Temporal patterns in the annual incidence of common mental disorders over two decades: A primary care cohort study

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Abstract

Background: Common mental disorders (CMD) including depression, anxiety, and stress are very common, but it is unclear whether the last two decades of social, economic, and political change have impacted incidence of CMD. This study explored longer-term temporal trends in the incidence of CMD in the UK.

Methods: We used data from general practices in the UK (Clinical Practice Research Datalink) to estimate the incidence of news episodes of CMD, including of symptom, diagnosis, or pharmaceutical treatment. Trends were explored by age group, sex, ethnicity, deprivation, and physical comorbidity.

Results: We included 29,480,164 individuals followed for 12.5 years on average (SD=6.4 years). The incidence of CMD episodes was 55.9 per 1,000 person-years in 2000 (95% CI 55.8–56.1), increasing to 79.6 per 1,000 person-years in 2019 (95% CI 79.5-79.8). Females had higher incidence rates, as did those living in more deprived areas. There were differing patterns of incidence by ethnic group, with a steeper increase in Asian, Black, and Mixed groups in recent years. We observed striking patterns by age over time, with rates in ages 16-24 increasing from 40.2 per 1,000 in 2000 (95% CI 39.8–40.5), to 107.8 per 1,000 in 2019 (95% CI 107.0–108.6). In contrast, the rates in those aged 55 or older decreased since 2014.

Conclusions: Overall, the incidence of recorded CMD in UK general practice increased between 2000 and 2019 with a small decrease in 2020. We found large differences across demographic characteristics, which may have implications for primary, secondary, and tertiary prevention.

Background

Common mental disorders (CMD), including anxiety, depression, and more non-specific stress, are highly prevalent mental health conditions which affect millions each year and contribute to substantial psychological distress and reduced social functioning. Recent estimates suggest that 1 in 5 have met the criteria for a common mental disorder in the past year, and 1 in 4 during in their lifetime (Steel et al., 2014). CMD accounted for 12.5% of sickness absences in the UK in 2018 (Office for National Statistics, 2018), and remained a leading cause of absences through 2020 (11.6%) despite the emergence of coronavirus-related sickness, which accounted for 14.0% of sickness absences (Office for National Statistics, 2020). Common mental disorders contribute to a substantial proportion of disability-adjusted life years lost (DALYs), including 1.5% due to depressive disorders and 1.1% due to anxiety disorders globally (Vos et al., 2020).

Importantly, the burden of CMD is not distributed equally across population groups. Higher rates of CMD have been observed in females compared to males, lower socioeconomic groups, people living in deprived neighbourhoods, and people with chronic conditions (Doherty & Gaughran, 2014; Fone et al., 2013; Muntaner, Eaton, Miech, & O'campo, 2004; Steel et al., 2014). Previous research has also noted patterns by age, ethnicity, and region, with historically marginalised groups experiencing a disproportionate burden of CMD (Cooper et al., 2010, 2013; Lewis & Booth, 1992; Weich, Holt, Twigg, Jones, & Lewis, 2003). These links between common mental disorders and socioeconomic conditions suggest that wide-spread changes to the social and economic conditions of a country may correspond to changes in the rates of common mental disorders. Periods of economic downturn, job loss, and reduced income have been linked to worse mental health outcomes (Muntaner et al., 2004), including depression, psychological distress, and suicide, a phenomenon sometimes described as 'diseases and deaths of despair' (Brignone et al., 2020). The effects of economic crises can have a disproportionate impact on historically marginalised groups, further exacerbating inequalities in mental health.

Periods of economic downturn, like the 2007-08 global financial crisis are often followed by the introduction of austerity measures, ostensibly to curb public debt and stimulate the economy. Like many countries, the United Kingdom (UK) introduced a range of austerity measures following the global financial crisis beginning in 2010, including cuts in public expenditure for health and social services (Marmot, Allen, Boyce, Goldblatt, & Morrison, 2020). These spending cuts and changes to taxation and benefits systems had a disproportionate impact on the low-income households in increased levels of poverty, growing income inequality (Innes & Tetlow, 2015; Muntaner et al., 2004), and the erosion of social support programme and welfare systems, contributing to growing poverty and income inequality across the UK (Poinasamy, 2013). After a decade of austerity measures, the economic shock and unprecedented social change resulting from the COVID-19 pandemic has further intensified existing health and social inequalities. Examining long-term trends of CMD in the population can provide important critical information on the burden of CMD, relevant determinants, and treatment needs, however, there was a paucity of research examining CMD over time.

Aim: Our aim was to examine long-term temporal trends in the annual incidence of common mental disorders in UK adults using primary care data. In this study, we explored the incidence of CMD over a 20-year period (2000-2020), marked by large macrosocial and economic changes. We used a broad case definition of common mental disorders, including anxiety, depression, and stress-related symptoms, disorders, and pharmaceutical treatment, in order to build on previous disorder-specific research over shorter time periods (Rait et al., 2009; Walters, Rait, Griffin, Buszewicz, & Nazareth, 2012). Further, we had access to key sociodemographic variables which allowed us to generate stratum-specific estimates of the annual incidence. We hypothesised that CMD incidence would increase during the decade following the financial crisis of 2007-2008 and the introduction of austerity measures, with evidence for increasing inequalities and would be more pronounced in areas with higher deprivation. As a secondary aim, we explored incidence separately by CMD type to estimate if any temporal changes could be attributed to diagnoses and symptom recording or changes in pharmaceutical treatment.

Methods

Study design and data source: We created a longitudinal cohort of over 29 million UK adults aged 16 or older registered to a general practice using de-identified individual electronic health records from the Clinical Research Practice Datalink (CPRD) Aurum and Gold databases (Clinical Practice Research Datalink, 2021a, 2021b). As practices can change from Gold into the Aurum database over time, we de-duplicated the data if a patient was present in both databases. CPRD includes individual consultation records from general practitioners containing patient demographic information, symptoms, diagnoses, medications, prescriptions, referrals to secondary care, and death date. CPRD is broadly representative of the English population with respect to age, sex, ethnicity, and region (Clinical Practice Research Datalink, 2022).

Cohort entry occurred when participants were at least 16 years of age and registered at their general practice for at least 12 months between 1 January 1999 and 31 December 2020. Cohort exit occurred when patients left the practice, died, or developed CMD, whichever was earliest. CPRD data was linked to Office for National Statistics (ONS) death registration data, as death dates are more accurately recorded in ONS compared to CPRD. When only the year of death was available, we used the median calendar date in that year (2 July) as death date. This study was approved by the Independent Scientific Advisory Committee for CPRD research (ISAC Protocol 21_000354). This protocol was agreed by all co-authors and pre-registered on Open Science Framework (https://osf.io/ka7uw/).

*Outcome*s: The outcomes of this study were a record of common mental disorder within primary care. CMD codes included: (i) symptoms or diagnosis of an anxiety disorder, or a depressive disorder, or a mixed depressive and anxiety disorder, or stress, or (ii) pharmaceutical treatment for an anxiety disorder or depressive disorder, including prescriptions for antidepressants and anxiolytics. Clinical procedures, assessments, diagnoses, symptoms, and prescriptions are recorded in patient records using Read and SNOMED codes (Appendix 1 for full code list).

Annual incidence of common mental disorders was calculated (per 1,000 person-years at risk). CMD are commonly recurrent, episodic disorders over lifetimes. We defined an incident episode of CMD when there was a new record of CMD diagnoses, symptoms, or pharmaceutical treatment in primary care records, where there had been no such code in at least 1 year prior. We reviewed data from 1 January 1999 to exclude prevalent cases at the start of follow-up (1 January 2000). For similar reasons, we excluded the first year of registration at a practice to avoid misclassifying prevalent cases who had transferred from another practice or were receiving treatment for common mental disorders elsewhere. After each CMD episode, we considered a patient to be at risk of another incident CMD episode if at least one year had elapsed since receiving a CMD code.

Covariates: We included sex (female, male), age (10-year age bands), UK (England, Scotland, Northern Ireland, Wales), ethnicity (Asian, Black, Mixed, Other, White, Unknown), and physical comorbidity as covariates. We included region and practice-level deprivation for those registered to English practices.

We categorised patients into five ethnic groups: Asian; Black; Mixed; Other; White; or Unknown, based on recorded values in their patient records. Patients with multiple ethnicity codes were categorised in the following way. When all recorded ethnicity codes were concordant, the patient was assigned that ethnicity. However, if a patient had received two or more discordant ethnicity codes, we selected the modal ethnicity as recorded in their CPRD records. Where there was no modal code, the participant was flagged as having Mixed ethnicity. Finally, patients who had no record of ethnicity codes were categorised as "Unknown."

For those registered to English practices, we included 10 geographic regions used for routine data collection and administration in England: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South West, and South East. We also included area-level socioeconomic deprivation, as measured at the practice-level using the Index of Multiple Deprivation (IMD). The IMD is an aggregate score of indicators of deprivation, calculated at the practice-

level and provided as quintiles: quintile 1 (low deprivation) to quintile 5 (high deprivation).

We used the Charlson Comorbidity Index (CCI) to assess physical comorbidities present before the diagnosis of CMD. The CCI is calculated based on the number of physical comorbid conditions which are assigned an integer weight from one to six, with a weight of six representing the most severe morbidity (Charlson, Pompei, Ales, & MacKenzie, 1987). The total CCI score was calculated as the sum of these points, which we categorised into three levels: 0, 1, and 2 or more. If there was no record of physical comorbidities in the patient record, we assumed there were no comorbidities present (CCI score = 0). We brough forward older records of chronic conditions to create a cumulative score for each year in the follow-up period. For example, for a patient experiencing a myocardial infarction in 2004 (1 point) would be assigned a CCI score of 1 for the rest of the study period, which would be increased if there was a record of any further comorbidities. If this patient went on to develop localised cancer in 2007 (2 points), their CCI score would be 3 from 2007.

Statistical analysis: Participants were entered into the cohort at the start of follow-up (1 January 2000), their 16th birthday, or registration at an eligible GP practice, if later than the start of follow-up. We split the records using the Lexis expansion to calculate the annual incidence rates, and time-varying covariates calculated after the expansion. As patients were re-entered into the cohort following 365 days without receiving a code for CMD, we assumed multiple ordered failure events with discontinuous risk intervals. We calculated annual incidence rates per 1,000 person-years at risk and person-years at risk stratified for all covariates in Stata v.17.

Sensitivity analysis: We conducted a sensitivity analysis to explore incidence by type: recorded diagnosis/symptom of CMD or pharmaceutical treatment of CMD with antidepressants or anxiolytics. When comparing outcomes ascertained via diagnosis/symptom versus drug prescription, the two outcomes were considered independently, so individuals could contribute to incidence counts of both outcomes if they had received both a diagnoses and prescription in that calendar year.

Results

Descriptive statistics: The analytic sample included 29,480,164 participants from 2,248 general practices across the UK, accounting for 237,123,186 person-years, with a mean follow-up time of 12.5 years (standard deviation (SD): 6.4 years). Table 1 provides descriptive statistics of the study sample in 2000, 2010, 2020.

[Table 1 here]

There were similar proportions of females and males at all time points (e.g. females comprising 50.5% of the sample in 2000, 50.8% in 2010, and 50.5% in 2020). The mean age increased over the study period, from 46.8 (SD 18.7) to 51.8 (SD 17.9). In 2000, 68.5% of the sample did not have a recording of ethnicity, which deceased to 42.4% in 2010 and 31.6 in 2020. Of those with recorded ethnicity, the largest ethnic group was White ethnicity (2000 - 28.5%, 2010 - 48.2%, and 2020 - 54.3% of the full sample) followed by Asian ethnicity (1.6%, 4.9%, and 7.4% respectively). The proportion of the sample from each of the devolved nations remained relatively stable over time, between 83.3% and 84.7% from England, 8.0-9.0% from Northern Ireland, 5.2-5.8% from Wales, and 1.8-2.0% from Scotland.

Within England, the South East was the most common region of residence in 2000 and 2010 was the South East, accounting for 17.3 and 17.8% of the English population, respectively. In 2020, London was the largest region (18.5%) with the South East retaining a large proportion of participants (17.6%). In 2000, the level of deprivation was higher than expected with 23.0% and 24.6% in the highest two quintiles of deprivation with lower proportions (16.1 and 17.4%) in the least deprived quintiles. This persisted through the follow-up time, with 23.6% and 22.8% in the most deprived quintiles in 2020.

There were large changes in proportions with physical comorbid conditions over the study period. In 2000 3.1% had 1 comorbid condition and 1.7% had two or more. By 2020, this increased to 11.2% with one comorbidity, and 13.6% with multiple comorbid conditions.

Incidence rates of CMD episodes: The overall incidence rate (IR) for any new episode of CMD was 55.9 per 1,000 person years in 2000 (95% CI 55.8–56.1), and increased over time until 2019 (IR 79.6, 95% CI 79.5–79.8), followed by a slight decline in 2020 (IR 76.9, 95% CI 76.8-77.1) (Figure 1; Appendix 2). We noted an increase between 2005 and 2006, with overall incidence increasing from 63.6 per 1,000 person-years (95% CI 63.5–63.8) to 72.5 (95% CI 72.4–72.7) but did not see evidence for an increase in incidence following the 2007-08 financial crisis as originally hypothesised.

[Figure 1]

Incidence rates were substantially higher among females than males across the whole study period, with broadly parallel trends over time in females and males. (Figure 2).

[Figure 2]

We observed large differences in the incidence rate of recorded episodes of common mental disorders over time by age. There was a steep increase in annual incidence of CMD among those aged 16 to 24, more than doubling from 40.2 per 1,000 person-years (95% CI 39.8-40.5) in 2000 to 107.8 (95% CI 107.0-108.6) in 2019. The incidence rate also increased in those aged 25-34 over the same period, but the increase was not as pronounced (2000: 57.0, 95% CI 56.7-57.4; 2019: 90.7, 95% CI 90.2-91.2). We found evidence for increasing incidence in all age groups in the first decade of follow-up (2000-2010), but differing patterns from 2011 on, with incidence continuing to increase in the youngest age groups, but stable rates in those aged 35-54, and decreasing rates in those 55 or older. For example, in those age 34-44, the incidence rate remained stable between 78.5 and 81.4 per 1,000 person-years from 2010 to 2020. The oldest age groups (55 or older) showed evidence of decreasing incidence in the second decade of follow-up. Those 75 or older, for example, had an incidence rate of 88.1 per 1,000 person years (87.5-88.6) in 2011 and an incidence rate of 74.3 per 1,000 (95% CI 73.9-74.8) in 2019. Similar decreases were observed in those aged 55-64 and 65-74.

[Figure 3]

We found distinct patterns of incident new episodes of common mental disorders by ethnic group. Incidence rates in Asian groups were stable for much of the study period, but we found a large increase from 2016 (62.5, 95% CI 61.9-63.1) to 2018 (74.3, 95% CI 73.7-75.0). For the Black ethnic group, we observed that the rate of incident CMD increased over the study period, from 52.9 per 1,000 (95% CI 51.4-54.3) in 2000 to 83.0 (95% CI 82.1-84.0) in 2019, with much of this increase occurring between 2016 and 2019. There was evidence of a pronounced increase in incidence rate from 2016-2019. In the mixed ethnicity group, we observed an increased in incidence at the start of follow-up, from 65.6 (63.0-68.2) in 2000 to 82.0 (95% CI 79.5-84.5) in 2003, after which, the incidence rate remained relatively stable from 2008-2020. CMD incidence rates were highest for the White ethnic group from 2005-2020, with a large increase in incidence between 2005 and 2006 followed by stable rates from 2007 through 2012, with some evidence of decline after 2013.

[Figure 4]

For all nations, there was evidence of increasing incidence rates at the beginning of the study (2000-2004, with a large increase between 2005 and 2006, a small decrease in 2008, and decrease between 2019 and 2020 (Figure 5). In Northern Ireland, Scotland, and Wales, there was relative stability between 2007 and 2012, with decreasing incidence rate until the end of the study period. In contrast, there was an overall pattern of increasing incidence in England from 2000 through 2019. Northern Ireland had the highest incidence rates from 2000 to 2013, after which England had the highest rates across the four nations.

[Figure 5]

Within England, the pattern was largely the same across all regions, with evidence of increasing incidence over time, with some distinct patterns, including a decrease between in 2005, a large increase in 2006, and a decrease in 2008. While the pattern looked broadly similar across regions, the level of incident CMD

varied between regions, with London showing consistently lower incidence (from 47.0, 95% CI 46.7-74.4 in 2000 to 73.2, 95% CI 72.8-73.6 in 2019) than all other regions. In contrast, the North East had elevated rates across the study period, ranging from 62.5 per 1,000 (95% CI 61.6-63.4) in 2000 to 92.3 (95% CI 91.1-93.5) in 2019.

[Figure 6]

When exploring patterns by deprivation (England only), we found evidence of a dose-response relationship between incident CMD and deprivation quintile, with lower rates of CMD in areas with lower levels of deprivation, and higher rates of incident CMD in higher quintiles of deprivation (Figure 7). There appeared to be a divergence in the incidence rates between deprivation quintile over time, with steeper increases in the most deprived quintiles when compared to less deprived areas. In 2000, the incidence in the lowest quintile was 55.4 per 1,000 person-years (95% CI 55.1-55.8) in 2000, which increased to 71.7 per 1,000 person-years (95% CI72.3-73.1) in 2010, and 74.8 per 1,000 person-years (95% CI 74.4-75.2) in 2019. The incidence rate in the most deprived quintile was similar in 2000 per 1,000 person-years (57.8, 95% CI 57.9-58.1), but increased to 85.4 per 1,000 person-years (95% CI 83.1-83.8) in 2010, and 85.9 per 1,000 person-years (95% CI 85.6-86.3) in 2019.

[Figure 7]

There were marked differences in incident CMD episodes by comorbidity score, as measured by the Charlson Comorbidity Index (CCI), with increased rates of CMD in those with greater comorbidity. In 2000, those with a 0 on the CCI had an incidence of 54.0 per 1,000 person-years (95% CI 53.9-54.1), while those with a score of one an incidence rate of 78.9 per 1,000 person-years (95% CI 78.0-79.9), and those with a score of two or more had an incidence rate of 123.2 per 1,000 person-years (95% CI 121.6-124.8) (Figure 8). Visual inspection suggested that these rates were converging over time, largely driven by increases in the group with the lowest comorbidity score and decreased incidence in the group scoring

two or more on the CCI, although we did not test for a statistical interaction with comorbidity score and time (Figure 8).

[Figure 8]

In our sensitivity analysis, we divided incident cases by episode type to compare incident rates of those who had new episodes of CMD symptoms or diagnosis included in their records versus those who had received new pharmaceutical treatment for CMD (e.g., antidepressants or anxiolytics). At the start of the study period, nearly twice the number of incident cases were due to pharmaceutical treatment than recorded symptoms/diagnosis (49.6 per 1,000 person-years, 95% CI 49.4-49.7; 25.5 per 1,000 person-years, 95% CI 25.5-25.6; respectively). Over time, the incidence rate of CMD episodes due to prescribing remained largely stable, with a small increase between from 2000 (49.6, 95% CI 49.4-49.7) until 2014 (63.5, 95% CI 63.3-63.6), and evidence of a decreasing trend thereafter. There was a comparably larger increase in diagnoses/symptoms, more than doubling from 25.5 per 1,000 person-years (95% CI 25.5-25.6) in 2000 to 68.5 per 1,000 person-years (95% CI 68.3-68.7) in 2019. The pattern was markedly different by type between 2019 and 2020, where there was a decrease in diagnosis/symptom incident cases (from 68.5 per 1,000 person-years; 95% CI 68.3-68.7 in 2019, to 62.0 per 1,000 person-year, 95% CI 61.8-62.2 in 2020), but an increase in drug prescription (from 58.5 per 1,000 person-years, 95% CI 58.3-58.6 in 2019, to 61.2 per 1,000 person-years, 95% CI 61.0-61.3 in 2020).

[Figure 9]

Discussion

Overall, we observed an increase in the annual incidence of new episodes of common mental disorders between 2000 and 2019, as recorded in primary care the UK, followed by a small decrease in 2020. The overall trend increased across the entire study period. While annual incidence rates continued to broadly increase in the last decade, we did not find clear evidence that the increased incidence of CMD could be

linked to the 2007-08 financial crisis and ensuing years of austerity in the UK.

We found notable differences in annual incidence rates of new episodes of CMD across demographic groups. Across the study period, females had nearly double the rate of incident CMD compared to males. We also found striking changing patterns in incidence over time by age. Among those aged 16-24, the incidence rate more than doubled between 2000 and 2019. A less-pronounced increase was also observed in those age 25-34. In contrast, older age groups showed increased incidence in the first decade of follow-up, with stable or decreasing incidence after 2011. At the start of follow-up, the oldest age group (75 or older) had the highest incidence rate, and the lowest rate was found in the youngest age group (16-24). The increasing incidence over time in younger age groups combined with decreasing incidence in older age groups after 2011 revealed a different pattern of incidence at the end of the study, with the highest rates in the youngest age groups, and the lowest rates in older age groups.

There were differences in the changing incidence of common mental disorders episodes over time by ethnic group. Between 2000 and 2006, incidence increased in Asian, Black, and White groups. Incidence were remarkably stable for most ethnic groups between 2008 and 2016, with an increase in Asian and Black groups between 2016 and 2019.

The overall pattern of increasing incidence over time was driven by the patterns in England, as 85% if the sample was from England. In the other three nations, incidence rates were largely stable between 2007 and 2012, with evidence of decreasing incidence after 2012. Incidence rates were highest in Northern Ireland until 2013, after which England was the nation with the highest rates of incident CMD.

When we looked in more detail at the English regions, we found that the North East and North West had consistently high rates of CMD compared to other regions, and London had the lowest incidence rates at all time points. We found evidence of a dose-response relationship between incident CMD and deprivation quintile in England, where areas with low levels of deprivation also had lower levels of

incident CMD, and vice versa. There was some evidence that the difference in incidence may be widening between the highest and lowest fifths of deprivation, but we did not statistically test this trend.

We found dramatically higher rates of incident CMD in those with high comorbidity scores. These differences were particularly pronounced in the first decade of the study, with an indication that the rates are converging over time, with decreasing incidence rates in those with high comorbidity scores and increasing rates in those with low comorbidity scores. This was in keeping with the observed changing patterns of CMD incidence by age group, as comorbidities increase substantially with age.

In our secondary analysis, we found that the overall increase in CMD incidence between 2000 and 2020 was driven by an increase in physician-recorded symptoms and diagnoses, and the rate of incident cases due to prescription of psychotropic medication remained relatively stable over the follow-up period.

Comparisons to previous research: We found evidence of increasing incidence of common mental disorders over the past 20 years, with important differences by demographic group. Our study confirms previous research showing higher CMD rates in females than males, those living in more deprived areas compared to more affluent areas, and those who have physical chronic conditions, and these differences have persisted over time.

Our study adds to the literature of common mental disorders, extending previous studies by exploring long 20-year follow-up period with detailed estimates of CMD incidence by key sociodemographic strata, which have not been explored in previous papers. A study on anxiety and depression in Wales found a lower incidence rate (20.3 per 1,000 person-years in 2000) with evidence of increasing incidence rates from 2000 to 2006 (John et al., 2016). We also noted an increase in incidence rates over this time period, but our estimates were more than double (e.g. 50.4 per 1,000 person-years in 2000). The previous study previous study only used recorded diagnoses and symptoms for their case definition of CMD, while ours additionally included pharmaceutical treatment with anti-depressants and anxiolytics, explaining our

higher rate. Our estimates of incidence for symptoms and diagnosis across the UK revealed similar estimates to this previous research (25.5 per 1,000 person-years in 2000) with an increasing trend in the first decade of follow-up.

Our incidence rates are higher than previous estimates using primary care data in the UK, due in part, to our inclusive case definition of CMD to include anxiety, depression, and stress-related diagnoses, symptoms, and pharmaceutical treatment. Previous studies often would separate these the diagnostic categories into separate estimates. For example, Rait et al (2009) estimated the incidence of diagnosed depression was 18.1 per 1,000 person years (95% CI 17.8-18.3) in 2000, and the incidence of symptoms of depression was 8.72 per 1,000 person years (95% CI 8.6-8.9). The same research team calculated the incidence of anxiety diagnoses and symptoms, finding an incidence rate in 2000 of was 7.2 per 1,000 person-years (95% CI 7.0-7.3) (Walters et al., 2012). While the magnitude of incidence estimates was lower than our study, several trends are consistent, including evidence higher rates in females compared to males, and a dose-response pattern of incidence by levels of deprivation (Rait et al., 2009; Walters et al., 2012).

Similar to our findings of an increase in CMD incidence over the study period, recent research has found an increase in anxiety disorders in the UK between 2003 and 2018, although their incidence estimates were lower than those we found due to their concentration on anxiety disorders and symptoms only (Archer, Turner, Kessler, Mars, & Wiles, 2022). Archer et al (2022) also showed a marked increase over time in the incidence of anxiety in adolescents and young adults, which was also found across common mental disorders (Archer et al., 2022).

Interestingly, previous studies did not identify an increase in depression or anxiety between 2005 and 2006 in UK data, which was apparent in our data. During this time, there was an introduction of incentives for GPs to identify depression, which likely explain the increase, rather than a true change in the incidence common mental disorders in the population. Previous research has shown that

reimbursement incentives introduced in primary care can increase the number of new depression-related diagnoses in people with chronic conditions (McLintock et al., 2014).

In our secondary analysis, we found that the incidence rate of drug prescription exceeded the incidence rate of recorded symptoms/diagnoses at most time points before 2017, which has been reported in previous research (McLintock et al., 2014). This may suggest that despite the increase over time recorded symptoms and diagnoses that we observed that clinical coding of these diagnostic categories is not always part of routine practice, emphasising the importance of including prescription information in the case definition of CMD.

The decline in incidence in 2020 aligns with a study published by Carr and colleagues (2021) which showed a considerable reduction in primary-care recorded common mental disorders during the first six-months of the COVID-19 pandemic (Carr et al., 2021). The decrease was more pronounced in recorded symptoms and diagnoses, possibly due to fewer consultations with physicians about symptoms of common mental disorders during the first year of the pandemic. The switch from in-person consultations to online and phone consultations may also have contributed to lower physician recording of CMD symptoms during the pandemic (Murphy et al., 2021). In contrast, the rates of drug prescription showed evidence of a small increase between 2019 and 2020. The differences between recorded diagnoses and prescribing may highlight changes during the pandemic to coding of CMD by physicians during a period of increased demand on the health care system.

Limitations and strengths: A key limitation of our analysis was that the data collected in CPRD is based on electronic health record data collected in general practices to support clinical practice, not for research purposes. While there were quality checks for data accuracy, there were not regular audits of coding practices to ensure that symptoms, diagnoses, and prescriptions were captured accurately.

Based on clinical knowledge, it is likely that the prescribing data was accurate and largely complete, but

the same may not be true for coding of symptoms and diagnoses. In practice, many symptoms of anxiety or depression can be recorded in the free text sections of a patient's medical record without being assigned a diagnostic or symptom code. This would result in an underestimate of the true incidence of CMD within primary care, as these patients would not have record of their CMD symptoms within the coding structure.

Several important variables are not well-captured in CPRD across the study period. Patients' ethnicity is one of the recorded variables on which the quality of CPRD data is lower: it is missing for about 50% of patients, although that proportion is decreasing over time reflecting the constant improvement of the CPRD database. Due to differences in methodology for calculating deprivation between the devolved nations, we were only able to explore deprivation in England.

Our cohort of subjects registered with a GP practice has had a considerable turnover during the twenty-year study period: overall it is made up of about 30 million people, but there are only about 8 million people per year. This allows us to assess the change in age and comorbidity rates in the UK, assuming that our sample is an accurate representation of British residents. The population of UK is aging and is becoming sicker: the average age increased by about 2 years every 10 years, and the proportion of people with longstanding illnesses had about a ten-fold increase in twenty years.

Temporal changes in coding practices could explain some of these patterns, as clinical practice is likely to have changed over the 20-years of the study. However, we do not expect these temporal changes to differentially impact population groups. For example, we have no reason to expect that changes in diagnostic practice would be more pronounced for older or younger ages and therefore is unlikely to fully account for the observed trends.

This study has many strengths, including 20 years of follow-up, an inclusive case definition, and stratum-specific estimates which allowed us to create a detailed picture of the temporal trends in CMD incidence

and provide clues to the underlying mechanisms for changing incidence over time. A key strength of this study was that it has a broadly nationally representative with more than 29 million participants. That said, while 98% of the UK population is registered to a general practitioner's surgery, this study is likely to underestimate the incidence of episodes of common mental disorders in vulnerable groups, institutionalised populations, asylum seekers, or homeless people who may be less likely to be registered and may be more likely to experience mental health problems.

While electronic medical records were not developed for research purposes, they provide an accurate estimate of clinical demand and service provision. The variables we used in this analysis were nearly complete. Apart from the aforementioned issues with missing cases due to use of free text instead of read codes, and missing ethnicity information, there was low levels of missingness on other variables. This can provide important information for practitioners and commissioners on resources needed to address mental health needs.

We used a broad case definition for CMD in this study, which reflects the shared psychopathology, high comorbidity, and diagnostic overlap between anxiety and depressive disorders (Conway et al., 2019; Kessler et al., 2008; Zbozinek et al., 2012). This broad case definition may also capture pragmatic behaviours in primary care, including the use of codes to record symptoms of mental health problems that do not meet diagnostic thresholds (e.g., low mood, anxiousness) or non-specific codes (e.g. stress-related problem) without relying on the use of specific diagnostic categories. Importantly, the patients presenting with sub-threshold symptoms of CMD or transdiagnostic symptoms are common presentations in primary care, so including them in an epidemiological analysis allows us to capture a comprehensive picture of CMD presentations to primary care.

We were also able to generate annual incidence estimates by sociodemographic group, which has not been done in previous research. For example, research has generated summary estimate of incidence by sociodemographic characteristics (e.g. one incidence rate for females and one for males covering all years

in the study period) (Rait et al., 2009; Walters et al., 2012). By disaggregating estimates for each demographic group annually, we were able to highlight differing trends over time across stratum, which would have been obscured in previous analyses. We were also able to explore patterns by region, ethnicity, and comorbidities, which have not been done in previous studies.

Meaning of findings: The key finding in this study was that the incidence of common mental disorders has increased between 2000 and 2019, however the mechanisms underlying these patterns cannot be determined in this study. There are several plausible explanations for the increase in the incidence of common mental disorders that we observed over the full study period between 2000 and 2019, including (1) increased experiences of anxiety, depression, and stress across the population; (2) changes in help-seeking behaviours, including changes in rates of consulting with GPs for mental health concerns; or (3) changes in general practice around diagnosing, prescribing, and recording of mental health symptoms and diagnoses. There is some indication that all three may contribute to the overall trend. Previous research has suggested that there has been an increase in symptoms of mental health problems in recent decades, which would support the first explanation. The decrease in recorded incidence between 2019 and 2020 was unlikely to be due to a true decrease in CMD incidence but may be a marker of decreased consultations or the shift from in-person to online consultations, resulting in lower rates of recorded symptoms and diagnoses by GPs. Other researchers have noted a reduction in GP consultations in 2020 across many long-term conditions due to the beginning of the COVID-19 pandemic (Fraser & Fisher, 2021; Murphy et al., 2021). The change we observed in incidence in between 2005 and 2006 was likely attributable to the introduction of incentives in GP practices to increase recording of mental health problems (McLintock et al., 2014), rather than a true increase in CMD incidence, consistent with the third plausible explanation for the observed trends in CMD incidence.

Conclusions

The incidence of CMD identified and recorded in primary care in the UK has been increasing over the last two decades before the COVID-19 pandemic. Importantly, we found large differences across demographic characteristics, which may have implications for the identification, assessment, and treatment of CMD across the population. In particular, the incidence of mental disorders in older adolescents and young adults is rapidly increasing.

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