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Lifetime risk and age-of-onset of mental disorders in the Belgian general population

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Abstract *Aims* To estimate lifetime risk and age of onset of mental disorders in the adult general population of Belgium. *Method and materials* For the World Mental Health Surveys of the World Health Organization, a representative random sample of non-institutionalized inhabitants from Belgium aged 18 or older ($n = 2419$) were interviewed between April 2001 and June 2002. The interview took place by means of the Composite International Diagnostic Interview, version 3.0. Lifetime prevalence, projected lifetime risk, and age-of-onset of mental disorders were assessed. *Results* Lifetime risk for any mental disorder was 37.1%: 22.8% for mood disorders, 15.7% for anxiety disorders, and 10.8% for alcohol disorders. Median age of onset was 38 years for mood, 14 years for anxiety, and 23 years for alcohol disorders. Prevalence estimates of mood and alcohol disorders were significantly higher in the cohorts between 18 and 34 years. *Conclusion* This is the first study that assessed projected lifetime risk and age of onset of mental disorders in the Belgian general population. About one-third of the Belgian non-institutionalized adult population will meet the criteria for a DSM-IV mental disorder at some time during their life. Median age of onset varies from disorder to disorder and younger cohorts had higher likelihood for developing mental disorders.

Key words mental disorders – epidemiology – lifetime risk – lifetime prevalence – age of onset – Belgium

Introduction

Recent population-based epidemiological studies carried out in the United States, Europe, and Australia have shown that mental disorders are frequent and associated with a wide range of disabilities and functional impairments [2, 15, 26]. Depending on case definitions and instruments used, between one in four and one in two meets criteria for any mental disorder throughout their life.

These data are to some extent limited in their completeness because of three reasons. First, it is unknown how many persons will ever meet criteria for a mental disorder. We assume that lifetime prevalence rates of mental disorders in cross-sectional study designs are to some extent biased since respondents who participated in population-based studies differed in age. Consequently, they differ also in number of years of expected future risk. After all, against the background that DSM-IV disorders show a wide variation in ages of onset [25] we suppose that a certain proportion of respondents who have participated in a population-based study did not yet develop a mental disorder. We may therefore assume that lifetime rates of mental disorders are actually a considerable underestimation of the real lifetime risk of having a mental disorder. Second, there is also some inconsistency with regard to the existence of inter-cohort differences in the lifetime occurrence of mental disorders. There is some evidence that there is an increase in the occurrence of mood disorders in cohorts born after World War II [22, 28], but this has not been systematically investigated for other than mood disorders. Several possible explanations have been

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offered in previous research: (a) memory effects: older adults are more likely to forget previous depressive episodes compared to younger ones [18], (b) depression is associated with a higher mortality [42], (c) older individuals are less likely to recognize depression as a mental disorder, compared to younger adults [21]. Third, the use of different types of diagnostic interviews affect the estimation of lifetime prevalence rates. The use of fully structured interviews administered by lay interviewers for example yield higher prevalence rates compared to semi-structured interviews administered by clinically trained interviewers [33].

Providing estimates of lifetime risks and cohort effects of mental disorders may assist both clinicians and policy makers in their management of the burden of mental disorders in the population. Most epidemiological research has focused on calculating lifetime risk for somatic disorders, such as dementia and Alzheimer's disease [36], cancer [35], or coronary heart disease [31]. To date, there is only one study that calculated the projected lifetime risk of mental disorders from data gathered in the United States [25], reporting a considerable higher lifetime risk of any mental disorder compared to the actual lifetime prevalence estimates.

To date, existing publications on mental health issues in Belgium were focused on estimating lifetime and 12-month prevalence of mental disorders in the Belgian population [15, 11]. Found estimations of lifetime prevalence rates vary from 13% to 34% for mood disorders, from 17% to 29% for anxiety disorders, from 9% to 30% for alcohol disorders [6, 7, 10]. The current report is the first study that tries to depict the lifetime risk of mental illness in the general population of Belgium. Hence, the purpose of the current article is (1) to report upon lifetime prevalence and projected lifetime risk of mental disorders, (2) to provide age-of-onset distributions of mental disorders in the Belgian population, and (3) to calculate cohort effects in the lifetime risks of mental disorders.

Material and methods

■ Sample

The data provided in this study stem from the European Study on the Epidemiology of Mental Disorders (ESEMED), a part of the World Mental Health Surveys by the World Health Organization. The study was cross-sectional in nature and individuals were interviewed in person at their homes using computer-assisted interview (CAPI) techniques. The Belgian target population was the non-institutionalised (exclusion of persons staying in hospitals, in prison or other institutions) adult population (aged 18 years or older), representing a total of 7,900,000 inhabitants. In total, 2,419 respondents from Belgium provided data for this study. Interviews were performed between April 2001 and June 2002. A stratified, multistage, clustered area, probability sample design was used. The initial response rate in Belgium was 47.5%. In order to increase this moderate rate, 20% of the initial refusers was re-approached, of

which 25.4% did participate to the study. Weights were applied to these initial refusers to optimize representativity of the study. This conversion resulted in a final response rate of 50.7%. A more in-depth description of the sampling frame and selection has been published elsewhere [3, 4].

Internal subsampling was used to reduce respondent burden by dividing the interview into two parts. Part I included the core diagnostic assessment of mental disorders. Part II included additional information relevant to a wide variety of survey aims, including assessment of chronic physical conditions. Details of the subsampling are described elsewhere [26]. All respondents completed part I. All part I respondents ($N = 2419$) who met criteria for any mental disorder and a probability sample of other respondents were administered part II ($N = 1043$). Part II respondents were weighted by the inverse probability of selection of part II of the interview to adjust for differential sampling. Standardized descriptions of the goals and procedures of the study, data uses and protection, and the rights of respondents were provided to all pre-designated respondents before obtaining verbal informed consent for participation in the survey. Quality control protocols, described in more detail elsewhere [26], were standardized to check on interviewer accuracy and to specify data cleaning and coding procedures. The institutional review board of the organization that coordinated the survey in each country approved the procedures for obtaining informed consent and protecting human subjects. Prevalence estimates were weighted to account for the known probability of selection as well as to restore the distribution of the population within each country.

■ Measures

Data were gathered by means of the 3rd version of the Composite International Diagnostic Interview (CIDI 3.0) of the World Health Surveys (WMH) of the World Health Organization (WHO) [26]. This version of the CIDI was developed and adapted by the WHO Coordinating Committee for their WMH initiative [26]. The CIDI (3.0) is a fully structured diagnostic interview administered by lay interviewers. The CIDI (3.0) was first produced in English and underwent a rigorous process of adaptation in order to obtain conceptually and cross-culturally comparable versions in Dutch and French. This process included forward and backward translations, a review by a panel of experts. The questionnaire consisted of a screening section that was given at the beginning of the questionnaire to each respondent. All participants responding positively to a specific screening question were eligible to complete the corresponding sections of the questionnaire. Lifetime prevalence of mental disorders was determined by whether respondents' symptomatology met the lifetime diagnostic criteria for this disorder. Disorders were assessed using the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [8]. Mental disorders included mood disorders (major depressive episode [MDE], dysthymia), anxiety disorders (generalized anxiety disorder [GAD], social phobia, specific phobia, post-traumatic stress disorder [PTSD], agoraphobia, panic disorder), and alcohol disorders (alcohol abuse, alcohol dependence). CIDI 3.0 organic exclusion rules were imposed in making all diagnoses. Methodological evidence collected in the WHO CIDI 3.0 Field Trials and later clinical calibration studies showed that all the disorders considered herein were associated with acceptable reliability and validity both in the original CIDI [41] and in the original version of the CIDI 3.0 [26]. The recent clinical reappraisal studies carried out in four WMH countries (i.e., United States, Spain, France, and Italy, with total $N = 468$) indicated a good concordance between diagnoses based on the CIDI-3.0 and diagnoses based on blinded clinical re-interviews. Area under receiver operator curves were found in the .73-.93 range for lifetime, and in the .83-.88 range for 12-month anxiety/mood disorders [20].

Retrospective age-of-onset reports were also obtained in the survey. This sequence started with a question designed to emphasize the importance of accurate responses: "*Can you remember your exact age the very first time you had the syndrome?*" Respondents who were not able to answer these questions were subsequently probed for a bound of uncertainty by moving up the age range incrementally (like "*Was it before you first started*

Table 1 Sociodemographic characteristics of the participants of the wmh/ esemed study in Belgium

	Total sample N = 2419	% (SE)
Age (mean)	47.0 (.47)	
18–34	573	28.8 (.01)
35–49	775	28.6 (.01)
50–64	570	21.3 (.01)
65+	501	21.3 (.01)
Gender		
Male	1,190	48.4 (.01)
Female	1,229	51.6 (.01)
Marital status		
Single	528	26.6 (.02)
Divorced	250	8.5 (.01)
Widowed	208	7.6 (.01)
Married	1,359	57.3 (.02)
Living arrangement		
Not living with someone	672	21.0 (.02)
Living with someone	1,747	79.0 (.02)
Geographical area		
Rural	346	13.2 (.05)
Mid-size urban	1,814	77.3 (.06)
Large urban	259	9.6 (.04)
Employment		
Paid employment	1,298	52.8 (.01)
Unemployed	95	3.5 (.00)
Retired	529	21.2 (.01)
Homemaker	119	4.5 (.01)
Student	9	0.5 (.00)
Other	145	5.7 (.01)
Never worked more than 6 months	224	11.8 (.01)
Educational level ^a		
0–4 years	7	0.3 (.00)
5–8 years	244	15.3 (.01)
9–12 years	631	37.2 (.02)
+13 years	765	47.2 (.02)

^a This variable only includes the educational level of the Flemish sample (n = 1661)

school?” or “Was it before you became a teenager?”). In this report, dysthymia was not included since there were too many missing values in the age of onset for this disorder.

Statistical analyses

All analyses were performed using version 8 of the SAS System for Windows [34] and SUDAAN, a statistical package used to analyse data from complex sample surveys (i.e., multi-stage, stratified, unequally weighted, or clustered). Standard errors of ratio estimates, means, regression coefficients, and other statistics were estimated taking into account the sample design, by using the Taylor series linearization method implemented in SUDAAN, version 8.01 [37].

Analyses were adjusted for age, but adjusting for education levels was not possible because there was a problem in the variable that measured educational attainment. Due to differences in the questionnaire formulation in the French and Dutch version, it is impossible for the French speaking individuals to differentiate in the number of years of education [3].

Projected lifetime risk as of age 75 years was estimated using the actuarial method [19] implemented in SAS software. The actuarial method differs from the more familiar Kaplan-Meier method [24] in using a more accurate way of estimating onset within a given year. This method assumes constant conditional risk of onset during a given year of life across the cohort. Estimated projections of cumulative lifetime probability of disorders

are divided by the cumulative lifetime probability at age 75 to determine the age of onset percentiles [17, 30]. The cumulative risks estimates were standardized and analyzed for fixed percentiles (pc 5, 10, 25, 50, 75, 90, 95, 99). We also give interquartile ranges (IQR—the number of years between the 25th and 75th percentile of the age of onset distributions) as a measure of the spread of the age of onset of mental disorders. Providing IQRs enables us to identify a critical age-range in which a specific disorder may develop.

Results

Sample description

As shown in Table 1, the mean age of the study sample was 49 years, with the majority of respondents (28.8%) between 18 and 34 years old. In total, 52% of the respondents were female. More than a half (57.3%) of the sample was married, and about one in four (26.6%) was single. The majority of respondents were living in a mid-size urban environment, and most respondents were in paid employment at the time they participated in the study. A more elaborate description of the sample is described elsewhere [3, 11].

Lifetime prevalence of mental disorders

Estimates of lifetime prevalence of mental disorders are presented in Table 2. About 29.1% of the respondents reported a lifetime history of any mental disorder: 14.1% reported the occurrence of a mood disorder at some time in their life, 13.1% reported that they ever had an anxiety disorder, and 8.3% met criteria for a lifetime alcohol disorder. In more detail, major depressive episode was the most common lifetime disorder (14.1%), followed by alcohol abuse (7.8%), and specific phobia (6.8%).

Projected lifetime risk of mental disorders at age 75

Projected lifetime risk of mental disorders at age 75 years based on the age-of-onset distributions (Table 2) was 37.1% for any mental disorder: 22.8% for mood disorders, 15.7% for anxiety disorders, and 10.8% for alcohol disorders. If we compare the lifetime prevalence estimates with the projected lifetime risk estimates (column 3 in Table 2), we could see that, in absolute percentages, the most notable increase was found in mood disorders (+8.7%). Overall, projected lifetime prevalence risk for any mental disorder is increased with (29.1–37.1%). However, considering the relative change between the lifetime prevalence estimates and projected lifetime risks for any mental disorder, the prevalence of any mental disorder is expected to increase with 27.5%. The largest increase is expected in MDE (+61.7%), alcohol

Table 2 Lifetime prevalence and projected lifetime risk of mental disorders at age 75 in the WMH/ESEMeD study in Belgium

Mental disorder	N	Lifetime prevalence estimates (% [SE])	Projected lifetime risk at age 75 (% [SE])	Absolute change between lifetime prevalence estimates and projected lifetime risk	Relative change between lifetime prevalence estimates and projected lifetime risk
Any anxiety disorder*	216	13.1 (1.9)	15.7 (2.5)	+2.6	+19.8
Panic disorder	40	1.6 (0.4)	2.2 (0.5)	+0.6	+37.5
Specific phobia	159	6.8 (1.0)	8.0 (1.4)	+1.8	+26.5
Social phobia	46	2.0 (0.4)	2.2 (0.4)	+0.2	+10.0
General anxiety disorder	55	1.9 (0.4)	3.4 (0.9)	+1.5	+78.9
PTSD*	45	2.6 (0.5)	6.7 (3.5)	+4.1	+157.7
Any mood disorder	367	14.1 (1.0)	22.8 (1.7)	+8.7	+61.7
MDE	367	14.1 (1.0)	22.8 (1.7)	+8.7	+61.7
Any alcohol disorder	195	8.3 (0.9)	10.8 (1.5)	+2.5	+30.1
Alcohol abuse	187	7.8 (0.9)	10.5 (1.5)	+2.7	+34.6
Alcohol dependence	40	1.7 (0.5)	2.4 (0.8)	+0.7	+41.1
Any disorder*	519	29.1 (2.3)	37.1 (3.0)	+8.0	+27.5

*Assessed only in the Part II sample

abuse disorders (+34.6%), and specific phobia (+26.5%).

■ Cohort effects in the prevalence of mental disorders

Considering the lifetime prevalence in the different cohorts (Table 3), we can notice an overall cohort effect for mood disorders and alcohol disorders. If we look at projected lifetime risks in the different cohorts (Table 4), there are two important findings that emerge. First, the youngest cohort (i.e., respondents between 18 and 34 years) showed the highest risk for a lifetime mental disorder (OR = 4.7), followed by the cohort of respondents between 35 and 49 (OR = 2.5), the cohort of respondents between 50 and 64 years (OR = 2.0), and, last, those respondents older than 65 (reference category). Second, the highest risk of lifetime mood disorders is found for respondents between 18 and 34, the same trend was found for anxiety and alcohol disorders. Some odds ratios in the cells of the first cohort show a wide confidence interval, which is probably due to the rather small numbers of respondents in the cell.

■ Age-of-onset distributions

Cumulative lifetime risks (Fig. 1) were different for the groups of disorders assessed. Mood disorders were found to have the highest median age of onset (38 years) with an IQR of 23 years. Anxiety disorders generally start earlier in life than mood disorders. These develop very early (with a median age of onset of 14) and develop within a relatively broad age range (IQR = 27 years): 75% of the persons who will ever have an anxiety disorder, have it by the age of 34. We also found considerable intra-disorder differences: the median age of onset of PTSD was 54 and 37 years for GAD; whereas panic disorder (26 years), social phobia (13 years), and specific phobia (9 years) start much earlier in life. Finally, median age of onset for alcohol disorders was 23 years; these group of disorders tend to develop within a relatively narrow age range (IQR = 11 years): 75% of those who will ever have an alcohol disorder, will have the disorders by the age of 31.

When gender is taken into account (see appendix), the following results were found. Mood disorders have a median age of onset of 40 years for males (IQR = 23 years) and 36 years for females

Table 3 Lifetime prevalence of mental disorders by cohort in the WMH/ESEMeD study in Belgium

Mental disorder	Overall	18–34 years		35–49 years		50–64 years		65+ years		chi ²	chi ² p	chi ² df
	N	N	% (SE)	N	% (SE)	N	% (SE)	N	% (SE)			
Any anxiety disorder	216	57	15.8 (3.6)	78	13.0 (1.3)	53	12.2 (2.6)	28	10.5 (3.3)	2.3	0.553	3
Panic disorder	40	15	2.5 (1.0)	14	1.6 (0.5)	11	2.0 (0.7)	0	0.0 (0.0)	36.2	0.000	3
Specific phobia	159	45	8.8 (1.9)	42	4.9 (1.0)	37	6.2 (1.2)	35	7.4 (2.0)	3.4	0.353	3
Social phobia	46	16	2.2 (0.8)	19	3.1 (1.0)	10	1.9 (0.8)	1	0.3 (0.3)	23.3	0.001	3
General anxiety disorder	55	14	1.4 (0.5)	23	2.6 (0.7)	13	2.3 (0.7)	5	1.4 (0.8)	2.9	0.419	3
PTSD	45	4	1.2 (0.8)	21	3.7 (0.7)	13	2.4 (1.2)	7	3.1 (1.7)	8.7	0.057	3
Any mood disorder	367	79	12.8 (1.8)	130	15.4 (1.6)	116	19.9 (2.8)	42	8.4 (1.3)	26.1	0.000	3
MDE	367	79	12.8 (1.8)	130	15.4 (1.6)	116	19.9 (2.8)	42	8.4 (1.3)	26.1	0.000	3
Any alcohol disorder	195	40	9.4 (1.8)	82	10.0 (1.2)	54	9.0 (1.7)	19	3.6 (1.1)	17.1	0.005	3
Alcohol abuse	187	37	8.5 (1.6)	79	9.7 (1.1)	53	8.9 (1.7)	18	3.4 (0.9)	20.9	0.002	3
Alcohol dependence	40	7	1.5 (1.0)	17	2.4 (0.8)	15	2.6 (0.8)	1	0.2 (0.2)	7.6	0.082	3
Any disorder	519	126	34.1 (4.6)	181	29.4 (2.7)	148	31.5 (4.1)	64	19.7 (4.5)	7.8	0.077	3

Table 4 Cohort as a predictor of lifetime risk of mental disorders in the WMH/ESEMeD study in Belgium

Mental disorder	18–34 years OR (CI)	35–49 years OR (CI)	50–64 years OR (CI)	65+ years OR (CI)	chi ²	chi ² p	chi ² df
Any anxiety disorder	2.6* (1.3–5.0)	1.7 (0.8–3.2)	1.3 (0.6–2.6)	1.0	14.2	0.003	3
Panic disorder	2.8 (0.9–8.3)	1.0 (0.3–2.9)	1.0	– ^a	4.0	0.132	2
Specific phobia	1.4 (0.8–2.6)	0.7 (0.4–1.3)	0.9 (0.5–1.6)	1.0	4.5	0.214	3
Social phobia	7.3* (1.6–34.1)	9.3 (0.8–10.4)	5.4 (0.6–48.3)	1.0	9.3	0.026	3
General anxiety disorder	5.2* (1.5–17.6)	4.4* (1.4–14.0)	2.1 (0.7–6.5)	1.0	9.9	0.020	3
PTSD	2.5 (0.3–19.6)	5.1 (1.1–23.6)	1.7 (0.4–8.2)	1.0	8.1	0.044	3
Any mood disorder	11.3* (6.1–20.9)	4.9* (3.2–7.5)	3.6 (2.0–6.4)	1.0	87.3	0.000	3
MDE	11.3* (6.1–20.9)	4.9* (3.2–7.5)	3.6 (2.0–6.4)	1.0	87.3	0.000	3
Any alcohol disorder	5.0* (2.6–9.8)	3.6* (1.7–7.3)	2.6* (1.2–5.4)	1.0	26.7	0.000	3
Alcohol abuse	4.9* (2.6–9.2)	3.7* (1.9–7.1)	2.7* (1.4–5.4)	1.0	27.4	0.000	3
Alcohol dependence	20.6* (1.9–21.8)	13.9* (1.3–14.9)	12.4* (1.4–11.2)	1.0	7.1	0.070	3
Any disorder	4.7* (2.6–8.7)	2.5* (1.3–4.6)	2.0* (1.2–3.3)	1.0	37.2	0.000	3

^a Since there were no persons in the oldest age category who met criteria for a panic disorders, the 50–64 year age group was set as a reference group

Fig. 1 Ages at selected percentiles on the standardized age-of-onset Distributions of DSM-IV Disorders in the WMH/ESEMeD Study in Belgium

(IQR = 23 years). Anxiety disorders have a median age of onset of 19 years for males (IQR = 32 years) and 13 years for females (IQR = 25 years). Alcohol disorders have the same median age of onset (20 years) for males and females (respectively IQR = 11 years and IQR = 17 years).

Discussion

Lifetime prevalence and lifetime risk of mental disorders in the general population of Belgium were 29% and 37%, respectively. This means that, in absolute terms, 37% of the Belgian population will ever have a mental disorder by the age of 75, 8% more than the actual estimate of 29%. The lifetime risks of anxiety and alcohol disorders approximate the lifetime prevalence estimates: lifetime risks for these disorders were only 2.5–2.6% higher than prevalence estimates, which reflects their early ages of onset and/or the fact that these disorders develop within a relatively narrow age range [13, 25, 40]. A somewhat different profile was found for mood disorders. Lifetime risk for mood disorders was considerably higher (8.7%) than the prevalence rate.

Most probably, this is due to the fact that we found both a late age of onset for mood disorders (38 years) and a large interquartile range (23 years) that indicates a broad age range in which these disorders develop. Another notable observation was that, if we consider the most common mental disorders (i.e., MDE, alcohol abuse disorder, and specific phobia), our findings suggest that most increase is to be expected in the occurrence of MDE (i.e., 62%).

Lifetime prevalence rates are lower than rates found in the United States [25]. Except for the American study of Kessler and colleagues, there are no previous reported data on projected lifetime risk of mental disorders by cohort. Comparison with the American data concerning age of onset, mental disorders seem to arise little later in the Belgian population, although obtained interquartile ranges are almost similar.

Concerning lifetime prevalence rates and cohort differences, two striking findings have emerged: (1) mental disorders have very early ages of onset with a strong foothold in youth and (2) the risk of ever having a mental disorder seems to mature out once individuals passed the critical high-risk age [32].

In combining lifetime risks, ages of onset, and IQRs of mental disorders, both clinicians and policymakers may be more able to promote public interest in preventing, screening, and treating mental disorders. In this light, there are some important issues that emerge if we combine our findings. First, our data enable us to put more emphasis on the early age at which most disorders develop. People with mental disorders seem to have these disorders in their prime of life. This raises the question whether there is a need for more screening and treatment interventions for children and adolescents to prevent that undiagnosed and untreated disorders at an early age may have a progressive course in later life. This seems especially important with regard to anxiety disorders because these start

in late childhood and early adolescence. Moreover, within this group of disorders, social and specific phobias not only start between the age of 9–13, but also develop within a narrow age range. Andrews and Wilkinson for example have generated reports preventing the onset of anxiety, affective, or substance-use disorders [5]. They plead for prevention programs which focus on the reduction of risk factors to increase protective behaviour in children and young adults at risk. Epidemiological data can be taken into account to differentiate in age of onset of different mental disorders. Second, our findings also enable us to identify the group of disorders with lowest IQRs: alcohol disorders. Although they have a median age of onset of 23 years, the age range in which they develop is quite narrow, 11 years (compared to 23 years in mood, and 27 years in anxiety disorders). About 90% of those persons who will ever have an alcohol disorders will be confronted with it before the age of 45. Our observations highlight that the critical high-risk age for alcohol disorders is in young adulthood (approximately between the ages 20 and 31). Previous research has found that a significant proportion of American college students reported binge drinking and that up to 6% meet the criteria for a DSM-IV alcohol dependence [23, 29, 39]. Third, our data also highlight the late onset of mood disorders, together with the broad age range in which these disorders develop. The onset and progression of mood disorders are not concentrated in a narrow age range, which may indicate that, compared to alcohol and anxiety disorders, there is no critical high-risk age. These data are comparable with reports of age of onset in the American NCS-R-study [25].

Considering the cohort differences in the lifetime projections of mental disorders, we notice that these were more common in the youngest cohort (respondents born in 1972 or later) than in older cohorts. Consistent with the existing literature [25], we found that mood and alcohol disorders were more common in the younger cohorts. Mood disorders were most common in cohorts younger than 65 which is congruent with literature indicating an increasing rate in cohorts born after World War II [22, 28].

This study had several methodological weaknesses that should be considered in interpreting the findings. First, the response rate of the sample was moderate. Although weighting strategies were used to optimize the representativity of the study, it is plausible that our results were biased because persons with a history of mental disorders might have been less likely to participate in this study. Indeed, it has been mentioned that persons with mental disorders were less likely to participate in commu-

nity mental health surveys [1, 14, 16]. Consequently, reported prevalence rates are only estimations of the real occurrence of mental disorders in Belgium. Second, we assumed that, in the calculations of projected lifetime risks and cohort effects, the ages of onset were valid and reliable estimates, whereas there are previous studies indicating that reported ages of onset could be biased by respondents' age at the moment of the interview [18, 38]. Third, an assumption in calculating projected lifetime risks was that respondents from different cohorts had a constant conditional risk of developing a mental disorder in a given year. In the light of our own findings, this is most certainly not correct. Indeed, we found that there were considerable inter-cohort differences in lifetime risks of mental disorders. Last, the lifetime prevalence is possibly underestimated because of the well-known effect that self-reported data on mental health or quality of life data may be flawed [9, 12, 27].

In conclusion, our data show that approximately 37% of the Belgian population will have had a mental disorder by the age of 75, with mood disorders being the most prevalent class of disorders (23%). Projected lifetime risks were 8% higher than lifetime prevalence estimates. The median age of onset was lowest for anxiety disorders (14 years) and highest for mood disorders (38 years). Mental disorders appeared to be more common among younger cohorts compared to older cohorts. Although our observations are explorative and require more systematic study in the future, from a public health perspective they draw attention to a preventive and curative initiatives to be implemented in late childhood or early adolescence.

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Appendix

Appendix 1 Lifetime prevalence of mental disorders by cohort in the WMH/ESEMeD study in Belgium—male respondents

Mental disorder	18–34 years [% (SE)]	35–49 years [% (SE)]	50–64 years [% (SE)]	65+ years [% (SE)]	chi ²	chi ² p	chi ² df
Any anxiety disorder	15.8 (5.9)	11.8 (2.1)	9.5 (4.0)	8.8 (4.0)	2.4	0.514	3
Panic disorder	3.5 (1.8)	0.8 (0.5)	1.3 (0.8)	0.0 (0.0)	10.6	0.030	3
Specific phobia	9.8 (2.5)	4.1 (1.2)	3.9 (1.4)	4.4 (2.0)	4.5	0.238	3
Social phobia	1.6 (1.1)	3.4 (1.8)	1.1 (0.7)	0.0 (0.0)	26.7	0.000	3
General anxiety disorder	1.3 (0.6)	2.7 (1.0)	0.9 (0.6)	0.4 (0.4)	8.3	0.064	3
PTSD	0.2 (0.2)	2.4 (0.6)	2.3 (2.0)	0.4 (0.4)	12.2	0.019	3
Any mood disorder	8.9 (2.6)	12.6 (2.1)	13.4 (3.3)	5.2 (2.1)	8.5	0.061	3
MDE	8.9 (2.6)	12.6 (2.1)	13.4 (3.3)	5.2 (2.1)	8.5	0.061	3
Any alcohol disorder	14.8 (3.3)	17.8 (2.4)	15.0 (2.7)	8.8 (2.5)	6.4	0.122	3
Alcohol abuse	13.8 (3.2)	17.1 (2.2)	14.8 (2.7)	8.3 (2.2)	7.5	0.083	3
Alcohol dependence	2.0 (1.2)	3.9 (1.5)	3.4 (1.1)	0.5 (0.5)	5.7	0.157	3
Any disorder	32.0 (5.7)	32.4 (4.1)	29.7 (4.4)	19.6 (5.3)	4.0	0.293	3

Appendix 2 Lifetime prevalence of mental disorders by cohort in the WMH/ESEMeD study in Belgium—female respondents

Mental disorder	18–34 years [% (SE)]	35–49 years [% (SE)]	50–64 years [% (SE)]	65+ years [% (SE)]	chi ²	chi ² p	f
Any anxiety disorder	15.8 (4.2)	14.2 (1.8)	14.9 (3.3)	11.7 (4.4)	0.6	0.895	3
Panic disorder	1.4 (0.6)	2.3 (0.6)	2.8 (1.1)	0.0 (0.0)	40.9	0.000	3
Specific phobia	7.7 (1.9)	5.8 (1.3)	8.4 (1.7)	9.5 (2.5)	3.4	0.361	3
Social phobia	3.0 (1.1)	2.9 (0.9)	2.6 (1.5)	0.6 (0.6)	11.8	0.021	3
General anxiety disorder	1.4 (0.7)	2.5 (0.9)	3.7 (1.4)	2.0 (1.2)	2.1	0.553	3
PTSD	2.2 (1.6)	5.1 (1.3)	2.4 (1.0)	4.9 (3.0)	6.5	0.118	3
Any mood disorder	17.1 (2.3)	18.2 (2.4)	26.4 (3.6)	10.7 (2.0)	30.2	0.000	3
MDE	17.1 (2.3)	18.2 (2.4)	26.4 (3.6)	10.7 (2.0)	30.2	0.000	3
Any alcohol disorder	3.5 (1.8)	2.1 (0.9)	2.8 (1.3)	0.0 (0.0)	19.7	0.002	3
Alcohol abuse	2.7 (1.6)	2.1 (0.9)	2.8 (1.3)	0.0 (0.0)	22.6	0.001	3
Alcohol dependence	0.9 (0.8)	0.8 (0.5)	1.7 (1.1)	0.0 (0.0)	5.5	0.168	3
Any disorder	36.2 (7.3)	26.3 (2.8)	33.3 (5.5)	19.7 (5.6)	5.6	0.165	3

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