Prevalence and age patterns of depression in the United Kingdom. A population-based study.

Running title: Prevalence and age patterns of depression in the United Kingdom.

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Short Report

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Abstract (248 words)

Background: Identifying variations by age in the prevalence of depression would be instrumental in supporting case detection and targeted prevention. Our aim was to determine these variations in the UK. **Methods:** A representative sample of the UK population (n=17,152) from the European Health Interview Survey of 2014 was included in the analyses. The Patient Health Questionnaire (PHQ-8) was used to assess the prevalence of depressive symptoms and of probable depressive disorder. Prevalence estimates (95%CI) were calculated. The association between prevalence and age was assessed using multivariable multinomial logistic and logistic regression models. All analyses were carried out for the total sample and stratified by sex. **Results:** The prevalence of depressive symptoms ranged from 11.3% (10.6-11.9) for mild, to 3.3% (3.0-3.7) for severe symptoms. The prevalence of probable depressive disorder was 7.5% (95%CI: 7.0-8.0). A significantly higher prevalence of probable depressive disorder was found in those aged 45 to 59 years old compared with those aged 16 to 29. For the prevalence of severe depressive symptoms those age differences were even higher: 2.55 times higher (5.38 for men and 1.75 for women). **Limitations:** The cross-sectional design precludes stablishing the direction of the relationship between age and the prevalence. **Conclusions:** The prevalence and age patterns of depression in the UK were described. A peak in the prevalence was identified during middle adulthood. These results could serve as a reference for the monitoring of depression in the UK and the development of preventive strategies, particularly in the high-risk population groups identified.

Keywords: *Depression; PHQ-8; Prevalence; Age; Survey studies.*

Introduction

Depressive disorders are prevalent and place a significant burden on patients and health systems (James et al., 2018; World Health Organization, 2017). These disorders are one of the foremost causes of disability, are associated with reductions in quality of life for patients and their families, and generate a substantial expenditure of resources for health systems (James et al., 2018; Kyu et al., 2018; Moussavi et al., 2007). Variations by country and over time in the prevalence of depression have been systematically reported (Auerbach et al., 2016; Bretschneider et al., 2018; Bromet et al., 2011; James et al., 2018; World Health Organisation (WHO), 2011). A periodic evaluation for each country could be highly valuable for monitoring the prevalence of depression, planning health resources and to improve preventive measures through identifying higher risk groups.

In the United Kingdom (UK), the Adult Psychiatric Morbidity Survey (APMS) has provided information on Mental Health and Wellbeing in the population aged 16 and over since 1993 (NHS Digital, 2014). Whilst the emphasis of APMS is on common mental disorders, including both depression and anxiety, it also reports the prevalence of depressive episode assessed using the Clinical Interview Schedule-Revised (CIS-R) (Lewis et al., 1992). This prevalence was estimated by the APMS in 2014 to be between 2% and 6%. However, since 2007 the APMS collects information only for England and not for Scotland, Wales and Northern Ireland. In addition to the APMS, other studies within the UK have tried to determine the prevalence of depression such as the Outcome of Depression International Network study (ODIN) or the South East London Community Health Study (SELCoH) (Ayuso-Mateos et al., 2001; Hatch et al., 2012). These studies, based in selected samples from Liverpool in the case of the ODIN study (Ayuso-Mateos et al., 2001), and south east London in the case of the SELCoH study (Hatch et al., 2012), have reported higher prevalence estimates for depression, varying between 5% and 15% depending on the specific study. Besides the differences in the population

considered, variations in the figures reported could be caused by different factors, such as differences in the study period and in the measure of depression severity (Chang et al., 2008). Hence, to obtain a clear representation of the prevalence and severity of depressive symptoms in the UK, it would be appropriate to make an assessment using a population representative sample of the whole country.

Both sex and age have been systematically related to the prevalence of depression (Arias-de la Torre et al., 2018; Kessler et al., 2010; Patel et al., 2018a). While a higher prevalence of depressive symptoms has consistently been found in women compared to men, the relationship of the prevalence with age is less clear. The most recent APMS suggested a peak of prevalence among the middle-aged population, independent of their sex, and a possible increased prevalence of depressive symptoms in young women (NHS Digital, 2014). It should also be highlighted that the relationship between age and the prevalence of depressive symptoms might vary depending on depression severity (Salk et al., 2017). While the younger population might have higher rates of mild depression, the prevalence of severe depression could be higher among the older population (Patel et al., 2018b).

Taking this into consideration, the aims of the current study were: a) to determine the prevalence of depressive symptoms and of probable depressive disorder in the UK, and b) to examine its association with age and sex.

Methods

A cross-sectional study using data from the UK edition of the second wave of the European Health Interview Survey (EHIS) was carried out. EHIS is a nationwide representative survey conducted in all EU member states, Iceland, Norway and Turkey, which began in 2006 (Eurostat, 2018). A survey was conducted for the second wave between 2013 and 2015 including health related and socioeconomic variables (Eurostat, 2015). The EHIS sample for

the UK was selected using a simple random sampling method based on the household as the sampling unit. This sampling method, in essence, consists of random selection from the target population of the number of households required to reach a previously determined effective sample size, after assigning weights to the selected households according to their characteristics. Approximately 25% of the sample was interviewed face-to-face and 75% by telephone, with a response rate about 60%. The non-response rate was compensated in EHIS using an approach based on sample sizes and weighting. The minimum effective sample size is the size required if the survey was based on simple random sampling. The actual sample size is the number of sample units interviewed. The actual sample size should be larger to the extent that the design effects exceed 1.0 and to compensate for all kinds of non-response (Eurostat, 2018). In the UK, the ratio between the actual effective sample size and the estimated minimum effective sample size was 1.08 and thus it could be assumed that the effects of the non-response rate were compensated. In addition, EHIS sampling weights were designed to compensate unequal probabilities of selection and non-response adjustments (Eurostat, 2018). For this study, we included 17,706 non-institutionalized individuals that completed the 8-item Patient Health Questionnaire (PHQ-8), a valid and reliable tool used to assess depressive symptoms based on DSM-IV criteria(Wu et al., 2019). Individuals with missing values in any of the independent variables were excluded (n=554; 3.1%).

Study measures

The presence of depressive symptoms and of probable depressive disorder assessed with the PHQ-8 were the main outcomes of the study. PHQ-8 questionnaire is composed of 8 Likert type items with responses ranging from 0 (Not at all) to 3 (Nearly every day). The final score is computed by adding the score for each of the items ranging from 0 to 24. In accordance with the developmental study of the PHQ-8 (Kroenke et al., 2009), to assess depressive symptoms, a categorical variable with the following levels was considered: mild (PHQ-8: 5-9), moderate

(PHQ-8: 10-14) and severe depressive symptoms (PHQ-8≥15). Additionally, to assess probable depressive disorder, a score equal to or higher than 10 (PHQ-8≥10) was considered as positive. According to previous validation studies (Levis et al., 2019; Wu et al., 2019), this cut-off value has a sensitivity >75% and a specificity >85% to detect depressive disorders including major depressive disorder and dysthymia.

The main explanatory factor of this study was age (categorical: 16 to 29, 30 to 44, 45 to 59, 60 to 74 and 75 or more years old). Furthermore, based on evidence from previous research (Arias-de la Torre et al., 2018; De Wit et al., 2009; Maske et al., 2016; Onyike et al., 2003; Rai et al., 2013), sex and the following confounders were considered as covariates for the adjustment of models: interview method, birthplace, degree of urbanization of the individuals' residence area, Body Mass Index (BMI) derived from self-reported height and weight of participants (categorized), and social support evaluated with the Oslo Social Support (OSS) scale and considered as a categorical variable (Kocalevent et al., 2018).

Statistical analysis

A descriptive analysis of the characteristics of the study sample was carried out. The prevalence of depressive symptoms, of probable depressive disorder and their 95% Confidence Intervals (95%CI) according to age and sex were calculated. To assess the relationship of the prevalence with age, bivariable and multivariable multinomial (polytomous) logistic regression models for depressive symptoms and binary logistic regression models for probable depressive disorder (PHQ-8≥10) were performed. From these models, crude and adjusted Relative Odds Ratios (ROR and aROR respectively) and crude and adjusted Odds Ratios (OR and aOR respectively) together with their 95%CI were obtained (Szklo and Nieto, 2014). To assess the statistical significance of age within the models, Wald tests were used. Multivariable regression models were adjusted by all the covariates selected. The absence of multicollinearity and of interaction

between all the covariates and age were tested. To ensure representativeness and to obtain variance estimates that account for the sampling design, sampling weights using Taylor series linearization were applied for the analyses(West and Mccabe, 2012). The level of significance was set at 0.01. All analyses were performed using the statistical software Stata v.16 ("Stata Statistical Software: Release 16," 2019).

Results

Analyses were carried out in a sample of 17,152 individuals, of whom. 53.8% were women, 88.1% were born in the UK (88.1% of men and 88.2% of women), 54.4% resided in densely populated areas (53.4% of men and 55.2% of women), 45.1% had a BMI between 18.5 and 24.9 (40.9% of men and 48.7% of women) and had moderate-strong social support according to the OSS score (Table1).

The prevalence of both depressive symptoms and of a probable depressive disorder was higher among women than among men. Table 2 shows the distribution of the prevalence of depressive symptoms and probable depressive disorder by age and sex. The prevalence of depressive symptoms ranged from 11.3% (95%CI 10.6-11.9) for mild depressive symptoms, 4.2% (95%CI: 3.8-4.6) for moderate depressive symptoms and 3.3% (95%CI: 3.0-3.7) for severe depressive symptoms (Supplementary file 1). The prevalence of a probable depressive disorder was 7.5% (95%CI: 7.0-8.0). A higher prevalence of probable depressive disorder was observed for those aged 45 to 59 for both sex (Figure 1). Among men, lower prevalence was found in the younger population (16 to 29 years old) both in all levels of depressive symptoms and in probable depressive disorder. Among women, a higher prevalence was found in younger (16 to 29), middle-aged (45 to 59) and older (75 or more) population groups both in all levels of depressive symptoms except for mild, and in probable depressive disorder.

Significant differences related to age were only found in severe depressive symptoms (Table 3). A higher prevalence of severe symptoms was found among those between 45 to 59 years old compared with those aged 16 to 29 years (aROR: 2.55 95%CI: 1.60-4.06). For men, statistically significant differences in the prevalence of mild and severe depressive symptoms related to age were found. The prevalence of mild depressive symptoms (aROR: 1.76, 95%CI: 1.15-2.71) and severe depressive symptoms (aROR: 5.38, 95%CI: 2.51-11.53) was higher in middle-age men (45-59 years) than in younger men (16-29 years). Among women, significantly higher prevalence of severe symptoms (ROR: 1.78, 95%CI: 1.04-3.06) was found at the bivariable level in the middle-aged (45-59 years) group compared with younger (16-29 years) women. In multivariable analysis, the prevalence of severe depressive symptoms was higher in middle-aged women compared to younger women (aROR: 1.75, 95%CI: 0.99-3.10), but this difference was not statistically significant.

The prevalence of probable depressive disorder (PHQ-8≥10) was also related with age (Table 4). The group aged between 45 and 59 years had a significantly higher prevalence than the younger population in the total sample (aOR: 1.82, 95%CI: 1.32-2.50) and in men (aOR: 2.84, 95%CI: 1.57-5.14). Among women, while statistically significant differences were found for the group aged between 45 and 59 at bivariable level (OR: 1.48, 95%CI: 1.03-2.12), no significant differences at multivariable level were found.

Discussion

Based on a representative sample, our study showed that the prevalence of depressive symptoms in the UK ranged from 11.3% with mild symptoms to 3.3% with severe depressive symptoms. Furthermore, the prevalence of probable depressive disorder in the UK was 7.5% (6.2% and 8.6% for men and women respectively). All these estimates varied largely according

to age with a peak of prevalence, particularly of severe depressive symptoms, in the population aged between 45 to 59 years old.

The prevalence estimates of probable depressive disorder reported in the present study are slightly higher than those reported by the APMS in 2014 using a different measure (CIS-R) (NHS Digital, 2014), but are similar to those observed in the same year in other high-income countries using the PHQ-8 such as Germany (around 7.4%) and Spain (approximately 6.5%) (Arias-de la Torre et al., 2018; Bretschneider et al., 2018). Regarding the higher prevalence we found compared to the APMS, it is important to note that the measures used to ascertain depression (PHQ-8 in the former and CIS-R in the latter) are different. It should be mentioned the possible differences related to the timeframe of the tools used for the evaluation of depression (two weeks for the PHQ-8 used in EHIS and one week for the CIS-R used in the APMS). The use of a screening tool to determine probable depressive disorder, as is the PHQ-8, could lead to classify as cases some individuals that, while at risk of having a depressive disorder, might not be classified as such using a structured interview as CIS-R. In addition, the study populations also varied between EHIS and the APMS: EHIS examined a representative sample from the whole UK, whereas the APMS focused on England only. Despite these differences, variation in the prevalence patterns by age were similar in both surveys, with a clear peak between age 45 and 59 for both sex (NHS Digital, 2014). Accordingly, our results corroborate that individuals between 45 and 59 years are the age group with the highest risk of depression in the UK.

It should be noted that a higher crude prevalence was found in women than men in all age groups and a significantly higher prevalence was found in most of the cases only for the group between 45 to 59 years old. Among men aged 45 to 59 years, the prevalence of probable depressive disorder was almost triple that found in the youngest group, and this increased to more than 5.3 times higher for severe symptoms. In women, the prevalence of severe

depressive symptoms was more than 1.7 times higher than in younger women. It should be highlighted that while among men the relationship of age with the prevalence of depressive symptoms becomes more relevant as severity increases, among women the strength of these relationships is lower. These results suggest that the role of age as a determinant of depression might vary according to both sex and the severity level considered. Moreover, these findings might be explained by a number of reasons, such as period factors (e.g. the possible higher impact on group aged 45 to 59 of the previous economic recession period, particularly in those belonging to the most disadvantaged groups) and other potential mediators in the relationship of age and depression (e.g. inflammation increasing with age or family and social roles) (Arias-de la Torre et al., 2019b, 2019a; Dijkstra-Kersten et al., 2015; Dregan et al., 2020; Hong et al., 2011; Niedzwiedz et al., 2017; Perry et al., 2020). Further longitudinal research to elucidate the causes of the increased rates of depression in this age group in the UK could be valuable to better understand them. Furthermore, the results suggest that targeted screening and preventive strategies in this high-risk population group (middle-aged adults) may help reduce the prevalence of depression in the UK population, particularly in the case of severe depression.

Evidence from other countries (Arias-de la Torre et al., 2018; Luppa et al., 2012; Maske et al., 2016), suggests that the prevalence of depression tends to increase as the age increases. Such variability between countries in the age patterns, might be explained by methodological and health-related factors, such as differences in the populations analized and reporting bias between countries, differences in the access to health care resources and treatments in older population, and differences in welfare regimes and social protection policies. Due to the high differences between countries in these factors, the prevalence in the middle-age group might be higher in the UK than in southern or central European countries (Arias-de la Torre et al., 2019b; Bambra, 2011; Bambra and Eikemo, 2008; Reibling, 2010). New research using homogeneous samples from countries with different healthcare systems and social protection

policies, could be valuable to understand differences between countries in the age patterns of depression.

Another finding was the high prevalence of mild depressive symptoms found in those aged 75 years or more (9.3% for men and 12.9% for women) and in younger women (14.4%). The mild depressive symptoms category is under the cut-off value (10+) consistently proposed to determine the presence of depression using the PHQ-8 and, therefore, could be indicative of subclinical depression or depressive mood (Levis et al., 2019; Moriarty et al., 2015; Salk et al., 2017). In older ages, the presence of mild depressive symptoms are strongly associated with an increased risk of mortality, decline of overall health status and low quality of life (Cai et al., 2020; Holwerda et al., 2016; Sivertsen et al., 2015). In younger women, while in many cases mild depressive symptoms could have a remission in the late 20s (Patton et al., 2014), some of them could develop more severe symptoms and a depressive disorder over adulthood. These results suggest that the mild symptomatic group in early adulthood might be a fruitful target for early intervention or targeted preventive strategies.

Some limitations of the study should be discussed. First, the use of a screening tool to determine the presence of probable depressive disorder and the severity of depressive symptoms. However, the PHQ-8 shows suitable psychometric properties for its use as a screening tool when compared to clinical interviews, showing a very high (but not perfect) sensitivity and specificity to detect major depressive disorders at the general population level (Levis et al., 2019; Moriarty et al., 2015; Wu et al., 2019). Another limitation is related to potential bias from how the information on depressive symptoms was gathered (approximately 25% of the sample was interviewed face-to-face and 75% by telephone). However, previous evidence suggests that the information gathering methods might not influence the results when assessing psychiatric disorders (Fenig et al., 1993; Rohde et al., 1997), and particularly when using the PHQ (Pinto-Meza et al., 2005). Additionally, despite the differences in the prevalence in the

sample used in our study (Supplementary file 2) and their potential influence in the relationships shown, as the interview method was adjusted for in multivariable, this potential source of bias could be considered, at least, partially controlled. Future research considering the potential effect of different administration methods could be valuable to obtain new evidence related to this aspect and improve the accuracy of mental health interview surveys. It should be also mentioned that people with mental disorders could be less likely to participate in cross-sectional population surveys and therefore our results may be under-estimates of true population prevalence (Arias-de la Torre et al., 2020; Knudsen et al., 2010). Despite this limitation, as our aim was to assess differences in prevalence according to age, the relationships and patterns found might be considered relevant although under-estimation is possible. It should be also noted the lack of inclusion of socioeconomic status and other sociodemographic variables (e.g. educational level and marital status) in multivariable models. These variables could interact with age having a mediational or indirect effect in the relationship between age and depression. Therefore, including these interactions within the multivariable models, could lead to misinterpretations of the differences in prevalence by age. Finally, we should point out that EHIS data has no information on other relevant variables, such as ethnicity or family history of depression. However, EHIS captures a wide range of variables consistently related to the prevalence of depressive symptoms (e.g. age, sex, demographic factors, BMI, and social support) (Eurostat, 2018). Therefore, the results of the current study could be considered as relevant in terms of their capability to be extrapolated to the UK population.

In conclusion, our study shows the prevalence of depressive symptoms (from 11.3% with mild symptoms to 3.3% with severe symptoms) and of probable depressive disorder (7.5%) in the UK. Furthermore, a clear peak in the prevalence of depression, and particularly of severe depressive symptoms, was identified during middle adulthood (from 45 to 59 years). Given the representativeness of the sample (including England, Scotland, Wales, and Northern Ireland)

these results could serve as a reference for the monitoring of depression in the UK, the planning of health resources, and the development of preventive and screening strategies targeting the higher risk population groups identified.

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Table 1. Distribution of the study covariates. European Health Interview Survey 2014/2015.

	Total (n=17,652)		Men (n=7,515; 46.3% 95%CI: 45.3-47.3)		Women (n=9,637; 53.8% 95%CI: 52.8-54.7)	
	n	**% (95%CI)**	**n**	**% (95%CI)**	**n**	**% (95%CI)**
Age						
16 to 29	1,205	18.2 (17.2-19.2)	489	17.8 (16.3-19.4)	716	18.5 (17.2-19.9)
30 to 44	3,140	25.3 (24.5-26.3)	1,282	25.7 (24.4-27.1)	1,858	25.1 (24.0-26.3)
45 to 59	4,560	26.3 (25.5-27.1)	1,956	26.8 (25.6-28.0)	2,604	25.9 (24.8-26.9)
60 to 74	5,774	20.2 (19.6-20.8)	2,663	20.7 (19.8-21.7)	3,111	19.7 (18.9-20.5)
75 or more	2,473	10.0-9.5-10.5)	1,225	9.0 (8.4-9.6)	1,348	10.9 (10.2-11.5)
Interview method						
Face-to-face	4,322	26.3 (25.4-27.2)	1,873	25.7 (24.4-27.0)	2,449	26.8 (25.7-28.0)
Telephone	12,830	73.7 (72.8-74.6)	5,642	74.3 (73.0-75.7)	7,118	73.2 (72.0-74.3)
Birthplace						
Native-born	15,674	88.1 (87.4-88.8)	6,866	88.1 (87.1-89.0)	8,808	88.2 (87.2-89.1)
EU Member State	529	4.2 (3.8-4.7)	221	4.3 (3.6-5.0)	308	4.1 (3.6-4.7)
Non-EU country	949	7.7 (7.1-8.3)	428	7.6 (6.8-8.6)	521	7.7 (7.0-8.6)
Residence area						
Densely-populated	10,061	54.4 (53.4-55.4)	4,382	53.4 (51.9-55.0)	5,677	55.2 (53.9-56.5)
Intermediate-populated	4,651	29.1 (28.2-30.0)	2,048	29.9 (28.5-31.3)	2,603	28.4 (27.3-29.6)
Thinly-populated	2,440	16.5 (15.8-17.3)	1,083	16.7 (15.5-17.9)	1,357	16.3 (15.4-17.4)
Body Mass Index						
Less than 18.5	296	2.2 (1.9-2.6)	81	1.5 (1.1-2.0)	215	2.8 (2.3-3.3)
18.5 to less than 25	7,184	45.1 (44.0-46.1)	2,822	40.9 (39.4-42.4)	4,362	48.7 (47.4-50.0)
25 to less than 30	6,197	33.7 (32.8-34.7)	3,120	38.7 (37.2-40.1)	3,077	29.5 (28.4-30.7)
30 or more	3,475	19.0 (18.3-19.8)	1,492	19.0 (17.9-20.1)	1,983	19.1 (18.1-20.1)
Social Support						
Strong	8,989	50.9 (49.9-51.9)	3,698	47.6 (46.1-49.1)	5,291	53.7 (52.4-55.0)
Moderate	6,612	40.0 (39.0-40.9)	3,046	42.4 (40.9-43.9)	3,566	37.9 (36.7-39.2)
Poor	1,551	9.2 (8.6-9.8)	771	10.1 (9.0-11.1)	780	8.4 (7.7-9.2)

n: absolute frequency of individuals (without weighting); %: Percentage for total sample and prevalence for Depression and severity levels. 95%CI: 95% Confidence Interval. All percentages and standard errors were calculated taking into account the weights derived from the complex sample design using the Taylor series linearization method.

Table 2. Prevalence of depressive symptoms and of probable depressive disorder. European Health Interview Survey 2014/2015. Bivariable analysis.

	Depressive symptoms			Probable depressive disorder
	Mild (PHQ-8: 5-9) % (95%CI)	Moderate (PHQ-8: 10-14) % (95%CI)	Severe (PHQ-8>=15) % (95%CI)	(PHQ-8>=10) % (95%CI)
Total (n=17,152)	11.3 (10.6-11.9)	4.2 (3.8-4.6)	3.3 (3.0-3.7)	7.5 (7.0-8.0)
Age				
16 to 29 (n=1,205)	11.3 (9.4-13.6)	3.7 (2.6-5.2)	2.4 (1.6-3.6)	6.2 (4.7-7.9)
30 to 44 (n=3,140)	10.8 (9.6-12.1)	3.7 (3.0-4.6)	2.9 (2.3-3.6)	6.6 (5.7-7.7)
45 to 59 (n=4,560)	12.0 (11.0-13.2)	5.1 (4.5-5.9)	5.3 (4.6-6.1)	10.4 (9.5-11.5)
60 to 74 (n=5,774)	10.3 (9.4-11.3)	3.8 (3.3-4.4)	2.5 (2.1-3.0)	6.3 (5.3-7.1)
75 or more (n=2,473)	12.2 (10.8-13.7)	4.2 (3.4-5.2)	2.4 (1.7-3.2)	6.6 (5.5-7.8)
Men (n=7,515)	9.3 (8.5-10.2)	3.5 (3.0-4.1)	2.7 (2.3-3.2)	6.2 (5.6-6.9)
Age				
16 to 29 (n=489)	7.7 (5.4-10.8)	2.6 (1.4-5.0)	1.2 (0.6-2.4)	3.8 (2.3-6.2)
30 to 44 (n=1,282)	8.9 (7.2-10-8)	2.8 (1.9-4.1)	2.9 (2.1-4.1)	5.7 (4.4-7.4)
45 to 59 (n=1,956)	11.5 (9.9-13.3)	4.8 (3.8-6.0)	4.5 (3.6-5.7)	9.3 (7.9-10.9)
60 to 74 (n=2,663)	8.1 (7.0-9.4)	3.7 (2.9-4.6)	2.0 (1.5-2.7)	5.7 (4.7-6.8)
75 or more (n=1,125)	10.2 (8.3-12.05)	2.9 (2.0-4.2)	1.4 (0.8-2.7)	4.3 (3.1-5.9)
Women (n=9,637)	12.9 (12.0-13.8)	4.8 (4.2-5.3)	3.8 (3.3-4.4)	8.6 (7.9-9.3)
Age				
16 to 29 (n=716)	14.4 (11.6-17.8)	4.6 (3.1-6.9)	3.4 (2.1-5.5)	8.1 (5.9-10.8)
30 to 44 (n=1,858)	12.5 (10.8-14.3)	4.5 (3.5-5.8)	2.9 (2.1-3.9)	7.4 (6.1-8.9)
45 to 59 (n=2,604)	12.5 (11.1-14.0)	5.5 (4.6-6.6)	6.0 (5.0-7.1)	11.5 (10.1-12.9)
60 to 74 (n=3,111)	12.3 (11.0-13.8)	4.0 (3.3-4.8)	3.0 (2.4-3.7)	6.9 (6.0-8.0)
75 or more (n=1,348)	13.5 (11.6-15.8)	5.1 (3.9-6.7)	3.0 (2.1-4.3)	8.6 (7.9-9.3)

n: absolute frequency of individuals (without weighting); %: Prevalence of depressive symptoms and probable depressive disorder. 95%CI: 95% Confidence Interval.
All percentages and standard errors were calculated taking into account the weights derived from the complex sample design using the Taylor series linearization method.

Figure 1. Prevalence (%) of probable depressive disorder (PHQ-8≥10) by age and sex.

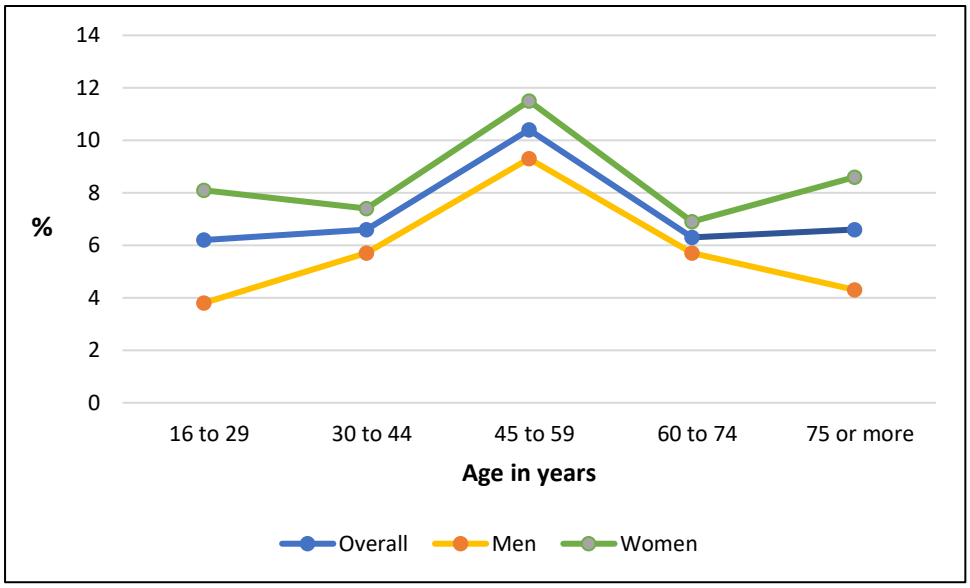

Table 3. Relationship of depressive symptoms with age and sex. European Health Interview Survey 2014/2015. Bivariable and mutivariable analysis.

	Mild symptoms (PHQ-8: 5-9; 11.3% 95%CI: 10.6-11.9)		Moderate symptoms (PHQ-8: 10-14; 4.2% 95%CI: 3.8-4.6)		Severe symptoms (PHQ-8>=15; 3.3% 95%CI: 3.0-3.7)			
	ROR (95%CI)	**aROR (95%CI)**	**ROR (95%CI)**	**aROR (95%CI)**	**ROR (95%CI)**	**aROR (95%CI)**	***p (RPR)***	***p (aROR)***
Total (n=17,152)								
Age							<0.001	<0.001
16 to 29	1.00	1.00	1.00	1.00	1.00	1.00		
30 to 44	0.95 (0.74-1.22)	0.94 (0.73-1.21)	1.00 (0.66-1.52)	1.02 (0.67-1.59)	1.19 (0.73-1.92)	1.35 (0.82-2.22)		
45 to 59	1.12 (0.89-1.43)	1.06 (0.83-1.35)	1.47 (0.99-2.16)	1.41 (0.93-2.14)	2.32 (1.48-3.63)	2.55 (1.60-4.06)		
60 to 74	0.90 (0.71-1.12)	0.87 (0.68-1.11)	1.01 (0.69-1.50)	1.02 (0.67-1.56)	1.02 (0.65-1.62)	1.21 (0.75-1.95)		
75 or more	1.09-0.85-1.40)	1.01 (0.78-1.31)	1.14 (0.75-1.75)	1.10 (0.71-1.68)	0.99 (0.58-1.68)	0.91 (0.53-1.58)		
Men (n=7,515)								
Age							<0.001	<0.001
16 to 29	1.00	1.00	1.00	1.00	1.00	1.00		
30 to 44	1.19 (0.77-1.86)	1.28 (0.82-2.00)	1.12 (0.51-2.43)	1.18 (0.52-2.67)	2.46 (1.14-5.35)	3.07 (1.37-6.83)		
45 to 59	1.68 (1.11-2.53)	1.76 (1.15-2.71)	2.03 (0.99-4.14)	2.07 (0.94-4.55)	4.13 (1.99-8.59)	5.38 (2.51-11.53)		
60 to 74	1.08 (0.72-1.63)	1.16 (0.76-1.79)	1.43 (0.71-2.92)	1.50 (0.68-3.29)	1.69 (0.80-3.59)	2.31 (1.06-5.01)		
75 or more	1.38 (0.89-2.15)	1.32 (0.83-2.10)	1.12 (0.52-2.46)	1.11 (0.51-2.43)	1.20 (0.47-3.09)	1.27 (0.48-3.38)		
Women (n=9, 637)								
Age							<0.001	<0.001
16 to 29	1.00	1.00	1.00	1.00	1.00	1.00		
30 to 44	0.84 (0.62-1.13)	0.79 (0.59-1.08)	0.94 (0.5-1.54)	0.95 (0.57-1.57)	0.81 (0.44-1.47)	0.86 (0.46-1.60)		
45 to 59	0.89 (0.66-1.18)	0.77 (0.57-1.04)	1.21 (0.76-1.91)	1.10 (0.67-1.79)	1.78 (1.04-3.06)	1.75 (0.99-3.10)		
60 to 74	0.82 (0.61-1.09)	0.73 (0.54-1.00)	0.82 (0.51-1.31)	0.80 (0.48-1.31)	0.83 (0.48-1.46)	0.88 (0.49-1.58)		
75 or more	0.93 (0.69-1.27)	0.89 (0.65-1.22)	1.10 (0.66-1.82)	1.07 (0.65-1.76)	0.88 (0.47-1.65)	0.76 (0.39-1.45)		

n: absolute frequency of individuals (without weighting); %: prevalence of severity of depressive symptoms; 95%CI: 95% Confidence Interval; ROR: Relative Odds Ratio; aROR: Relative Odds Ratio adjusted for interview method, birthplace, degree of urbanization of the individuals' residence area, Body Mass Index and social support (OSS). In the total sample aROR multivariable models were also adjusted by sex; *p (RPR): and p (aROR): p value* for age from Wald tests for bivariable and multivariable models respectively.

All analyses were performed taking into account the weights derived from the complex sample design using the Taylor series linearization method.

Table 4. Relationship of probable depressive disorder with age and sex. European Health Interview Survey 2014/2015. Bivariable and multivariable analysis.

	Pobable depressive disorder (PHQ-8≥10: 7.5%; 95% CI: 7.0-8.0)			
	OR (95%CI)	***p***	**aOR (95%CI)**	***p***
Total sample (n=17,152)				
Age		<0.001		<0.001
16 to 29	1.00		1.00	
30 to 44	1.08 (0.78-1.49)		1.17 (0.84-1.63)	
45 to 59	1.78 (1.32-2.49)		1.82 (1.32-2.50)	
60 to 74	1.03 (0.76-1.39)		1.12 (0.81-1.55)	
75 or more	1.07 (0.77-1.50)		1.02 (0.73-1.44)	
Men (n=7, 515)				
Age		<0.001		<0.001
16 to 29	1.00		1.00	
30 to 44	1.52 (0.55-2.71)		1.70 (0.93-3.12)	
45 to 59	2.56 (1.49-4.40)		2.84 (1.57-5.14)	
60 to 74	1.51 (0.87-2.59)		1.74 (0.96-3.16)	
75 or more	1.12 (0.61-2.07)		1.12 (0.60-2.12)	
Women (n=9, 637)				
Age		<0.001		<0.001
16 to 29	1.00		1.00	
30 to 44	0.91 (0.62-1.34)		0.95 (0.63-1.42)	
45 to 59	1.48 (1.03-2.12)		1.43 (0.97-2.09)	
60 to 74	0.55 (0.59-1.22)		0.88 (0.59-1.30)	
75 or more	1.02 (0.68-1.51)		0.95 (0.63-1.42)	

n: absolute frequency of individuals (without weighting); %: prevalence of probable depressive disorder; 95%CI: 95% Confidence Interval; *p: p value* for age from Wald tests for models; OR: Odds Ratio; aOR: Odds Ratio adjusted for interview method, birthplace, degree of urbanization of the individuals' residence area, Body Mass Index and social support (OSS). In the total sample aOR multivariable models were also adjusted by sex.

All analyses were performed taking into account the weights derived from the complex sample design using the Taylor series linearization method.