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Lifetime Incidence of Treated Mental Health Disorders and Psychotropic Drug Prescriptions and Associated Socioeconomic Functioning

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IMPORTANCE Few studies have estimated the lifetime incidence of mental health disorders and the association with socioeconomic functioning.

OBJECTIVE To investigate whether the lifetime incidence of treated mental health disorders is substantially higher than previously reported and estimate associations with long-term socioeconomic difficulties.

DESIGN, SETTING, AND PARTICIPANTS This nationwide population-based register linkage study includes a randomly selected sample of 1.5 million individuals from the population of Denmark from 1995 to 2018. Data were analyzed from May 2022 to March 2023.

MAIN OUTCOMES AND MEASURES Lifetime incidence of any treated mental health disorder in the general population was estimated from birth to age 100 years taking into account the competing risk of all-cause death and associations with socioeconomic functioning. Register measures were (1) from hospitals, a diagnosis of any mental health disorder at an inpatient/outpatient hospital contact; (2) from hospitals and prescription statistics, any mental health disorder/psychotropic prescription, including a hospital-contact diagnosis, or any psychotropic medication prescribed by physicians, including general practitioners or private psychiatrists; and (3) socioeconomic functioning as indicated by highest educational achievement, employment, income, residential status, and marital status.

RESULTS Among a sample of 462 864 individuals with any mental health disorder, the median (IQR) age was 36.6 years (21.0-53.6 years), 233 747 (50.5%) were male, and 229 117 (49.5%) were female. Of these, 112 641 were registered with a hospital-contact mental health disorder diagnosis and 422 080 with a prescription of psychotropic medication. The cumulative incidence of a hospital-contact mental health disorder diagnosis was 29.0% (95% CI, 28.8-29.1), 31.8% (95% CI, 31.6-32.0) for females, and 26.1% (95% CI, 25.9-26.3) for males. When also considering psychotropic prescriptions, the cumulative incidence of any mental health disorder/psychotropic prescription was 82.6% (95% CI, 82.4-82.6), 87.5% (95% CI, 87.4-87.7) for females, and 76.7% (95% CI, 76.5-76.8) for males. Socioeconomic difficulties were associated with mental health disorder/psychotropic prescriptions, including lower income (hazard ratio [HR], 1.55; 95% CI, 1.53-1.56), increased unemployment or disability benefit (HR, 2.50; 95% CI, 2.47-2.53), and a greater likelihood of living alone (HR, 1.78; 95% CI, 1.76-1.80) and being unmarried (HR, 2.02; 95% CI, 2.01-2.04) during long-term follow-up. These rates were confirmed in 4 sensitivity analyses with the lowest being 74.8% (95% CI, 74.7-75.0) (1) by using varying exclusion periods, (2) by excluding prescriptions of anxiolytics and quetiapine that may be used for off-label indications, (3) by defining any mental health disorder/psychotropic prescription as any hospital-contact mental health disorder diagnosis or any psychotropic medication prescribed at least 2 times, and (4) by excluding individuals with somatic diagnoses for which psychotropics may be prescribed off-label.

CONCLUSIONS AND RELEVANCE This registry study of data from a large representative sample of the Danish population showed that the majority of individuals either received a diagnosis of a mental health disorder or were prescribed psychotropic medication during their lifetime, which was associated with subsequent socioeconomic difficulties. These findings may help change our understanding of normalcy and mental illness, reduce stigmatization, and further prompt rethinking the primary prevention of mental illness and future mental health clinical resources.

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Supplemental content

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What is the lifetime risk of experiencing mental health disorder? Although knowledge about lifetime incidence is vital for health care policies, etiological theories, and public perceptions of mental health disorder, lifetime incidence estimates remain controversial.[1] One source of information is hospital data. A nationwide study estimated that approximately one-third of the Danish population received hospital treatment (either inpatient or outpatient) for a mental health disorder in their lifetime.[2] But since most people experiencing mental health problems do not require secondary care treatment, this is an underestimate of lifetime risk of mental health disorder.

A second source of information is community surveys of participants that use structured diagnostic interviews. Using retrospective reports, the US National Cormorbidity Study (N = 9282) estimated that the lifetime prevalence of any mental health disorder was 46%.[3] Subsequently, the Organization for Economic Cooperation and Development estimated that the lifetime prevalence of mental health disorder was 40% to 50% for an average country.[4] But these surveys rely on respondents who try to remember their mental health over their entire life, and some may forget they had symptoms of disorder some time ago, in their younger days. As such, this is probably an underestimate as well.[5]

A third source of information is longitudinal cohort studies that have carried out repeated diagnostic interviews with their participants. Surprisingly, a recent longitudinal-prospective study of a New Zealand birth cohort (N = 1013) followed up from birth to age 45 years estimated that 86% of the participants experienced a mental health disorder.[6] But is this estimate too high, and is there evidence of impairment? For example, is the occurrence of a mental health disorder related to subsequent socioeconomic difficulties?

The aims of the present study were to use a unique data resource to estimate (1) the lifetime incidence (lifetime risk) of any mental health disorder and/or psychotropic medication prescription in a nationwide population-based register linkage study for the Danish population and (2) the association between mental health disorder/psychotropics and subsequent socioeconomic functioning. If individuals experienced socioeconomic decline during follow-up after onset of a mental health disorder/treatment with psychotropics, this would support the validity of the diagnosis and treatment reflecting a mental health difficulty followed by functional impairment.

Key Points

Question What is the lifetime risk of experiencing mental health disorder and/or receiving psychotropic medication and the association with long-term socioeconomic difficulties?

Findings In this cohort study, lifetime cumulative incidence of mental health disorder and/or prescription of psychotropics was greater than previously reported with about 80% of the population getting treatment for a mental health disorder in hospital settings or from general practitioners or private psychiatrists. Mental health disorder and prescription of psychotropics were associated with subsequent increased socioeconomic difficulties, including lower income, unemployment, and increased likelihood to live alone and to be unmarried.

Meaning These findings may be used to change attitudes toward mental health disorder, promote greater mental health literacy, and promote policies to support needed services.

Methods

The study is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline. It was registered at ClinicalTrials.gov (NCT05415189). Informed consent or ethical approval of anonymous register studies is not required according to Danish law. The study was approved by the Data Agency of the Capital Region of Denmark.

Register Linkage

Data were obtained by linking Danish population-based registers using the unique personal identification number assigned to all persons living in Denmark, ensuring accurate linkage of information between registers, irrespective of changes in name and demographics.[7] Data for each individual on sex, date of birth, and socioeconomic status from Statistics Denmark[8] were linked with data on psychiatric diagnoses and corresponding dates from the Danish Psychiatric Central Research Register from 1969 (the first year available) to 2018,[9] data on all nationwide medication use from the Medicinal Product Statistics from 1995 (the first year available) to 2018,[8] and data on death from the Danish Medical Register on Vital Statistics from 1969 to 2018.[10]

Study Cohort

The study examined a randomly selected sample of 1.5 million individuals from 5 215 718 persons with birth years from 1896 to 1994 who were registered in Statistics Denmark on January 1, 1995. Study time for analyses started January 1, 1996. In order to exclude already prevalent cases, persons with a diagnosis in the Danish Psychiatric Central Research Register from 1969 to 1995 or medication purchases in year 1995 were excluded (eAppendix 1 in Supplement 1). Similarly, patients who died or emigrated before 1996 were excluded.

Outcome Measures

The primary estimate of mental health disorder comprised data from 2 sources: (1) a diagnosis of any mental health disorder at an inpatient or outpatient hospital contact, as recorded in the Danish Psychiatric Central Research Register, and (2) psychotropic medication prescribed by physicians in Denmark, including general practitioners and private psychiatrists, as recorded in the Medicinal Product Statistics. We supplemented inpatient/outpatient mental health disorder diagnoses with medication records because hospital registries do not record mental health disorders treated by general practitioners or private psychiatrists, but prescriptions in the Medicinal Product Statistics reflect that the individual for whom the drug is prescribed is thought to experience a mental health disorder whether treated by a hospital physician, general practitioner, or private psychiatrist. Notably, drugs can only be prescribed

in Denmark via pharmacies, and drugs cannot be prescribed without a diagnosis being made by the physician as required by the pharmacies. However, these diagnoses attached to prescriptions are not available for analysis as part of Danish nationwide registries.

Diagnoses included all codes for mental and behavioral disorders from the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (*ICD-10*).[11] *ICD-10* codes for individual mental health disorders and corresponding excluded codes from the *International Classification of Diseases, Eighth Revision* (*ICD-8*), are listed in eAppendix 1 and codes for psychotropic medications in eAppendix 2 in Supplement 1.

Mental health disorder was defined according to 3 different outcome measures: primary, any diagnosis of mental health disorder at a hospital contact *or* any psychotropic medication prescribed by physicians, including general practitioners or private psychiatrists; secondary, a hospital-contact mental health disorder diagnosis; and tertiary, any psychotropic medication only (ie, no hospital contact and diagnosis). In addition, we evaluated whether the 3 outcome measures of mental health disorder/prescription of psychotropics were followed by impaired socioeconomic functioning. Socioeconomic functioning was determined by highest educational achievement, employment, income, residential status, and marital status.

Statistical Analyses

The Aalen-Johansen estimator was used to calculate absolute risks (cumulative incidences) of the 3 outcome measures from birth to age 100 years in the total population and according to sex (eAppendix 3 in Supplement 1).

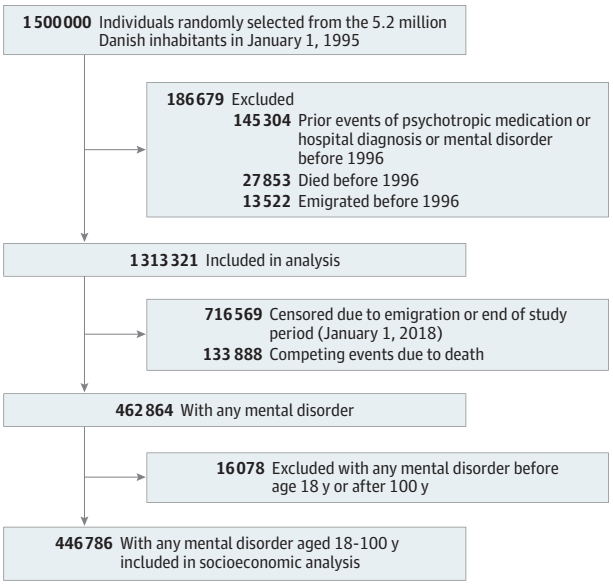
In all analyses, the competing risk of all-cause death was taken into account and individuals free of a mental health disorder on January 1, 1996, were followed up from their age at that date until their age at the date of the earliest of the following 3 events: a hospital-contact mental health disorder diagnosis/psychotropic medication (event), death (competing event), date of emigration, or January 1, 2018 (censoring). When analyzing the tertiary outcome measure, any psychotropic medication only, we included any hospital-contact mental health disorder diagnosis as a competing risk in addition to all-cause death.

Socioeconomic measures were compared between patients recorded with a mental health disorder/prescription of psychotropics and individuals from the general population who did not have a prior mental health disorder or prescription. These control groups were matched according to sex and year of birth and following onset of mental health disorder/prescription of psychotropics (eAppendix 4 in Supplement 1). Data were analyzed from May 2022 to March 2023.

Results

Figure 1 presents a flowchart of the selection of study participants, censoring, and events in the analysis of any mental health disorder/prescription of psychotropics. Among the 1.5 million randomly selected individuals from the Danish population, we identified a total of 462 864 individuals with any mental health disorder, ie, either a hospital contact or any psychotropic medication prescribed by physicians, including general practitioners or private psychiatrists; of these, 112 641 were registered with a hospital-contact mental health disorder diagnosis and 422 080 with a prescription of psychotropic medication. The median (IQR) age of the cohort was 36.6 years (21.0-53.6 years), 233 747 (50.5%) were male, and 229 117 (49.5%) female. **Table 1** shows the demographic and socioeconomic characteristics for these 3 groups as well as for control individuals from the general population, matched according to the date of the diagnosis/treatment, year of birth, sex, and calendar year.

Figure 1. Participant Selection, Events, and Censoring in the Statistical Analysis in Relation to Any Hospital-Contact Mental Health Disorder Diagnosis or Any Psychotropic Medication



Cumulative Incidence of Mental Health Disorder/Prescription of Psychotropics

Figure 2A shows that the cumulative incidence of any mental health disorder/prescription of psychotropics at age 100 years was 82.6% (95% CI, 82.4-82.6); it was 87.5% (95% CI, 87.4-87.7) for females and 76.7% (95% CI, 76.5-76.8) for males (see also eAppendix 3 in Supplement 1). Figure 2B shows that the cumulative incidence of hospital-treated mental health disorder at age 100 years was 29.0% (95% CI, 28.8-29.1); it was 31.8% (95% CI, 31.6-32.0) for females and 26.1% (95% CI, 25.9-26.3) for males (eTable 1 in Supplement 1). Figure 2C shows the cumulative incidence of any psychotropic medication only, in total and according to sex.

We conducted 4 different sensitivity analyses of the incidence of mental health disorder/prescription of psychotropics to confirm that we did not overestimate the lifetime incidence of mental health disorder/prescription of psychotropics:

1. To confirm that prevalent cases were excluded, we repeated our analysis by excluding persons with prior diagnoses or medication purchases up to January 1, 2000, and also up to

Table 1. Socioeconomic Baseline Functioning for Patients and Control Individuals From the General Population[a]

Characteristic	No. (%)					
	Any hospital-contact mental health disorder diagnosis or psychotropic medication		Any hospital-contact mental health disorder diagnosis		Psychotropic medication only	
	Patients	Controls	Patients	Controls	Patients	Controls
No. of individuals	446 786	446 786	101 713	101 713	414 646	414 646
Sex						
Male	196 473 (44.0)	196 473 (44.0)	44 975 (44.2)	44 975 (44.2)	180 852 (43.6)	180 852 (43.6)
Female	250 313 (56.0)	250 313 (56.0)	56 738 (55.8)	56 738 (55.8)	233 794 (56.4)	233 794 (56.4)
Age, median (IQR), y	51.2 (36.0-69.4)	51.2 (36.0-69.4)	38.8 (27.2-53.2)	38.8 (27.2-53.2)	52.9 (37.9-70.6)	52.9 (37.9-70.6)
Education						
Low (<14 y)	219 390 (54.0)	192 841 (47.3)	59 105 (61.0)	47 682 (48.7)	199 493 (53.2)	176 396 (46.9)
Academic (≥14 y)	186 821 (46.0)	215 213 (52.7)	37 839 (39.0)	50 211 (51.3)	175 490 (46.8)	200 065 (53.1)
Not assessed	40 575 (9.1)	38 733 (8.7)	4769 (4.7)	3820 (3.8)	39 663 (9.6)	38 185 (9.2)
Employment						
Employed	215 683 (48.3)	256 535 (57.4)	40 803 (40.1)	65 871 (64.8)	200 616 (48.4)	235 184 (56.7)
Unemployed or disability	72 332 (16.2)	31 573 (7.1)	33 971 (33.4)	9265 (9.1)	63 920 (15.4)	29 133 (7.0)
Pension	125 797 (28.2)	124 445 (27.9)	12 867 (12.7)	12 628 (12.4)	124 325 (30.0)	122 989 (29.7)
Student	21 582 (4.8)	25996 (5.8)	9233 (9.1)	11 649 (11.5)	16 500 (4.0)	19 970 (4.8)
Other	11 293 (2.5)	8192 (1.8)	4753 (4.7)	2285 (2.2)	9240 (2.2)	7331 (1.8)
Not assessed	99 (0.0)	46 (0.0)	86 (0.1)	15 (0.0)	45 (0.0)	39 (0.0)
Income[b]						
>20% Quartile	290 248 (65.0)	311 637 (69.8)	61 879 (60.9)	72 866 (71.6)	271 998 (65.6)	289 941 (69.9)
<20% Quartile	156 439 (35.0)	135 105 (30.2)	39 748 (39.1)	28 832 (28.4)	142 603 (34.4)	124 667 (30.1)
Not assessed	99 (0.0)	45 (0.0)	86 (0.1)	15 (0.0)	45 (0.0)	39 (0.0)
Residence status						
Living with someone	265 652 (59.5)	283 920 (63.5)	44 245 (43.5)	59 974 (59.0)	253 234 (61.1)	266 621 (64.3)
Living alone	181 134 (40.5)	162 867 (36.5)	57 468 (56.5)	41 739 (41.0)	161 412 (38.9)	148 025 (35.7)
Marital status						
Married	222 283 (49.8)	234 156 (52.4)	32 295 (31.8)	43 443 (42.7)	214 483 (51.7)	223 254 (53.8)
Not married	125 692 (28.1)	124 596 (27.9)	50 183 (49.3)	44 861 (44.1)	104 925 (25.3)	105 510 (25.4)
Divorced	46 579 (10.4)	35 709 (8.0)	12 750 (12.5)	7520 (7.4)	43 711 (10.5)	34 203 (8.2)
Widowed	52 232 (11.7)	52 326 (11.7)	6485 (6.4)	5889 (5.8)	51 527 (12.4)	51 679 (12.5)

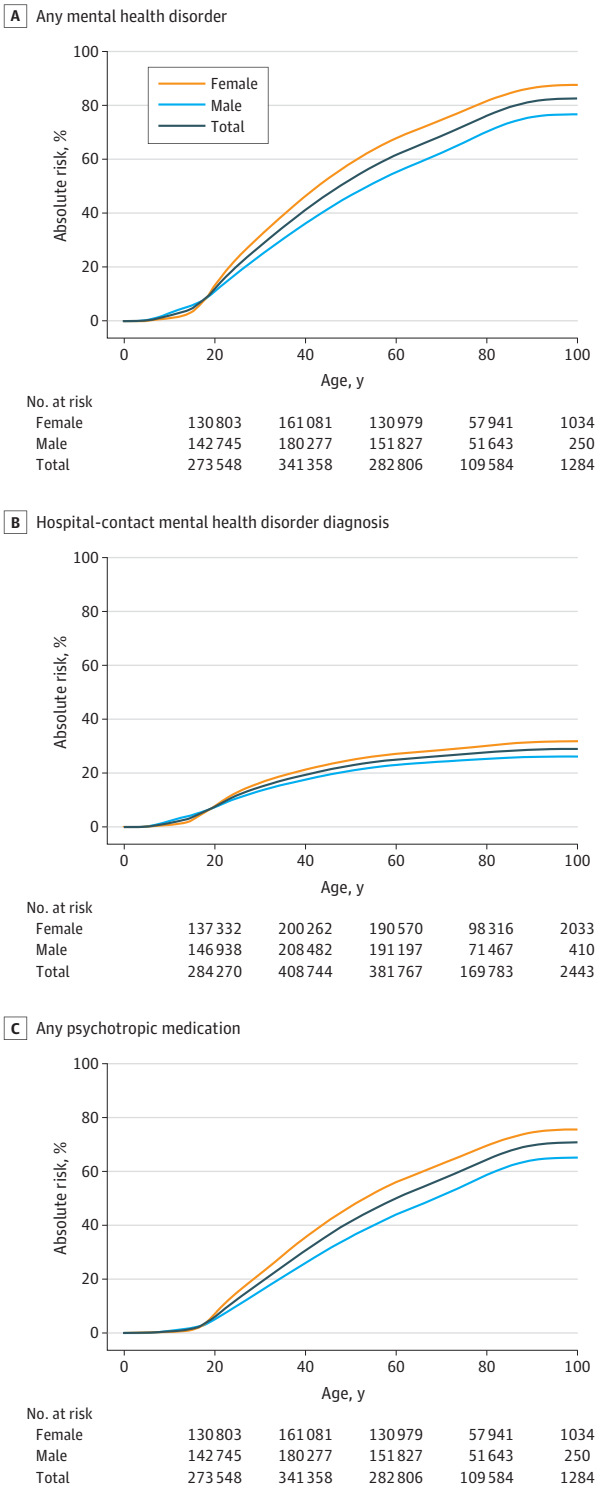
[a] Control individuals from the general population were matched according to the date of the diagnosis/treatment, year of birth, sex, and calendar year.

[b] Income (personal) was measured as the 20% lowest vs the 80% highest income. Each person's income in a given year was dichotomized as being below or above the 20% quantile of the population income in that year based on persons aged 18-67 years.

January 1, 2005, respectively, and with follow-up to 2018. This resulted in a cumulative incidence of any mental health disorder/prescription of psychotropics at age 100 years of 82.0% (95% CI, 81.9-82.1) and 80.6% (95% CI, 80.4-80.7), respectively (eAppendix 5 in Supplement 1).

2. We excluded prescriptions of anxiolytics (Anatomical Therapeutic Chemical [ATC] code N05B), which potentially could be used for transient stress/adjustment reactions or insomnia, and prescriptions of quetiapine (ATC code N05AH04), which may be used for off-label indications.[12,13] This resulted in a cumulative incidence of any mental health disorder/prescription of psychotropics at age 100 years of 76.9% (95% CI, 76.8-77.0).
3. To exclude individuals who did not fill their prescriptions or whose prescription was an isolated event, we repeated analyses with psychotropic medication prescribed at least 2 times. The cumulative incidence of any mental health disorder or any psychotropic medication prescribed at least 2 times was 74.8% (95% CI, 74.7-75.0); it was 81.0% (95% CI, 80.9-81.2) for females and 67.8% (95% CI, 67.6-68.0) for males at age 100 years (eFigure in Supplement 1).
4. To decrease the effect of antidepressants and antipsychotics prescribed for conditions not defined as mental health disorders, we conducted a sensitivity analysis with individuals who received the following somatic diagnoses for which psychotropics may be prescribed off-label: chronic pain (*ICD-10*: R52 and R52.1-R52.9), migraines (*ICD-8*: 346, 346.09; *ICD-10*: G43 and G43.0-G43.9), urine incontinence (*ICD-10*: R32 and R32.9 + N390, N39.3, or N39.4), irritable bowel syndrome (*ICD-10*: K58 + K58.0 and K58.9), and dementia (*ICD-8*: 290 and 290.09-290.19; *ICD-10*: F00-F0.39 + G30 and G30.0-G30.9). In this sensitivity analysis, individuals were dynamically split according to these conditions such that, after having received 1 of the diagnoses, only psychiatric diagnoses counted as an event whereas in the main analyses, prior to these diagno-

Figure 2. Estimated Lifetime Risks of Mental Health Disorder Diagnoses and Psychotropic Medication for the Entire Cohort and by Sex



A, Cumulative incidence of any mental health disorder (any hospital-contact mental health disorder diagnosis or any psychotropic medication), in total and according to sex. B, Cumulative incidence of hospital-contact mental health disorder diagnosis, in total and according to sex. C, Cumulative incidence of psychotropic medication only, in total and according to sex.

ses, both medication and psychiatric diagnoses counted. Some patients had a somatic diagnosis before inclusion, others received it during follow-up, and this dynamic change of status was accounted for in a multistate model when estimating the cumulative incidences of any mental health disorder and death. This resulted in a cumulative incidence of any mental health disorder/prescription of psychotropics of 76.4% (95% CI, 76.3-76.6); for females, 79.8% (95% CI, 79.6-80.0); and for males, 72.3% (95% CI, 72.1-72.5). Notably, this analysis underestimates mental health disorder/prescription of psychotropics because the risk of mental health disorder is increased following these physical disorders.[14-17]

Figure 3 shows the cumulative incidences for different psychotropics, and eTable 2 in Supplement 1 shows cumulative incidences for different psychotropics according to age.

Time trend analyses showed that the incidence of hospital-contact mental health disorder increased with calendar time while the incidence of any mental health disorder/prescription of psychotropics decreased with calendar time (eAppendix 6 in Supplement 1).

Mental Health Disorder, Prescription of Psychotropics, and Associated Socioeconomic Difficulties

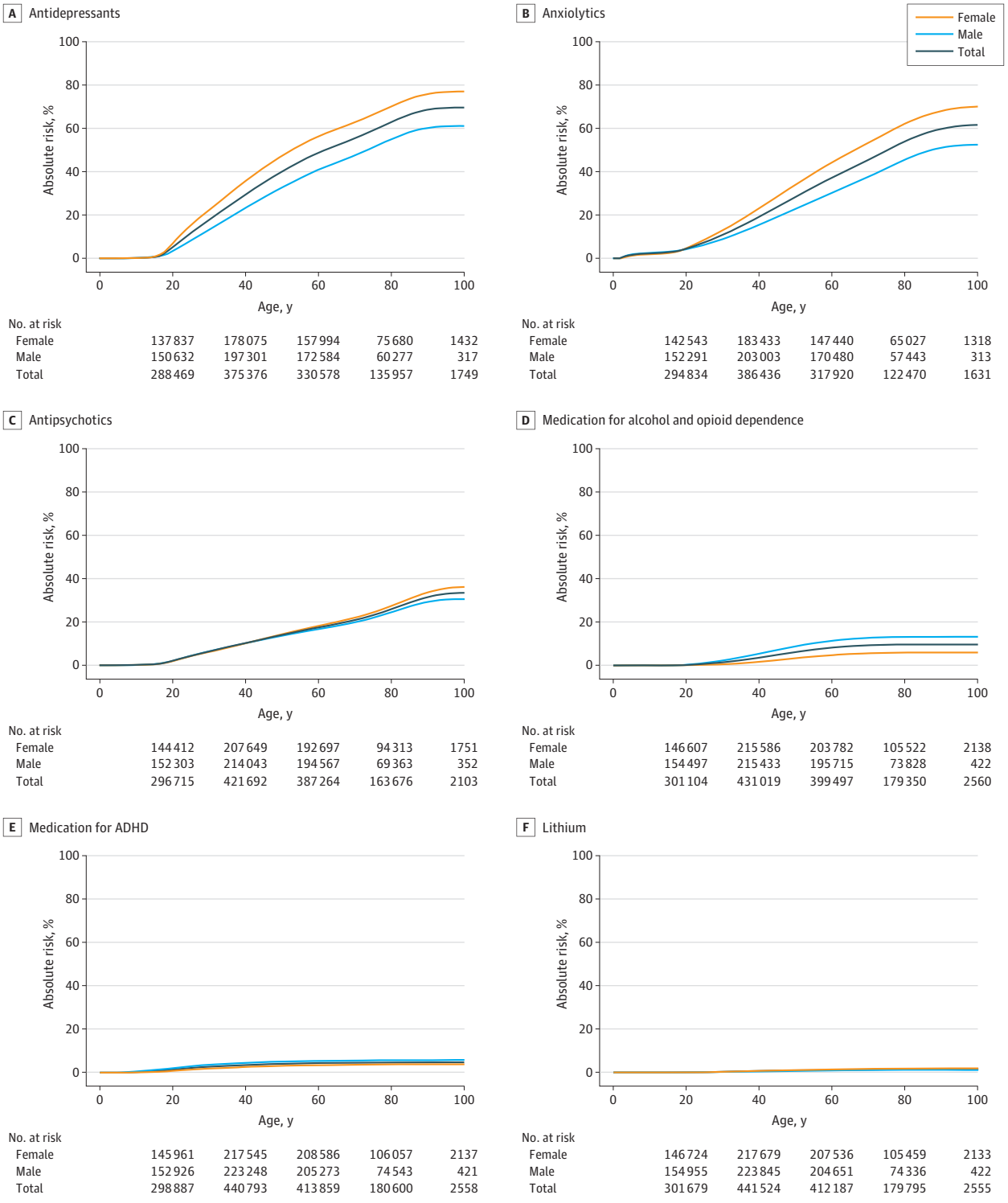
At baseline, individuals with any mental health disorder were more likely to be unemployed or receiving a disability benefit, had lower earnings, were more likely to be living alone, and were less likely to be married, compared with control individuals from the general population, matched according to the date of inclusion, year of birth, sex, and calendar year (**Table 2**).

During follow-up from 1996 to 2018, individuals with any mental health disorder were more likely to experience new socioeconomic difficulties, compared with control individuals from the general population, matched according to the date of inclusion, year of birth, sex, and calendar year. Median follow-up time varied between 11 and 15 years. During follow-up, they were more likely to become unemployed or receive a disability benefit (hazard ratio [HR], 2.50; 95% CI, 2.47-2.53), to earn lower income (HR, 1.55; 95% CI, 1.53-1.56), to be living alone (HR, 1.78; 95% CI, 1.76-1.80), and to be unmarried (HR, 2.02; 95% CI, 2.01-2.04). Table 2 shows that while increased socioeconomic diffculties were most pronounced among persons who had a hospital diagnosis, the increased difficulties were still apparent among those persons with a prescription of psychotropic medication only.

Discussion

This study presents systematic population-based nationwide data on the lifetime incidence of mental health disorder/prescription of psychotropics and the association with patients' socioeconomic functioning. We estimated lifetime risk in the Danish population by using a cohort design in which individuals were followed up between 1 to 100 years old for a 23-year observation period, from 1996 to 2018. We confirmed the prior finding that one-third of the Danish population received

Figure 3. Cumulative Incidence of Psychotropic Medication Prescriptions



Cumulative incidence and numbers of individuals at risk are shown for antidepressants, anxiolytics, antipsychotics, medications for alcohol and opioid dependence, attention-deficit/hyperactivity disorder (ADHD) medications, and lithium.

hospital treatment for a mental health disorder in their lifetime.[2] We then expanded on this initial estimate to document that the cumulative incidence of any mental health disorder/prescription of psychotropics, defined as a hospital-contact mental health disorder diagnosis or any psychotropic medication prescribed by general practitioners or private psychiatrists, was

Table 2. Socioeconomic Functioning at Baseline and Follow-up of Mental Health Disorder[a]

Measure[b]	RD or HR (95% CI) [marginal risk in control group]		
	Any hospital-contact mental health disorder diagnosis or any psychotropic medication	Any hospital-contact mental health disorder diagnosis	Any psychotropic medication without prior hospital contact related to mental health disorder
Risk difference			
Highest educational achievement[c]	0.068 (0.065-0.070) [0.473]	0.123 (0.118-0.127) [0.487]	0.063 (0.062-0.066) [0.469]
Unemployment[d]	0.127 (0.125-0.128) [0.097]	0.277 (0.273-0.281) [0.104]	0.120 (0.118-0.121) [0.099]
Income <20% quartile[e]	0.049 (0.047-0.051) [0.201]	0.125 (0.120-0.129) [0.248]	0.043 (0.041-0.045) [0.189]
Living alone[f]	0.041 (0.039-0.043) [0.365]	0.155 (0.150-0.159) [0.410]	0.032 (0.030-0.034) [0.357]
Not married[g]	0.027 (0.025-0.029) [0.476]	0.110 (0.105-0.114) [0.573]	0.021 (0.019-0.023) [0.462]
Hazard ratio			
Unemployment[d]	2.50 (2.47-2.53)	3.29 (3.22-3.36)	2.36 (2.34-2.39)
Income <20% quartile[e]	1.55 (1.53-1.56)	2.01 (1.97-2.05)	1.48 (1.47-1.50)
Living alone[f]	1.78 (1.76-1.80)	2.51 (2.46-2.56)	1.72 (1.70-1.73)
Not married[g]	2.02 (2.01-2.04)	2.36 (2.30-2.42)	1.97 (1.95-1.99)

Abbreviations: HR, hazard ratio; RD, risk difference.

[a] For patients with any mental health disorder, the median (IQR) follow-up time was 14 years (9-19) for income, cohabitation, and marital status and 14 years (9-18) for employment. For patients with any hospital-contact mental health disorder diagnosis the median (IQR) follow-up time was 12 years (6-17) for income, cohabitation, and marital status and 11 years (6-17) for employment. For patients with any psychotropic medication without prior hospital contact related to mental health disorder, the median (IQR) follow-up time was 14 years (9-19) for income, marital status, and cohabitation and 14 years (9-18) for employment.

[b] The top portion of the table shows RDs in socioeconomic correlates at baseline for patients with (1) any hospital-contact mental health disorder diagnosis or psychotropic medication, (2) any hospital-contact mental health disorder diagnosis, and (3) a prescription of psychotropic medication only, as identified in Medicinal Product Statistics, compared with control individuals from the general population, matched according to the date of inclusion, year of birth, and sex. The bottom portion shows HRs of time to switch from not having a poor outcome at baseline to a poor outcome at follow-up for these 3 groups vs control individuals from the general population matched according to the inclusion date, year of birth, and sex.

[c] Educational achievement was measured as having completed >14 years of education or not.

[d] Employment status was measured as unemployed or on disability vs employed, pension, student, or other.

[e] Income (personal) was measured as the 20% lowest vs the 80% highest income. Each person's income in a given year was dichotomized as being below or above the 20% quantile of the population income in that year based on persons aged 18-67 years.

[f] Residential status was measured as living with someone vs living alone.

[g] Marital status was measured as married vs not married, divorced, or widowed.

82.6% (95% CI, 82.4-82.6), 87.5% (95% CI, 87.4-87.7) for females, and 76.7% (95% CI, 76.5-76.8) for males. These rates were confirmed in 4 sensitivity analyses with the lowest being 74.8% (95% CI, 74.7-75.0): (1) by using varying washout periods that aimed to reduce potential misclassification of prevalent cases as incident cases by excluding persons with prior diagnoses or medication purchases, (2) by excluding from our lifetime estimates prescriptions of anxiolytics, which potentially could be used for transient stress/adjustment reactions or insomnia, and quetiapine, which may be used for off-label indications, (3) by defining caseness as any hospital-contact mental health disorder diagnosis or any psychotropic medication prescribed at least 2 times, to ensure that the detected mental health disorders were less likely to have been temporary or with short duration, and (4) by excluding instances of somatic diagnoses for which psychotropics may be prescribed off-label. In longitudinal analyses, the socioeconomic functioning of individuals with mental health disorder/prescription of psychotropics decreased during long-term follow-up compared with control individuals from the general population, suggesting that the life experiences associated with mental health problems as measured here were not trivial.

Implications of the Study Findings

The overall finding that the vast majority of people during their lifetime get treatment for mental health disorder/prescription of psychotropics in primary or secondary health care settings that is associated with long-lasting decreased socioeconomic functioning turns around the definition of normalcy in relation to mental health disorder. This finding can be leveraged in anti-stigma programming[18,19] and used to alter the conception of what it means to have mental illness. Notably, although the finding of this high lifetime cumulative incidence of mental health disorder/prescription of psychotropics is new, it is not a new phenomenon; in fact, the incidence of any mental health disorder/prescription of psychotropics decreased with calendar time. Further, the present findings illustrate that future strategies for the prevention of onset of mental illness in the general population[20,21] should integrate a life-course perspective, because incidence continues throughout the life course,[22] and that promoting good mental health/well-being[20,23,24] should be a universal approach applied to the whole population. The present findings do document that citizens are getting attention and treatment for mental health disorders, at least in developed nations with universal access to health care, which can be viewed as encouraging. The treatment gap continues to be a source of concern in many nations.

Strengths and Limitations

This registry-based study had many strengths, including a large sample size that was representative of all persons registered in Statistics Denmark beginning in 1995. With data from 2 distinct, complementary medical registries, the esti-

mates of mental health disorder/prescription of psychotropics were not susceptible to problems caused by recall failure or by self-reporting bias. Because Danish citizens have free and equal access to health care, any effect related to the ability to afford private insurance or access to health care was reduced, a large advantage over recent mental health disorder estimates from the United States.[25-27] It is mandatory in Denmark for all hospitals to report discharge diagnoses and for all pharmacies to report redeemed drugs to central registries. The cumulative incidence analyses took into account the competing risk of all-cause death, which is essential in order to produce accurate estimates of the occurrence of mental health disorder/prescription of psychotropics.

This study also had limitations. Although hospital-based psychiatric diagnoses in Denmark have been found to be generally valid for a range of disorders,[28,29] validity varies across diagnoses. Diagnoses made by general practitioners and private psychiatrists are not recorded in the hospital registries, but this was offset by the recording of prescriptions of psychothropics made by general practitioners and private psychiatrists. We thus added cases with psychotropic medication prescriptions. We recognize that using psychotropic medication prescriptions to index mental health disorder is not uncontroversial. Some medications may be incorrectly prescribed or prescribed for subsyndromal conditions. More research about compliance with prescription guidelines is needed, and we hope that the present findings indicating very high prescription rates invigorate such work. Some readers may even wonder if our findings speak more to the behavior of general practitioners and psychiatrists than they do to the burden of mental-health problems in the population. While this remains a reasonable concern, to dismiss the use of medication registers as an imperfect proxy for mental health disorders does a disservice to individuals who experience mental health difficulties and seek help and to professionals who encounter them. Importantly, longitudinal analyses showed that persons identified in medication registers with a prescription of psychotropic medication subsequently experienced long-term increased socioeconomic difficulties.

On the one hand, underdetection of mental health disorder/prescription of psychotropics is likely because data are not available for individuals who do not seek help for their mental health disorder, who seek help outside the health care system, or who are treated outside hospital psychiatry or without psychotropic medications, eg, with psychotherapy. On the other hand, there may be overdetection. Some medications may be prescribed for psychological conditions not fulfilling diagnostic criteria for a mental ilnness, such as stress or bereavement, and antipsychotics may be prescribed for people living with dementia.[13] We attempted to minimize this limitation by estimating lifetime risk of mental health disorder/prescription of psychotropics after excluding cases who were prescribed anxiolytics and quetiapine, 2 psychotropic medications that may be prescribed for nonpsychiatric indications.[12,13] Specifically, according to recent Danish register data on older patients, antidepressants are prescribed for such nonpsychiatric indications as chronic pain (0.4%), motion sickness (0.1%), and tobacco cessation and other conditions (0.2%), although missing and unspecified indications were prevalent.[30] Also, a recent conceptual analysis of epidemiological first-incidence short-term studies of depression concluded that there is little evidence that the incidence of treated depression is due to false-positive misdiagnoses of distress as depression.[31] Some medications may also be prescribed for conditions other than mental health disorders. To address this, we excluded instances of somatic diagnoses for which psychotropics may be prescribed off-label.

The ideal design for estimating lifetime risk of developing mental health disorders would follow up the same individuals from birth to death, but such data are not available on a population level. Instead, we estimated lifetime risk by following data for individuals aged 1 to 100 years for a 23-year observation period, from 1996 to 2018. However, misclassification of prevalent cases as incident cases did not appear to inflate our cumulative incidence rates substantially. Finally, the generalizability of the findings outside of Denmark may be limited because of different health care and socioeconomic structures. Nevertheless, the lifetime incidence of mental health disorder/prescription of psychotropics of 82.6% in the present study is similar to the recent finding from the Dunedin Longitudinal Study, estimating that 86% of the population experiences a *DSM* mental health disorder of some kind (with no additional requirement of psychiatric treatment) already by age 45 years.[6]

Conclusions

This registry study including data from a large representative sample of the Danish population showed that the majority of individuals either received a diagnosis of a mental health disorder or were prescribed psychotropic medication during their lifetime, which was associated with subsequent socioeconomic difficulties. The findings should add to changing our understanding of normalcy and mental illness by challenging the stigmatizing false dichotomy of individuals with vs without mental illness. These findings may further prompt rethinking the primary prevention of mental illness and future mental health clinical resources.

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