.7 (9.9-13.8)
Moderate	51.6 (49.5-53.8)	48.8 (46.9-50.7)	51.1 (48.0-54.1)	47.3 (44.5-50.2)
Strong	36.1 (33.9-38.2)	39.6 (37.8-41.5)	36.9 (33.9-39.9)	41.0 (38.4-43.7)
Socioeconomic status				
Low	18.8 (16.9-20.8)	20.7 (18.9-22.6)	18.7 (16.2-21.4)	20.1 (17.7-22.7)
Middle	58.8 (56.8-60.8)	61.7 (59.7-63.7)	58.4 (55.4-61.3)	62.4 (59.2-65.4)
High	22.4 (20.5-24.4)	17.6 (16.0-19.4)	23.0 (20.6-25.5)	17.6 (15.5-19.8)
Community size				
Rural (< 5000 inhabitants)	16.1 (11.2-22.7)	15.9 (11.0-22.5)	15.6 (10.4-22.8)	14.5 (9.5-21.4)
Small town (5000-<20,000)	23.4 (17.7-30.4)	23.2 (17.5-30.0)	24.0 (17.7-31.7)	24.3 (17.9-32.1)
Mid-sized town (20,000-<100,000)	29.4 (22.9-36.8)	29.8 (23.3-37.2)	30.0 (22.9-38.2)	29.7 (22.8-37.7)
Large town (≥100,000)	31.1 (24.4-38.7)	31.2 (24.6-38.6)	30.5 (23.5-38.5)	31.5 (24.4-39.7)
Fair/poor self-rated health	14.5 (13.1-16.0)	16.1 (14.6-17.7)	15.4 (13.3-17.7)	17.7 (15.7-20.0)
No. of chronic somatic conditions				
None	53.9 (51.8-55.9)	51.6 (49.7-53.5)	53.2 (50.4-56.0)	52.5 (50.0-55.0)
1	21.4 (19.8-23.1)	22.4 (20.8-24.0)	21.0 (18.8-23.3)	20.9 (19.0-22.9)
2+	24.7 (23.1-26.5)	26.0 (24.5-27.6)	25.8 (23.7-28.1)	26.6 (24.5-28.9)
SF-36 physical functioning scale, mean (95% CI)	88.8 (87.9-89.6)	84.5 (83.7-85.3)	88.9 (87.8-90.0)	84.3 (83.2-85.5)
SF-36 social functioning scale, mean (95% CI)	88.1 (87.2-89.0)	84.0 (83.2-84.8)	88.5 (87.3-89.6)	84.1 (82.8-85.4)
No. of activity limitation days due to physical or mental health problems (4 weeks), mean (95% CI)	-	-	2.5 (2.1-2.8)	3.4 (2.9-3.8)
No. of sick leave days (12 months), mean (95% CI)[b]	10.3 (9.1-11.5)	12.3 (10.6-14.0)	11.0 (9.4-12.7)	12.6 (10.1-15.2)
Any hospital admission (12 months)	12.4 (11.0-14.0)	13.3 (12.0-14.7)	12.2 (10.3-14.3)	13.3 (11.6-15.1)
No. of outpatient physician visits (12 months), mean (95% CI)	6.4 (6.0-6.9)	9.2 (8.6-9.7)	6.5 (6.0-7.1)	9.2 (8.6-9.8)

[a] Due to time lag between DEGS1 and DEGS1-MH (median, 6 weeks), 15 participants were already 80-81 years old at the time of DEGS1-MH assessment

[b] Among participants younger than 65 years in employment (DEGS1: n=2,160 men and n=2,201 women; DEGS1-MH: n=1,183 men and n=1,240 women)

Table 3 Prevalence of 12-month CIDI-defined major depressive disorder (CIDI-MDD), self-reported diagnosed depression in the last 12 months and current depressive symptoms (PHQ-9 ≥10) in the last 2 weeks by socio-demographic characteristics. Figures are weighted population estimates expressed in per cent (95% confidence interval)

	Men			**Women**		
	CIDI-MDD (12 months) n=2,103	**Self-reported diagnosed depression (12 months)** n=3,757	**Current depressive symptoms (2 weeks)** n=3,583	**CIDI-MDD (12 months)** n=2,305	**Self-reported diagnosed depression (12 months)** n=4,142	**Current depressive symptoms (2 weeks)** n=3,940
Total	4.2 (3.3-5.3)	3.8 (3.1-4.7)	6.1 (5.1-7.2)	9.9 (8.3-11.9)	8.1 (7.0-9.4)	10.2 (8.9-11.5)
Age group (years)						
18-34	4.8 (3.0-7.6)	2.7 (1.7-4.4)	7.4 (5.3-10.3)	15.7 (11.4-21.2)	6.5 (4.3-9.5)	12.0 (9.5-14.9)
35-44	3.0 (1.4-6.4)	1.9 (0.8-4.2)	5.4 (3.6-8.2)	11.8 (7.7-17.7)	5.2 (3.5-7.7)	9.5 (7.2-12.4)
45-54	5.8 (3.7-9.0)	5.5 (3.8-8.0)	6.0 (4.2-8.4)	8.0 (5.4-11.5)	10.1 (7.7-13.2)	9.8 (7.6-12.5)
55-64	4.6 (2.7-7.7)	5.5 (3.7-8.3)	6.7 (4.7-9.4)	5.5 (3.5-8.5)	12.6 (9.6-16.4)	11.1 (8.3-14.6)
65-79	2.3 (1.3-4.1)	3.9 (2.4-6.3)	4.3 (2.9-6.4)	6.8 (4.5-10.3)	7.2 (5.4-9.6)	8.0 (5.8-10.9)
Marital status						
Married and living with partner	3.4 (2.5-4.8)	2.7 (2.0-3.5)	5.5 (4.4-6.9)	6.2 (4.8-8.0)	6.7 (5.4-8.2)	7.9 (6.7-9.4)
Separated, divorced, widowed, or single	5.3 (3.7-7.4)	5.3 (3,8-7.3)	6.9 (5.2-9.2)	15.0 (11.7-18.9)	9.9 (7.9-12.2)	12.9 (10.7-15.5)
Social support						
Poor	7.1 (4.3-11.4)	6.1 (4.0-9.2)	16.1 (12.0-21.2)	22.6 (15.6-31.5)	17.6 (13.4-22.7)	27.7 (22.7-33.2)
Moderate	3.6 (2.5-5.2)	3.3 (2.4-4.4)	5.3 (4.2-6.7)	8.7 (6.8-11.1)	6.7 (5.4-8.2)	8.8 (7.2-10.8)
Strong	4.1 (2.6-6.2)	3.3 (2.0-5.5)	4.0 (2.7-5.8)	7.4 (5.2-10.4)	6.4 (4.9-8.2)	6.7 (5.1-8.7)
Socioeconomic status						
Low	5.5 (3.1-9.7)	3.7 (2.1-6.4)	10.7 (7.8-14.6)	14.9 (10.3-21.1)	12.5 (9.4-16.5)	16.7 (13.4-20.7)
Middle	4.4 (3.2-5.9)	3.6 (2.7-4.8)	5.4 (4.3-6.7)	8.8 (7.0-11.1)	7.1 (5.9-8.6)	9.7 (8.1-11.5)
High	2.6 (1.5-4.8)	3.7 (2.4-5.7)	4.4 (3.0-6.4)	8.1 (5.4-12.1)	5.6 (3.8-8.2)	5.0 (3.5-7.1)
Community size						
Rural (< 5000 inhabitants)	4.8 (2.7-8.3)	3.5 (1.6-7.4)	4.6 (3.3-6.3)	6.8 (4.5-10.0)	8.0 (5.7-10.9)	10.3 (8.0-13.2)
Small town (5000-<20,000)	2.7 (1.4-5.1)	2.5 (1.5-4.1)	4.2 (2.9-6.1)	8.1 (5.5-11.7)	6.4 (4.6-8.7)	7.4 (5.9-9.3)
Mid-sized town (20,000-<100,000)	5.0 (3.4-7.2)	4.1 (3.0-5.7)	7.1 (5.5-9.2)	10.5 (7.8-14.0)	6.9 (5.4-8.9)	10.8 (8.7-13.5)
Large town (≥100,000)	4.2 (2.8-6.4)	4.6 (3.3-6.4)	7.4 (5.4-10.1)	12.3 (8.8-16.9)	10.6 (8.1-13.7)	11.5 (8.9-14.6)

Table 4 Associations between socioeconomic status and community size (independent variables) and 12-month CIDI-defined major depressive disorder (CIDI-MDD), self-reported diagnosed depression in the last 12 months and current depressive symptoms (PHQ-9 ≥10) in the last 2 weeks (dependent variables)

	Men		**Women**	
	adjusted OR[a] (95%-CI)	p	adjusted OR[a] (95%-CI)	p
CIDI-MDD (12 months)				
Socioeconomic status				
Low	1.8 (0.7-4.4)	0.2	1.7 (0.9-3.3)	0.1
Middle	1.6 (0.8-3.0)	0.2	1.0 (0.6-1.7)	0.9
High	Ref.		Ref.	
Community size				
Rural (< 5000 inhabitants)	1.7 (0.7-4.1)	0.2	1.0 (0.5-1.7)	0.9
Small town (5000-<20,000)	Ref.		Ref.	
Mid-sized town (20,000-<100,000)	1.9 (0.9-4.1)	0.1	1.4 (0.8-2.4)	0.3
Large town (≥100,000)	1.5 (0.7-3.4)	0.3	1.4 (0.8-2.4)	0.3
Self-reported diagnosed depression (12 months)				
Socioeconomic status				
Low	0.9 (0.4-2.0)	0.8	2.1 (1.3-3.4)	0.002
Middle	1.0 (0.5-1.8)	0.9	1.2 (0.7-1.8)	0.5
High	Ref.		Ref.	
Community size				
Rural (< 5000 inhabitants)	1.6 (0.7-4.0)	0.3	1.2 (0.8-2.0)	0.4
Small town (5000-<20,000)	Ref.		Ref.	
Mid-sized town (20,000-<100,000)	2.0 (1.1-3.8)	0.03	1.1 (0.7-1.8)	0.6
Large town (≥100,000)	2.2 (1.2-4.1)	0.02	1.5 (1.0-2.5)	0.07
Current depressive symptoms (2 weeks)				
Socioeconomic status				
Low	2.1 (1.2-3.8)	0.008	3.0 (1.9-4.6)	<0.001
Middle	1.2 (0.8-1.8)	0.5	1.8 (1.2-2.8)	0.009
High	Ref.		Ref.	
Community size				
Rural (< 5000 inhabitants)	1.0 (0.6-1.8)	0.9	1.5 (1.0-2.1)	0.05
Small town (5000-<20,000)	Ref.		Ref.	
Mid-sized town (20,000-<100,000)	1.7 (1.0-2.7)	0.04	1.6 (1.1-2.3)	0.02
Large town (≥100,000)	1.6 (0.9-2.7)	0.09	1.5 (1.0-2.4)	0.06

[a] OR: odds ratio, adjusted for age group, socioeconomic status, community size, marital status, social support, number of chronic somatic conditions. Categories with the lowest prevalence were defined as reference categories.

Table 5 Regression analyses examining associations between 12-month CIDI-defined major depressive disorder (CIDI-MDD), self-reported diagnosed depression in the last 12 months and current depressive symptoms (PHQ-9 ≥10) in the last 2 weeks (independent variables) and health-related correlates (dependent variables)

	Men					**Women**				
	no	yes	Effect estimate	Adjusted effect estimate[b] (95%-CI)	p	no	yes	Effect estimate	Adjusted effect estimate[b] (95%-CI)	p
CIDI-MDD (12 months)										
Poor/fair self-rated health, %	14.4	38.7	OR	2.9 (1.3-6.4)	0.01	14.7	40.0	OR	4.5 (2.5-7.9)	<0.001
No. of chronic somatic conditions, %										
1	21.1	20.8	RRR	1.5 (0.7-3.1)	0.3	21.0	20.3	RRR	1.3 (0.8-2.2)	0.3
2+	25.2	34.9	RRR	2.8 (1.2-6.8)	0.02	27.2	19.4	RRR	1.3 (0.8-2.4)	0.3
SF-36 physical functioning scale, mean	89.3	80.2	ß	-7.5 (-13.5 to -1.5)	0.02	85.1	78.2	ß	-6.9 (-11.7 to -2.1)	0.005
SF-36 social functioning scale, mean	89.7	61.5	ß	-26.2 (-33.7 to -18.7)	<0.001	86.3	65.5	ß	-18.4 (-23.3 to -13.5)	<0.001
Any activity limitation days due to physical or mental health problems (4 weeks), %	35.6	67.8	OR	2.9 (1.6-5.2)	0.001	43.7	76.3	OR	3.3 (2.0-5.2)	<0.001
No. of activity limitation days due to physical or mental health problems (4 weeks), mean	2.3	7.1	IRR*	2.0 (1.3-3.2)	0.004	2.7	9.0	IRR*	1.9 (1.5-2.4)	<0.001
Any sick leave days (12 months)[a], %	56.1	72.3	OR	1.6 (0.7-3.7)	0.3	58.6	66.2	OR	1.0 (0.5-1.7)	0.9
No. of sick leave days (12 months)[a], mean	10.5	21.7	IRR*	1.9 (1.1-3.2)	0.01	11.8	18.9	IRR*	1.6 (1.0-2.6)	0.06
Any hospital admission (12 months), %	11.4	23.9	OR	2.1 (1.1-4.2)	0.03	13.7	10.2	OR	0.6 (0.3-1.2)	0.2
No. of outpatient physician visits (12 months), mean	6.2	14.5	IRR**	1.9 (1.5-2.6)	<0.001	8.8	12.2	IRR**	1.3 (1.0-1.6)	0.04
Self-reported diagnosed depression (12 months)										
Poor/fair self-rated health, %	12.8	56.6	OR	6.0 (3.4-10.7)	<0.001	13.6	43.0	OR	3.7 (2.4-5.5)	<0.001
No. of chronic somatic conditions, %										
1	21.4	24.1	RRR	2.1 (1.0-4.6)	0.05	22.2	27.5	RRR	1.8 (1.1-2.9)	0.01
2+	24.1	44.3	RRR	3.3 (1.6-7.0)	0.002	25.3	37.7	RRR	2.4 (1.5-3.8)	0.001
SF-36 physical functioning scale, mean	89.4	72.1	ß	-13.0 (-18.6 to -7.3)	<0.001	85.5	72.5	ß	-8.1 (-11.9 to -4.3)	<0.001
SF-36 social functioning scale,	89.4	57.8	ß	-29.5 (-34.9 to -24.1)	<0.001	86.0	61.5	ß	-21.9 (-26.2 to -17.6)	<0.001

	Men					Women				
	no	yes	Effect estimate	Adjusted effect estimate[b] (95%-CI)	p	no	yes	Effect estimate	Adjusted effect estimate[b] (95%-CI)	p
mean										
Any sick leave days (12 months) [a], %	55.5	69.4	OR	1.8 (0.9-3.5)	0.1	58.8	76.3	OR	2.0 (1.2-3.5)	0.01
No. of sick leave days (12 months) [a] mean	9.6	31.8	IRR*	2.3 (1.5-3.5)	<0.001	9.6	45.4	IRR*	3.2 (2.2-4.5)	<0.001
Any hospital admission (12 months), %	11.6	30.1	OR	1.9 (1.0-3.6)	0.04	12.7	21.3	OR	1.4 (0.9-2.1)	0.1
No. of outpatient physician visits (12 months), mean	6.0	17.0	IRR**	2.5 (1.8-3.5)	<0.001	8.3	19.5	IRR**	2.0 (1.7-2.4)	<0.001
Current depressive symptoms (2 weeks)										
Poor/fair self-rated health, %	11.8	53.2	OR	8.6 (5.2-14.5)	<0.001	11.8	47.4	OR	5.3 (3.6-7.8)	<0.001
No. of chronic somatic conditions, %										
1	21.3	24.0	RRR	2.3 (1.3-4.1)	0.004	22.6	20.8	RRR	1.6 (1.0-2.3)	0.03
2+	23.8	35.2	RRR	4.0 (2.0-7.6)	<0.001	24.6	32.0	RRR	2.7 (1.7-4.1)	<0.001
SF-36 physical functioning scale, mean	89.7	74.7	ß	-12.5 (-16.4 to -8.6)	<0.001	86.2	71.8	ß	-11.7 (-14.9 to -8.5)	<0.001
SF-36 social functioning scale, mean	90.5	53.5	ß	-34.8 (-39.5 to -30.1)	<0.001	87.6	56.0	ß	-28.8 (-32.3 to -25.4)	<0.001
Any sick leave days (12 months) [a], %	55.2	72.1	OR	1.6 (0.9-2.9)	0.1	57.9	78.9	OR	2.0 (1.2-3.1)	0.004
No. of sick leave days (12 months) [a] mean	9.4	27.5	IRR*	1.4 (1.0-1.9)	0.03	10.0	32.4	IRR*	1.9 (1.3-2.6)	<0.001
Any hospital admission (12 months), %	11.3	28.2	OR	1.9 (1.1-3.1)	0.01	12.2	20.6	OR	1.3 (0.9-1.9)	0.2
No. of outpatient physician visits (12 months), mean	5.9	14.9	IRR**	1.9 (1.5-2.5)	<0.001	8.5	15.0	IRR**	1.4 (1.2-1.7)	<0.001

[a] Among participants younger than 65 years in employment (DEGS1: n=2,160 men and n=2,201 women; DEGS1-MH: n=1,183 men and n=1,240 women)
[b] adjusted for SES, marital status, social support, number of chronic somatic conditions (except analysis on chronic somatic conditions) and physical functioning (except analyses on chronic somatic conditions and SF-36 scales). OR: odds ratio from logistic regression; RRR: relative risk ratio from multinomial logistic regression; ß: ß coefficient from linear regression; IRR*: incidence rate ratio from negative binomial regression with zero-inflation; IRR**: incidence rate ratio from negative binomial regression.