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Socioeconomic and gender inequalities in mental disorders among adolescents and young adults

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ABSTRACT

Background: Socioeconomic status (SES) and gender play a key role in mental health. The objective of this study was to assess socioeconomic and gender mental health inequalities in adolescents and young adults using a population-based registry.
Materials and methods: We conducted a lifetime follow-up study of all residents in the Basque Country between 1 and 30 years old (n = 609,381) as of 31 December 2018. Primary care, specialized outpatient, and hospital care records were searched for diagnoses. SES was assessed based on household income. We estimated disaggregated lifetime prevalence of substance use, behaviour, anxiety, depression, psychosis, and attention deficit hyperactivity disorder. The local Institute of Statistics validated the mortality data. The likelihood of risks was estimated using logistic regression.
Results: Overall, 96,671 individuals (15.9%) had a diagnosed mental disorder, with clear gradients by gender and SES. Females of medium-to-high SES had the lowest prevalence of all mental disorders, except anxiety and depression. This group was followed by males of the same SES and females of low SES, while the highest prevalence of mental disorders was observed in low-SES males. The lower income categories had higher risks of psychiatric admission (adjusted odds ratio [AOR]: 3.64 for females; 6.66 for males) and death (AOR: 5.42). People with a mental health diagnosis had higher mortality (AOR: 2.38).
Conclusions: Our work evidenced important SES and gender inequalities in the mental health and premature mortality of adolescents and young adults, findings that should drive the development and implementation of early preventive interventions.

Introduction

Socioeconomic status (SES)[1] and gender play a key role in the health of individuals and populations, the most disadvantaged groups having poorer outcomes in both physical[2] and mental health.[3] Social determinants have a greater impact in these early stages of life due to the special vulnerability of childhood, adolescence and youth to environmental stress which includes the moment of transition from educational settings to the workplace.[4–6] In a systematic review, Reiss found that children and adolescents with poorer SES are two or three times more likely to develop mental health disorders.[7] She also concluded that the theory of social causality plays a more relevant role than the theory of selection by health to understand the cycle of deprivation

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between generations that creates inequalities in mental health in children and adolescents.[7] Most studies have evidenced consistent gender differences, internalizing disorders (anxiety, depression, obsessive–compulsive disorder and eating disorders) being more frequent in girls and externalizing ones (psychosis, attention deficit hyperactivity disorder [ADHD], autism and conduct disorders) in boys.[8,9] The organization and characteristics of health systems can reduce inequalities generated by other social determinants or, on the contrary, amplify them.[10,11] In line with this, it has been suggested that early intervention is critical to tackling adverse conditions experienced during childhood and adolescence that contribute to poorer levels of health in youth and adulthood.[12,13]

Studies analysing inequalities in mental health are generally based on surveys with questionnaires referring to the presence of psychiatric symptoms.[7,11] On the other hand, the implementation of the electronic health record (EHR) in primary care and the coding of episodes in outpatient clinics and acute hospitals have created new sources of information about childhood, adolescence and youth for mental health epidemiology.[8,9,14,15] New designs based on the analysis of complete population registries (real-world data) such as those available in Scandinavia[8,9] and other European regions, including the Basque Country (Spain),[14] offer a great opportunity to assess inequalities in mental health.[16,17] The Basque Country has a population of 2,178,000 people and the funding of healthcare provision is based on the Beveridge model, the Basque Health Service being devolved to the regional government which has implemented an organization-wide database that has been validated for research.[14,15] The association of premature mortality with the presence of mental illness has been previously evidenced in Danish and Swedish registries.[18,19] It is not clear, however, whether that association may be mediated by SES, underlining the need to ascertain the separate weights of mental disorders and SES in the excess risk of death.[20]

The objective of this study was to identify and analyze inequalities by gender and SES in mortality and the prevalence of diagnosed mental health disorders in children, adolescents and young people up to 30 years of age in the Basque Country (Spain).

Method

Design

A study with an observational, descriptive and retrospective design was conducted. Access to health care is universal for all individuals notwithstanding the option to take out private health insurance, 20% of the population having double or supplementary coverage.[21] The information necessary for the study was retrieved from an organization-wide database of the Basque Health Service, called Oracle Business Intelligence (OBI), which has stored anonymous administrative and clinical data from all primary care, and outpatient, emergency and inpatient hospital care consultations at all the primary health centres and public hospitals since 2003.[14,15] A search was performed in OBI looking for specific codes in both primary care and hospital care (outpatient clinic, emergency department, and hospital ward) databases. The study protocol was approved by the Ethics and Clinical Research Committee of Euskadi (code PI2019078).

Study population

The reference population was all the individuals registered in the Basque Health Service who as of 31 December 2018 were between 1 and 30 years old. Within this general population, we identified individuals diagnosed with any of the following mental disorders: substance use (mental and behavioural disorders due to psychoactive substance use), conduct disorders (behavioural and emotional disorders with onset usually occurring in childhood and adolescence, suicidal ideations, suicidal attempts, intentional self-harm, antisocial personality disorder), anxiety disorder (phobic anxiety disorders, other anxiety disorders, obsessive–compulsive disorder, reaction to severe stress, and adjustment disorders, dissociative and conversion disorder, somatoform disorders, eating disorders), depression (major depressive disorder, persistent mood disorders), psychosis (schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders, manic episode, bipolar disorder) or ADHD. The supplementary material (Table SM1) describes the ICD-9 and ICD-10 codes used.

We also searched for prescriptions to avoid missing patients with double coverage. As patients seek drug reimbursement through the public system, however, those who had any prescription for antidepressants (Anatomical Therapeutic Chemical [ATC] code N06A group) or antipsychotics (ATC code N05A group) were also identified and included in the categories of depression and psychosis respectively. This inclusion criterion captured 49.3% of the cases of depression and 17.4% of those of psychosis.

Study variables

The registry information referring to sociodemographic and clinical data included age, sex, pharmaceutical co-payment code, vital status (alive/dead) at the start and end of 2018, date of death (if appropriate), diagnoses, date of diagnoses, prescription of medications (antidepressants and/or antipsychotics) and psychiatric hospital admissions. The search was repeated on 1 January 2019 to be able to analyze the impact on mortality during 2018.

As an indicator of SES, we employed the pharmaceutical co-payment code of the individual themselves, or their parent or legal guardian, which is based on household income.[17] Cases in which the health cardholder was an active worker with an income greater than or equal to €18,000 were assigned to the "high SES" category, those in which the cardholder was an active worker with an income lower than €18,000 to the "medium SES" category, and those in which the cardholder was on benefits and exempt from payment or retired to the low-income category ("low SES"). The reason for the aggregation of the adolescents and young people depending on a retired cardholder regardless of that person's income (higher or lower than €18,000) can be seen in Table SM2, where we show that both groups had a high prevalence of mental disorders (24.2% and 20.5%) indicating that they contained high-risk individuals. Further, we merged the "medium" and "high" SES categories into a single group ("medium-to-high SES") for our multivariate statistical analysis to simplify the interpretation of the gender-SES interaction.[17] For descriptive purposes, however, we differentiated between active workers with medium (<€18,000) and high (≥€18,000) incomes.

We calculated the lifetime prevalence as the percentage of the population who had a diagnosis at some point in their life up to their age at the time of data collection.[11] We used four age group categories: 1–12, 13–18, 19–24 and 25–30 years.

Statistical analysis

We used the statistical software R (version 3.3.2) to perform the statistical analysis and set the threshold for significance at 0.05. First, lifetime prevalence risk were estimated by age group and type of mental disorder.

Second, a multivariate analysis was performed using log-binomial regression models. In this way, we calculated the likelihood of developing any mental disorder and specific types of disorder, adjusted for age, gender and SES. We built models for each age group separately. In addition, the age variable included in the

Table 1
Characteristics of the study population aged between 1 and 30 years as of 31 December 2018 with and without a diagnosis of mental disorder (individuals 1–30 years of age, Basque Health Registry December 31, 2018).

	Study population		Diagnosed Mental Disorder				
			No		Yes		*p*-Value[a]
	N	%	*N*	%	*N*	%	
Patients							
Total	609,381		512,710	84.1%	96,671	15.9%	
Age, years							
Mean	15.57		14.69		20.23		<0.001
0–12	246,275	40.4%	231,079	93.8%	15,196	6.2%	<0.001
13–18	123,109	20.2%	100,582	81.7%	22,527	18.3%	
18–24	114,710	18.8%	87,918	76.6%	26,792	23.4%	
25–30	125,287	20.6%	93,131	74.3%	32,156	25.7%	
Gender							
Female	296,556	48.7%	251,825	84.9%	44,731	15.1%	<0.001
Male	312,825	51.3%	260,885	83.4%	51,940	16.6%	
Socioeconomic status							
Low	47,416	7.8%	36,945	77.9%	10,471	22.1%	<0.001
Medium	312,135	51.2%	254,306	81.5%	57,829	18.5%	
High	249,830	41.0%	221,459	88.6%	28,371	11.4%	
Municipality ≥100,000 residents							
Missing	695	0.1%	672	96.7%	23	3.3%	<0.001
No	369,454	60.6%	312,016	84.5%	57,438	15.5%	
Yes	239,232	39.3%	200,022	83.6%	39,210	16.4%	
Lifetime history Psychiatric hospitalization							
No	608,698	99.9%	512,709	84.2%	95,989	15.8%	<0.001
Yes	683	0.1%	1	0.1%	682	99.9%	
Death in 2018							
No	609,297	100.0%	512,657	84.1%	96,640	15.9%	<0.001
Yes	84	0.0%	53	63.1%	31	36.9%	

[a] Fisher's exact test and chi-square test were used for categorical variables (depending on whether they had two categories or more respectively) and Student's *t* test for continuous variables.

models for each age group allowed the OR of the other variables (SES and gender) to be adjusted for variation in age as a continuous variable. We also analyzed the likelihood of admission to a psychiatry ward and death in 2018. All models included the interaction between gender and SES, except the explanatory model for death, due to the small number of events.

Results

By December 31, 2018, the Basque Health Service database contained 609,381 individuals in the age range between 1 and 30 years, of which 15.9% (96,671) had been diagnosed with a mental disorder (Table 1). The low-SES group represented 7.8% of the population. From this more disadvantaged group, 22.1% of the individuals experienced some type of mental health disorder, compared to 11.4% in the higher income group. Half of the deaths in this age group during 2018 had a mental disorder diagnosis. Disaggregated cases for psychiatric hospital admissions and deaths are shown in Tables SM2, SM3 and SM4.

Table 2 shows the prevalence of the groups of diagnosed mental disorders as of 31 December 2018 according to age group, gender and SES. The low-SES group had a higher lifetime prevalence of mental disorders across five of the six categories; the exception being drug use disorders which were more prevalent in medium-SES individuals. The percentage of cases was higher in males for drug use (3.6% vs 2.8%), psychosis (1.4% vs 0.6%), conduct disorders (5.7% vs 3.7%) and ADHD (4.0% vs 1.5%), while females had more diagnoses of anxiety (9.0% vs 5.5%) and depression (1.0% vs 0.6%).

Table 3 and Table SM5 present the results of the logistic regression models estimating the adjusted odds ratios (AORs) with confidence intervals (CIs) of being diagnosed with any of the mental disorders adjusting for age group, gender and SES. A clear gradient appeared for any mental health disorder, with the lowest AOR in medium-to-high SES females (AOR: 1) followed by medium-to-high SES males (AOR: 1.13 [CI: 1.12–1.15]), low-SES females (AOR: 1.70 [CI: 1.65–1.76]) and low-SES males (AOR: 2.22 [CI: 2.15–2.29]), the association with SES being stronger than that with gender. The likelihood of psychosis was markedly higher in males of low SES than females of medium-to-high SES, with AORs across the age groups of 22.42 (CI: 19.29–26.05) (25–30 years), 7.08 (CI: 5.98–8.37) (19–24 years), 4.36 (CI: 3.61–5.27) (13–18 years) and 6.22 (CI: 5.06–7.65) (1–12 years). The AORs were also notably high in the case of conduct disorders (6.14 [CI: 5.33–7.07], 2.55 [CI: 2.32–2.80], 2.55 [CI: 2.35–2.76] and 2.91 [CI: 2.67–3.18]), drug use (3.90 [CI: 3.50–4.35], 2.02 [CI: 1.82–2.24] and 1.55 [CI: 1.26–1.91]) and ADHD (5.81 [4.50–7.52], 3.70 [CI: 3.31–4.13], 3.21 [2.92–3.54] and 3.14 [CI: 2.68–3.67] respectively). For internalizing clusters (anxiety and depression), the direction of the gender association was reversed, with a lower likelihood of these conditions in males (AORs of 0.58 [CI: 0.57–0.59] and 0.58 [CI: 0.54–0.61] respectively) (Table SM5).

Table 4 shows that the likelihood of any admission to a psychiatry ward followed a clear gradient in the older groups (19–24 and 25–30 years), with medium-to-high SES women at the lowest risk (AOR:1) and low-SES men the highest (AOR: 6.66 [CI: 5.25–8.44]); females were only more likely to be admitted in the 13–18-year-old group. The presence of mental illness was significantly associated with the likelihood of dying (AOR = 2.38 [CI: 1.49–3.78]) as can be seen in Table 4 and the most striking result was that low SES was associated with a more than five-fold higher likelihood, the AOR being as high as 10.33 (CI: 4.43–24.07) in 25–30-year-olds. The association of death with gender was less clear, the only significant AOR being that of 19–24-year-old men (3.39 [CI: 1.12–10.31]).

Table 2
Lifetime prevalence and characteristics of the study population by type of mental disorder diagnosed.

	All the study population		Substance use		Anxiety		Depression		Psychosis		ADHD		Conduct disorders	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Patients														
Total	609,381	100.0	19,507	3.2	44,081	7.2	4972	0.8	6084	1.0	16,986	2.8	28,778	4.7%
Age, years														
0–12	246,275	40.4	10	0.0	3347	1.4	54	0.0	1460	0.6	2896	1.2	8802	3.6
13–18	123,109	20.2	1427	1.2	7434	6.0	645	0.5	1327	1.1	6829	5.5	9311	7.6
18–24	114,710	18.8	6548	5.7	13,044	11.4	1685	1.5	1386	1.2	5405	4.7	6590	5.7
25–30	125,287	20.6	11,522	9.2	20,256	16.2	2588	2.1	1911	1.5	1856	1.5	4075	3.3
Gender														
Females	296,556	48.7	8364	2.8	26,814	9.0	3095	1.0	1717	0.6	4421	1.5	10,941	3.7
Males	312,825	51.3	11,143	3.6	17,267	5.5	1877	0.6	4367	1.4	12,565	4.0	17,837	5.7
Socioeconomic status														
Low	47,416	7.8	1916	4.0	4618	9.7	643	1.4	1177	2.5	1880	4.0	3968	8.4
Medium	312,135	51.2	14,152	4.5	28,509	9.1	3328	1.1	3241	1.0	8642	2.8	15,258	4.9
High	249,830	41.0	3439	1.4	10,954	4.4	1001	0.4	1666	0.7	6464	2.6	9552	3.8

ADHD: attention deficit hyperactivity disorder.

Discussion

To our knowledge, this is the first study analysing inequalities in mental health in children, adolescents and youth in a large general population registry simultaneously considering gender and SES. Besides a higher prevalence of mental disorders, low SES and male gender were associated with an excess mortality risk. Similarly, admission to a psychiatric ward showed inequalities by both SES and gender. These findings are discussed in detail below.

Our results confirm a gradient in the likelihood of diagnosed mental disorders when considering subgroups by gender and SES.[7,10] The group with the poorest mental health is that of low-SES males whose likelihood of being diagnosed with substance use, conduct disorders or ADHD was three to four times higher than that of the reference group (medium-to-high SES females), and most strikingly, their likelihood of being diagnosed with psychosis was eight times higher. As expected given the literature,[8,9] the prevalence of internalizing mental disorders (depression and anxiety) is higher in females, their risk of this type of diagnosis being nearly double that in males. The models are consistent in showing that the risk of all categories of mental disorder in lower SES groups is approximately double that in higher SES groups across all the ages studied.

Two mechanisms have been proposed to explain the association between SES and poorer health: social causality and health selection.[7,10] The finding that inequalities appear at an early age strengthens the evidence for an association with low family income, which would support social causality.[22] On the other hand, the alternative theory of selection for poor family health may also play a role, especially, in the age range covered by our study. Hoffman et al. reported that in the transition from childhood to working age, the two paths were similarly important, while in old age, causation is more important than selection.[23] Although children's health does not determine family income, as Reiss pointed out, mental health problems among parents may underlie generational cycles of deprivation across generations.[7] Further, child and adolescent resilience to stress is very dependent on interactions with their parents or legal guardians. As Oliver-Parra et al. highlight, not only SES but also parents' mental disorders play a key role in the risk of mental disorders in children, enhancing the theory of selection by health.[17] The complexity of psychological development makes it difficult to distribute weights between the two theories,[7] the aetiology of mental problems involving a wide range of genetic and environmental determinants.[24]

The patterns of gender inequality described in our study are consistent with findings from both retrospective surveys[11] and population registries.[8,9,17] Specifically, in our study, the risk in young males was significantly greater for any mental disorder and externalizing disorders like conduct disorders and substance use, and much higher for psychosis and ADHD. In contrast, the risk of internalizing disorders like depression and anxiety in males was approximately half that in females. As in the aforementioned studies, the overall prevalence of any mental disorder in the population between 1 and 30 years of age is higher in males. This finding is explained by the fact that while the risk of anxiety and depression diagnoses in adolescents and young people is higher in females, the prevalence of other diagnoses (substance use, psychosis and conduct disorders) is much lower.[8,9,11]. In contrast, studies based on self-reported surveys of the general Spanish population indicate that mental health disorders are more frequent in females than in males.[24,25] Women systematically have poorer perceived health in surveys, while young men are more frequently diagnosed with mental health problems by health services.[8,9] The explanation lies in the use of questionnaires such as the General Health Questionnaire that are better at identifying internalizing disorders.[26] Externalizing disorders are more visible because they directly affect interpersonal relations and behaviour, hampering personal relationships in the family, at school and in the community. In addition, ADHD is closely related to school performance. Moreover, in both genders, the social stigma associated with mental disorders hampers access to mental health services.[27]

Previously, excess mortality has been found in young people with mental disorders in Danish and Swedish registries but without taking into account SES.[18,19,28] In addition to confirming the mortality excess, the novelty of our work is to have considered SES which has revealed its even greater impact, lower income being associated with a five-fold higher risk of death, making the social gradient clearly visible.[10] We did not ascertain the causes of that excess in our population. An excess has been described throughout life in people with mental disorders, and 77.7% of this has been attributed to physical health problems, such as cardiovascular diseases (29.9%) and cancer (13.5%), and 13.9% to suicide.[20]

The existence of clear inequalities by SES suggests the need for early identification of mental health disorders and initiation of social, family and school interventions to improve social and community resilience, providing resources in society that buffer the negative effects of short-term risk factors.[12,16] The health system can provide care for individuals when problems are diagnosed,

Table 3
Association of diagnosed mental disorders (multivariate adjusted odds ratios) with age group, gender and socioeconomic status in the population between 1 and 30 years of age.

	Any mental health disorder	Substance use	Anxiety	Depression	Psychosis	ADHD	Conduct disorders
Total							
Age	1.09 (1.08–1.09)**	1.20 (1.20–1.20)**	1.13 (1.13–1.13)**	1.16 (1.16–1.17)**	1.05 (1.05–1.06)**	1.03 (1.03–1.03)**	1.01 (1.01–1.02)**
Gender: female; SES: medium-to-high	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Gender: male; SES: medium-to-high	1.13 (1.12–1.15)**	1.34 (1.30–1.38)**	0.58 (0.57–0.59)**	0.58 (0.54–0.61)**	2.39 (2.25–2.55)**	2.79 (2.69–2.89)**	1.58 (1.54–1.62)**
Gender: female; SES: low	1.70 (1.65–1.76)**	1.91 (1.77–2.06)**	1.75 (1.67–1.83)**	2.20 (1.98–2.46)**	2.78 (2.46–3.15)**	1.57 (1.43–1.72)**	1.95 (1.85–2.06)**
Gender: male; SES: low	2.22 (2.15–2.29)**	2.75 (2.57–2.95)**	1.12 (1.07–1.18)**	1.56 (1.37–1.78)**	8.07 (7.40–8.79)**	4.44 (4.16–4.73)**	3.27 (3.12–3.43)**
1–12 years							
Age	1.28 (1.27–1.28)**	2.01 (1.28–3.14)**	1.29 (1.27–1.31)**	1.63 (1.41–1.88)**	1.12 (1.10–1.14)**	1.48 (1.46–1.51)**	1.25 (1.24–1.25)**
Gender: female; SES: medium-to-high	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Gender: male; SES: medium-to-high	1.85 (1.78–1.92)**	0.47 (0.12–1.86)	1.11 (1.03–1.20)**	1.31 (0.74–2.32)	3.93 (3.42–4.52)**	2.61 (2.39–2.85)**	1.83 (1.74–1.92)**
Gender: female; SES: low	1.57 (1.44–1.71)**	1.70 (0.20–14.12)	1.61 (1.38–1.87)**	1.04 (0.24–4.46)	1.47 (1.02–2.13)*	1.41 (1.13–1.76)**	1.59 (1.43–1.78)**
Gender: male; SES: low	2.87 (2.68–3.08)**	-	1.77 (1.54–2.04)**	1.94 (0.66–5.68)	6.22 (5.06–7.65)**	3.14 (2.68–3.67)**	2.91 (2.67–3.18)**
13–18 years							
Age	1.10 (1.09–1.11)**	1.76 (1.69–1.83)**	1.18 (1.16–1.20)**	1.42 (1.35–1.50)**	1.03 (1.00–1.06)	1.09 (1.07–1.10)**	1.00 (0.98–1.01)
Gender: female; SES: medium-to-high	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Gender: male; SES: medium-to-high	1.40 (1.36–1.44)**	1.14 (1.02–1.28)*	0.67 (0.64–0.71)**	0.62 (0.52–0.73)**	2.29 (2.01–2.62)**	2.68 (2.53–2.84)**	1.52 (1.45–1.60)**
Gender: female; SES: low	1.60 (1.50–1.70)**	1.53 (1.24–1.90)**	1.65 (1.51–1.80)**	1.58 (1.21–2.08)**	1.97 (1.53–2.55)**	1.21 (1.05–1.39)**	1.62 (1.48–1.78)**
Gender: male; SES: low	2.19 (2.07–2.32)**	1.55 (1.26–1.91)**	1.14 (1.04–1.26)**	1.13 (0.84–1.54)	4.36 (3.61–5.27)**	3.21 (2.92–3.54)**	2.55 (2.35–2.76)**
19–24 years							
Age	1.02 (1.01–1.02)**	1.14 (1.12–1.16)**	1.08 (1.07–1.09)**	1.07 (1.04–1.10)**	1.02 (0.99–1.06)	0.88 (0.87–0.90)**	0.91 (0.90–0.92)**
Gender: female; SES: medium-to-high	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Gender: male; SES: medium-to-high	1.02 (0.99–1.05)	1.30 (1.23–1.38)**	0.52 (0.50–0.54)**	0.52 (0.47–0.58)**	2.01 (1.76–2.29)**	2.84 (2.66–3.04)**	1.43 (1.36–1.51)**
Gender: female; SES: low	1.58 (1.49–1.69)**	1.56 (1.40–1.75)**	1.62 (1.51–1.74)**	1.88 (1.60–2.22)**	2.59 (2.05–3.26)**	1.20 (1.01–1.41)*	1.56 (1.39–1.75)**
Gender: male; SES: low	1.67 (1.57–1.77)**	2.02 (1.82–2.24)**	0.85 (0.78–0.93)**	1.04 (0.84–1.28)	7.08 (5.98–8.37)**	3.70 (3.31–4.13)**	2.55 (2.32–2.80)**
25–30 years							
Age	1.04 (1.03–1.04)**	1.06 (1.05–1.07)**	1.07 (1.06–1.08)**	1.08 (1.06–1.11)**	1.06 (1.03–1.09)**	0.77 (0.75–0.79)**	0.91 (0.89–0.92)**
Gender: female; SES: medium-to-high	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Gender: male; SES: medium-to-high	0.81 (0.79–0.84)**	1.36 (1.31–1.42)**	0.51 (0.50–0.53)**	0.59 (0.54–0.64)**	1.92 (1.72–2.14)**	3.32 (2.97–3.71)**	1.41 (1.32–1.51)**
Gender: female; SES: low	1.92 (1.78–2.08)**	2.06 (1.84–2.31)**	1.82 (1.67–1.98)**	2.42 (2.04–2.88)**	5.39 (4.39–6.63)**	1.48 (0.99–2.23)	3.36 (2.89–3.92)**
Gender: male; SES: low	2.32 (2.11–2.54)**	3.90 (3.50–4.35)**	1.10 (0.98–1.23)	2.22 (1.81–2.74)**	22.42 (19.29–26.05)**	5.81 (4.50–7.52)**	6.14 (5.33–7.07)**

ADHD: attention deficit hyperactivity disorder. SES: socioeconomic status.
* $p < 0.05$;.
** $p < 0.01$.

Table 4
Association of admission to hospital psychiatry wards in 2018 (multivariate adjusted odds ratios) with age group, gender and socioeconomic status in the population between 1 and 30 years of age.

Psychiatric hospitalization	Total	1–12 years	13–18 years	19–24 years	25–30 years
Number	683	13	187	204	279
Age	1.12 (1.11–1.13)**	1.85 (1.30–2.65)**	1.27 (1.16–1.38)**	1.08 (0.99–1.17)	1.00 (0.93–1.07)
Gender: female, socioeconomic status: higher	Reference	Reference	Reference	Reference	Reference
Gender: male, socioeconomic status: higher	1.22 (1.03–1.45)*	3.73 (0.79–17.55)	0.70 (0.50–0.96)*	1.83 (1.31–2.55)**	1.28 (0.97–1.69)
Gender: female, socioeconomic status: low	3.64 (2.74–4.85)**	5.13 (0.47–56.63)	2.01 (1.25–3.24)**	2.33 (1.27–4.28)**	6.48 (4.15–10.12)**
Gender: male, socioeconomic status: low	6.66 (5.25–8.44)**	9.56 (1.35–67.92)*	1.33 (0.77–2.31)	6.38 (4.16–9.80)**	17.70 (12.45–25.16)**
Death	**Total**	**1–12 years**	**13–18 years**	**19–24 years**	**25–30 years**
Number	84	25	14	18	27
Age	1.03 (1.00–1.06)*	0.90 (0.79–1.01)	1.09 (0.79–1.49)	1.09 (0.82–1.43)	1.12 (0.90–1.41)
Gender: female	Reference	Reference	Reference	Reference	Reference
Gender: male	1.55 (0.99–2.40)	1.30 (0.58–2.90)	0.48 (0.16–1.43)	3.39 (1.12–10.31)*	2.21 (0.99–4.93)
Socioeconomic status: medium-high	Reference	Reference	Reference	Reference	Reference
Socioeconomic status: low	5.42 (3.41–8.62)**	2.85 (1.06–7.62)*	5.64 (1.94–16.38)**	7.40 (2.89–18.96)**	10.33 (4.43–24.07)**
Mental health disorder: no	Reference	Reference	Reference	Reference	Reference
Mental health disorder: yes	2.38 (1.49–3.78)**	4.57 (1.60–13.06)**	3.00 (1.02–8.75)*	2.20 (0.86–5.62)	1.88 (0.87–4.09)

* $p < 0.05$.
** $p < 0.01$.

but primary and secondary prevention requires other stakeholders to be active.[12,16] Early treatment is crucial but does not avoid the stigma associated with mental disorder diagnoses and treatments.[27] Stereotypes, prejudices and discrimination associated with stigma make the effects of mental illness go beyond its symptoms and associated disabilities.[29] In this context, primary prevention targeting all adolescents would strengthen the resilience of adolescents and young people to environmental stress helping them to manage conflicts efficiently.[12] Besides primary prevention, interventions for secondary prevention could be implemented for high-risk adolescents.[30]

Data routinely recorded from the EHR in childhood, adolescence and youth could help to stratify populations that might benefit from specific interventions.[16] Given their higher absolute risk, primary prevention would especially benefit low-SES young people and adolescents and their families.[31] Addressing social determinants is necessary to reduce mental health inequalities as the global burden of these disorders is unlikely to be alleviated simply by improving better access to mental health services.[32] The United Nations in its 2030 Agenda for sustainable development has highlighted education as a key dimension in the goal of reducing health inequalities in Goal 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). In addition, Objective 3 (Ensure healthy lives and promote well-being for all at all ages) makes explicit reference to the promotion of mental health.[33,34]

Limitations

The main limitations of our work are related to the biases associated with the database and especially the lack of validation of the diagnostic categories. As in other observational studies, the cohort effect may bias the results.[8,35] Our work, like other real-world data studies,[8,9,17] is based on an EHR and the creation of databases that integrate information on hospital admissions, outpatient clinics, emergency departments and primary care allowing the identification of all the diagnoses of individuals throughout their way through the health system. The severity of most of the disorders analyzed in our study may be mild, since general practitioners only refer a third of cases to psychiatrists. Nonetheless, the consistent patterns in the gender and SES inequalities in morbidity, hospitalization and mortality found in our study support the robustness of the results. Moreover, household income was assigned using individuals' co-payment category, which is based on employment and income information from government tax records, and previous studies have provided evidence of the validity of this approach.[17]

Second, the finding of a much higher likelihood of admission to a hospital psychiatric ward for low-SES individuals should be interpreted with caution because our data come from the public health system. Although universal health coverage is provided in the Basque Country, 20% of under-25-year-olds also have private insurance. People with double health insurance coverage, use the public health system less than those without double coverage.[36] As the higher their income, the more likely people are to take out private insurance, the lack of private sector utilization data could mean that our figures underestimate prevalence rates, and especially psychiatric hospital admissions. Our study has sought to overcome this bias by including individuals that used the public system just to subsidize the cost of their prescriptions, as private insurance does not do this, but we recognize that this is not a proxy for either psychiatric ward admissions or outpatient clinic consultations. Nonetheless, while private psychiatric consultations are plentiful, there are few private psychiatric hospital facilities in the Basque Country. Therefore, we believe that any bias due to private ward admissions (not recorded in our registry), is unlikely to have had a major influence on our findings.

Third, the lack of data on the specific cause of mortality and the small number of death events hamper the assessment of the relationship of mortality with gender and SES, which needs subgroup analysis. Nevertheless, information from the Basque Institute of Statistics validated our mortality data.

Fourth, as registries only capture data on users of health services, a similar limitation applies to outpatient diagnoses, it having been found that only approximately 40% of people from the general population with mental illness symptoms demand care in the same year as the onset of their disorder.[37] This delay is particularly worrying in the context of another finding of the same study, namely, that time to initial help-seeking was inversely related to age at onset. On the other hand, for the analysis of inequalities, the focus of our study, differences by SES and gender in demanding care are of greater interest. As noted above, since the high-SES population frequently also has private health insurance, they may be underrepresented in our database; however, the inclusion of prescriptions to avoid missing patients with double coverage helped to minimize this problem.

To conclude, our study has achieved its objective by showing substantial gender and social inequalities in mental health and premature mortality among adolescents and young adults. Females of

medium-to-high SES had the lowest prevalence of all mental disorders, except anxiety and depression, followed by males of the same SES and females of low SES, while the highest prevalence of mental disorders was observed in low-SES males. Moreover, the lower income categories had higher risks of psychiatric admission and death. Society must take into account that adults are forever shaped by the children, adolescents and youth they once were. Society must take into account that adults are forever shaped by the children, adolescents and youth they once were.

Authors' contributions

JM conceived and designed the research. IL, OI, and MMA obtained the data, interpreted the data and drafted the results section. AGP, CLH, AF and IIB reviewed and designed methods to classify mental disorders, performed the analyses and drafted the corresponding methods section. JM, IL, JA and EdM drafted the manuscript and approved the final manuscript. All authors revised the manuscript for important intellectual content and approved the final manuscript. All authors had full access to the full data in the study and accepted responsibility to submit for publication.

Compliance with ethical standards

This study was performed in line with the principles of the Declaration of Helsinki and received approval from the Basque Ethical Committee.

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Conflict of interest

The authors report no biomedical financial interests or potential conflicts of interest.

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Appendix A. UPRIGHT consortium

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Appendix B. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.rpsm.2022.07.001.

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