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Patient demographics and psychotropic medication prescribing in Australian general practices: pre- and during COVID-19 pandemic

Getiye Dejenu Kibret[A,*], Abbish Kamalakkannan[A], Judith Thomas[A], Gorkem Sezgin[A], Rae-Anne Hardie[A], Lisa Pont[B], Precious McGuire[C], Christopher Pearce[A,D] and Andrew Georgiou[A]

For full list of author affiliations and declarations see end of paper

*Correspondence to:
Getiye Dejenu Kibret
Australian Institute of Health Innovation, Faculty of Medicine, Health and Human Sciences, Macquarie University, NSW 2109, Australia
Email: getiye.kibret@mq.edu.au

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ABSTRACT

Introduction. Mental health conditions, such as depression, anxiety, and psychological distress in the adult population significantly increased during the COVID-19 pandemic. However, the rates of prescribing psychotropic medications in adults during the COVID-19 period have not been well explored. **Aim.** The aim of this study was to examine the association between demographic characteristics and rates of prescribing psychotropic medications to general practice patients during 2018–2022. **Methods.** A total of 154 528 general practice patients aged 20 years and above were included in the study. A mixed effects negative binomial regression model was employed and incidence risk ratios (IRRs) with corresponding 95% confidence interval (CI) are presented to measure the association of demographic characteristics with rates of prescribing psychotropic medication. **Results.** Over half (56.2%) of study subjects were female and 41.4% were aged between 20 and 39 years. Males had lower prescribing rates of antidepressants (IRR = 0.95; 95% CI: 0.94, 0.97) and hypnotics and sedatives (IRR = 0.97; 95% CI: 0.96, 0.99) than females. People in the age group 60+ years (compared with age group 20–39 years) and those in low and middle socio-economic status (SES) categories (compared with high SES) had higher rates of prescribing psychotropic medication. **Conclusion.** Females, people aged 60+ years, and people with low and middle SES had higher prescribing rates of psychotropic medication. A consistent increase in prescribing rates over time, particularly during the COVID-19 pandemic, was observed. It is important that health care planners and policy makers monitor and account for population diversity and equity.

Keywords: antidepressants, anxiolytics, COVID-19, demographic, general practice, prescriptions, primary care, psychotropics.

Introduction

The use of psychotropic medications in Australia has increased over the last two decades, with general practitioners (GPs) responsible for the majority of the prescriptions. During the SARS-CoV-2 (COVID-19) pandemic, mental health and wellbeing of individuals was at the forefront of concerns, influenced by numerous factors such as public health measures implemented to contain the pandemic, financial impacts, social isolation, fear of contracting the virus, and the health status of family members.[1] New mental health diagnoses, including depression, anxiety, and psychological distress in adult and older population groups significantly increased during the COVID-19 pandemic.[2,3]

A study on the impact of COVID-19 lockdown measures in older Australians showed that a third of people aged 60–87 years had depression, while 20% experienced higher anxiety and/or psychological distress during the confinement time.[4] The COVID-19 period also saw an increase in the prescribing of psychotropic medications.[5] This increase was particularly evident in the use of antidepressants, with the rate of use in the general

WHAT GAP THIS FILLS

What is already known: The use of psychotropic medications in Australia has increased over the last two decades, with general practitioners being the primary prescribers. The COVID-19 pandemic exacerbated mental health issues in adults and the older population, leading to increased concerns about mental health and wellbeing.

What this study adds: This study estimates prescribing rates of psychotropic medication by patient demographics and found higher rates of prescribing among females, older people, and those with low to moderate SES. There was a consistent increase in prescribing rates between 2018 and 2022, particularly during the COVID-19 pandemic.

population increasing during the pandemic in comparison to past decades.[6] The percentage of Australians receiving mental health-related prescriptions rose from 16.6% in 2016–17 to 18% in 2020–21, indicating an increase in the use of such medications.[7] A study from France on psychotropic drug consumption also showed that the COVID-19 pandemic led to a significant rise in psychotropic drug use, especially in antidepressants, anxiolytics, and hypnotics.[8]

Examining psychotropic medication prescribing patterns and understanding its relation with demographic factors are crucial steps in understanding mental health care needs.[9] The study could provide valuable insights into demographic disparities on psychotropic medication prescribing patterns in Australian general practice, pre- and during the COVID-19 pandemic.

In this study, we aimed to examine the association between demographic characteristics and the rates of prescribing psychotropic medications as well as the trends in first time prescribing of these medications by GPs, during 2018–2022.

Methods

Data source and study design

The study utilised data from electronic health records of 888 general practices in the Australian states of Victoria and New South Wales. Data were obtained using the Population Level Analysis and Reporting (POLAR) tool by Outcome Health, the data custodians, with identifying information removed and unique patient de-identified keys assigned. The methods used by the POLAR tool are detailed elsewhere.[10]

The study timeframe encompassed all psychotropic medication prescriptions from January 2018 to December 2022. Ethical approval to use general practice data for research purposes was obtained by the data custodian, from the ethics committee of the Royal Australian College of General Practitioners under reference number 17-008. Consent was obtained from general practitioners for the inclusion of their electronic health records in the study, and patients were provided with the opportunity to opt-out of having their data used for research. Ethics approval to use the data for this research was obtained from the Macquarie University Human Research Ethics Committee (Reference number: 52020675617176).

Population and outcomes

The target population for this study comprised all general practice patients aged 20+ years who had received a prescription for psychotropic medications with at least one repeat. The primary outcome was frequency of prescriptions for four Anatomical Therapeutic Chemical (ATC) categories of psychotropic medications: antidepressants, antipsychotics, anxiolytics, and hypnotics and sedatives. Additionally, the trends of first time prescribing of psychotropic medicines pre- and during the COVID-19 pandemic (2018 22) were evaluated. Demographic characteristics such as patient age (categorised into 20–39, 40–59, 60+ year age groups), sex, socio-economic status (SES) (low, low-mid, mid, high-mid, high), place of residence (metropolitan vs regional/remote), state of residence (NSW vs Victoria), and years of first-time medication prescribing were assessed for differences in psychotropic medication prescribing. We used the Modified Monash Model (MMM) to determine remoteness of areas.[11] The MMM measures remoteness and population size on a scale of seven categories where MM 1 is a major city (categorised as metropolitan in this research) and MM 7 is very remote. SES was determined using the Australian Bureau of Statistics' Socio-Economic Indexes for Areas,[12] based on the relative socio-economic disadvantage index (IRSD).

Statistical analysis

We summarised categorical variables as counts and proportions. A mixed effects negative binomial regression model was employed to analyse the association between demographic variables with the rates of psychotropic medication prescribing. The negative binomial model was selected over other model families due to its capability to account for data dispersion, and the mixed effects model is particularly adept at addressing potential clustering and interdependencies observed among patients from the same practice.[13] We also used patient follow-up length between their first and last prescription as an offset to standardise the counts and allow meaningful comparisons across different observation time intervals. Incidence risk ratios (IRRs) with corresponding 95% confidence intervals (CIs) were presented as measures of association.

We also examined the trends of first-time monthly prescriptions of each psychotropic medication as a percentage

of total GP prescriptions for any drug in NSW and Victoria from January 2018 to December 2022. A seasonally adjusted autoregressive moving average (SARIMA) time series model was fitted using data spanning from 1 January 2018 to 28 February 2020 to forecast trends after the start of the COVID-19 pandemic in Australia. A comparison was plotted between the actual data and the predicted trend, highlighting the disparities due to the pandemic versus the hypothetical scenario where it did not occur. Before forecasting, the model was evaluated using residual plots, the Ljung-box test, and inverse autoregressive (AR) plots to check if it best fits the data[14] (Supplementary Fig. S1*a*, *b* and Supplementary Table S1). The proportion of missing values in our dataset was less than 3% and we applied listwise deletion, as it would have little effect on the outcomes of our study. All statistical analyses were conducted using R statistical software version 4.3.1.[15]

Results

Demographic characteristics

The study included a total of 154 528 patients (Supplementary Fig. S2) aged 20 years and above who had received prescriptions of more than one psychotropic medication in any of the ATC categories. Among these patients, 56.2% were female, 41.4% were aged between 20 and 39 years, 22.2% were aged 60+ years, 83.7% resided in metropolitan regions, and 62.8% were from the high SES category (Table 1).

Demographic factors associated with rates of psychotropic medication prescribing

Prescribing of Antidepressants

A total of 68 203 patients were prescribed antidepressants within the study period. Male patients had fewer antidepressant prescriptions than female patients (IRR = 0.95; 95% CI: 0.94, 0.97). Antidepressant prescribing rates increased with age, with an IRR of 1.07 (95% CI: 1.05, 1.08) for age group 40–59 years and 1.54 (95% CI: 1.51, 1.56) for age group of 60+ years compared with age group 20–39 years. Patients in the low (IRR = 1.14; 95% CI: 1.10, 1.18), low-mid (IRR = 1.09; 95% CI: 1.06, 1.12), mid (IRR = 1.24; 95% CI: 1.18, 1.30), and high-mid (IRR = 1.08; 95% CI: 1.06, 1.10) SES categories had higher rates of antidepressant prescribing compared to patients in the high SES category (Fig. 1).

Prescribing of Antipsychotics

A total of 24 577 patients had antipsychotics prescribed within the study period. Prescribing rates of antipsychotics were lower in the age group 40–59 years (IRR = 0.95; 96% CI: 0.94, 0.99) and higher in the age group 60+ years (IRR = 1.34; 95% CI: 1.30, 1.38) compared to the age group 20–39 years. Patients in the low (IRR = 1.27; 95% CI: 1.20, 1.36), low-mid (IRR = 1.15; 95% CI: 1.09, 1.21), mid (IRR = 1.37; 95% CI: 1.24, 1.52), and high-mid (IRR = 1.12; 95% CI: 1.08, 1.17) SES categories had higher rates of antipsychotic prescriptions compared to patients in the high SES category. The rate of prescribing antipsychotics steadily increased every year with an IRR of 1.40 (95% CI: 1.35, 1.45) in 2020, 2.0 (95% CI: 1.89, 2.08) in 2021, and 4.48 (95% CI: 4.40, 4.78) in 2022 compared to 2018 (Fig. 1).

Prescribing of Anxiolytics

A total of 22 547 patients had anxiolytics prescribed within the study period. Prescribing rates of anxiolytics were higher in the age group of 60+ years compared to age group 20–39 years (IRR = 1.41; 95% CI: 1.36, 1.45). Patients in the low (IRR = 1.12; 95% CI: 1.04, 1.21), low-mid (IRR = 1.14; 95% CI: 1.07, 1.20), mid (IRR = 1.36; 95% CI: 1.23, 1.51), and high-mid (IRR = 1.16; 95% CI: 1.12, 1.21) SES categories received more frequent anxiolytic prescriptions compared to patients in the high SES category. The rate of prescribing also increased every year compared to the 2018 reference with an IRR of 1.11 (95% CI: 1.07, 1.14) in 2019, 1.46 (95% CI: 1.40, 1.52) in 2020, 2.09 (95% CI: 1.99, 2.20) in 2021, and 4.79 (95% CI: 4.48, 5.12) in 2022 (Fig. 1).

Prescribing of Hypnotics and sedatives

A total of 39 201 patients had hypnotics and sedatives prescribed within the study period. Male patients had fewer hypnotics and sedatives prescriptions than female patients (IRR = 0.97; 95% CI: 0.96, 0.99). Patients in the age group of 60+ years had higher prescribing rates of hypnotics and sedatives compared to age group 20–39 years (IRR = 1.46; 95% CI: 1.43, 1.50). Patients in the low (IRR = 1.14; 95% CI: 1.07, 1.20), low-mid (IRR = 1.14; 95% CI: 1.09, 1.18), mid (IRR = 1.24; 95% CI: 1.15, 1.34), and high-mid (IRR = 1.11; 95% CI: 1.08, 1.14) SES categories received more frequent hypnotics and sedatives prescriptions compared to patients in the high SES category. Compared to 2018, the prescribing rates demonstrated a consistent rise each year. Specifically, the IRRs were 1.03 (95% CI: 1.01, 1.05) in 2019, 1.38 (95% CI: 1.34, 1.42) in 2020, 1.90 (95% CI: 1.84, 1.97) in 2021, and 4.60 (95% CI: 4.38, 4.82) in 2022 (Fig. 1).

Trends of first-time psychotropic medication prescribing

Between 2018 and 2020, there was a gradual increase in first-time antidepressant prescriptions, with a substantial increase coinciding with the commencement of the COVID-19 pandemic. For the other psychotropic medications (antipsychotics, anxiolytics, and hypnotics and

Table 1. Demographic characteristics of patients who received psychotropic medication prescriptions in general practice in NSW and Victoria, 2018–2022.

Variable	Overall	Antidepressants	Antipsychotics	Anxiolytics	Hypnotics and Sedatives
Patients	154 528	68 203	24 577	22 547	39 201
Sex					
Female	86 915 (56.2%)	38 206 (56%)	14 245 (58%)	12 526 (55.6%)	21 938 (56%)
Male	67 613 (43.8%)	29 997 (44%)	10 332 (42%)	10 021 (44.4%)	17 263 (44%)
Age category					
20–39	64 023 (41.4%)	32 265 (47.3%)	8564 (34.8%)	9065 (40.2%)	14 129 (36%)
40–59	56 138 (36.3%)	23 751 (34.8%)	9064 (36.9%)	8684 (38.5%)	14 639 (37.3%)
60+	34 367 (22.2%)	12 187 (17.9%)	6949 (28.3%)	4798 (21.3%)	10 433 (26.6%)
SES					
Low	6410 (4.1%)	2728 (4%)	1619 (6.6%)	771 (3.4%)	1292 (3.3%)
Low-mid	17 590 (11.4%)	8120 (11.9%)	3944 (16%)	2105 (9.3%)	3421 (8.7%)
Mid	2426 (1.6%)	1200 (1.8%)	346 (1.4%)	334 (1.5%)	546 (1.4%)
High-mid	31 060 (20.1%)	14 412 (21.1%)	4999 (20.3%)	4566 (20.3%)	7083 (18.1%)
High	97 042 (62.8%)	41 743 (61.2%)	13 669 (55.6%)	14 771 (65.5%)	26 859 (68.5%)
State					
NSW	59 303 (38.4%)	27 195 (39.9%)	10 127 (41.2%)	7858 (34.9%)	14 123 (36%)
Victoria	95 225 (61.6%)	41 008 (60.1%)	14 450 (58.8%)	14 689 (65.1%)	25 078 (64%)
Region					
Metropolitan	129 300 (83.7%)	56 623 (83%)	20 958 (85.3%)	18 622 (82.6%)	33 097 (84.4%)
Regional/remote	25 228 (16.3%)	11 580 (17%)	3619 (14.7%)	3925 (17.4%)	6104 (15.6%)
Year of first prescribing					
2018	78 332 (50.7%)	32 887 (48.2%)	13 071 (53.2%)	12 195 (54.1%)	20 179 (51.5%)
2019	34 247 (22.2%)	14 966 (21.9%)	5541 (22.5%)	4861 (21.6%)	8879 (22.6%)
2020	19 495 (12.6%)	8980 (13.2%)	2989 (12.2%)	2634 (11.7%)	4892 (12.5%)
2021	14 186 (9.2%)	7072 (10.4%)	1882 (7.7%)	1837 (8.1%)	3395 (8.7%)
2022	8268 (5.4%)	4298 (6.3%)	1094 (4.5%)	1020 (4.5%)	1856 (4.7%)
Patient with chronic diseases					
Yes	49 686 (32.2%)	22 481 (33%)	8286 (33.7%)	6997 (31%)	11 922 (30.4%)
No	104 842 (67.8%)	45 722 (67%)	16 291 (66.3%)	15 550 (69%)	27 279 (69.6%)

SES, socio-economic status.

sedatives) prescribing trends decreased between 2018 and 2020, but they spiked around the period of the COVID-19 pandemic. First time prescribing of psychotropic medication trends showed a decreasing pattern beginning in 2022 (Fig. 2).

Discussion

In this study, we investigated the association between demographic characteristics and rates of prescribing psychotropic medications. Our findings showed that females had a higher frequency of prescriptions of antidepressants and hypnotics and sedatives than males. This difference is consistent with earlier evidence showing females use psychotropic medications more frequently than males. Higher proportions of females were dispensed mental health-related prescriptions than males in Australia in 2021–22.[5] Studies in the United States on sex and psychotropic drug use indicated a difference in the use of anxiolytics and antidepressants, with females using them more frequently.[16,17] Another survey study from 10 European countries also reported that females use psychotropic medication more often than males.[18] This implies the need for further exploration into gender-specific mental health needs and a re-evaluation of prescribing

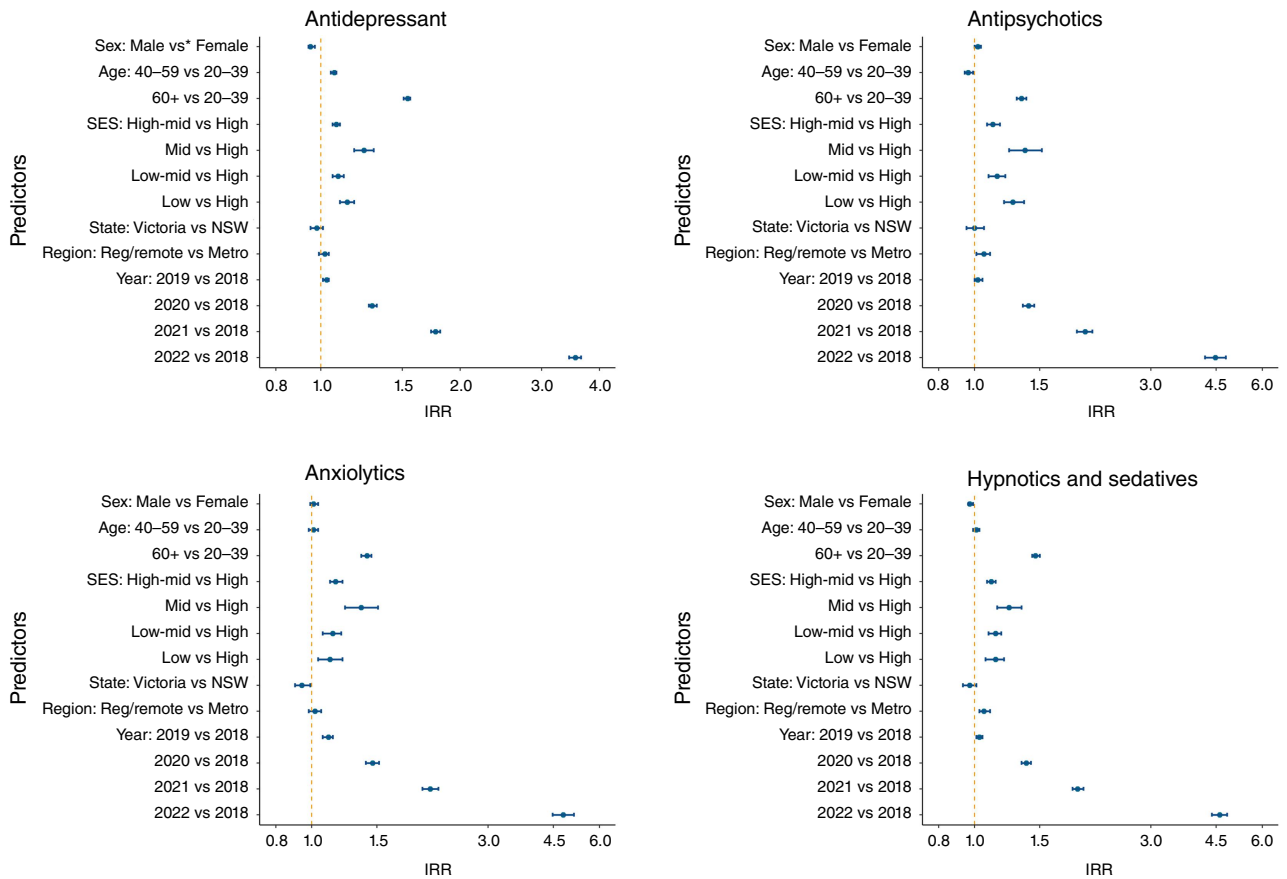

Fig. 1. Demographic characteristics associated with prescribing psychotropic medications (antidepressants, antipsychotics, anxiolytics, and hypnotics and sedatives) at general practices in NSW and Victoria, 2018–2022. Note: IRR, incidence risk ratio (adjusted); Metro, metropolitan; Reg, regional; SES, socio-economic status; *Categories to the right of vs are reference.

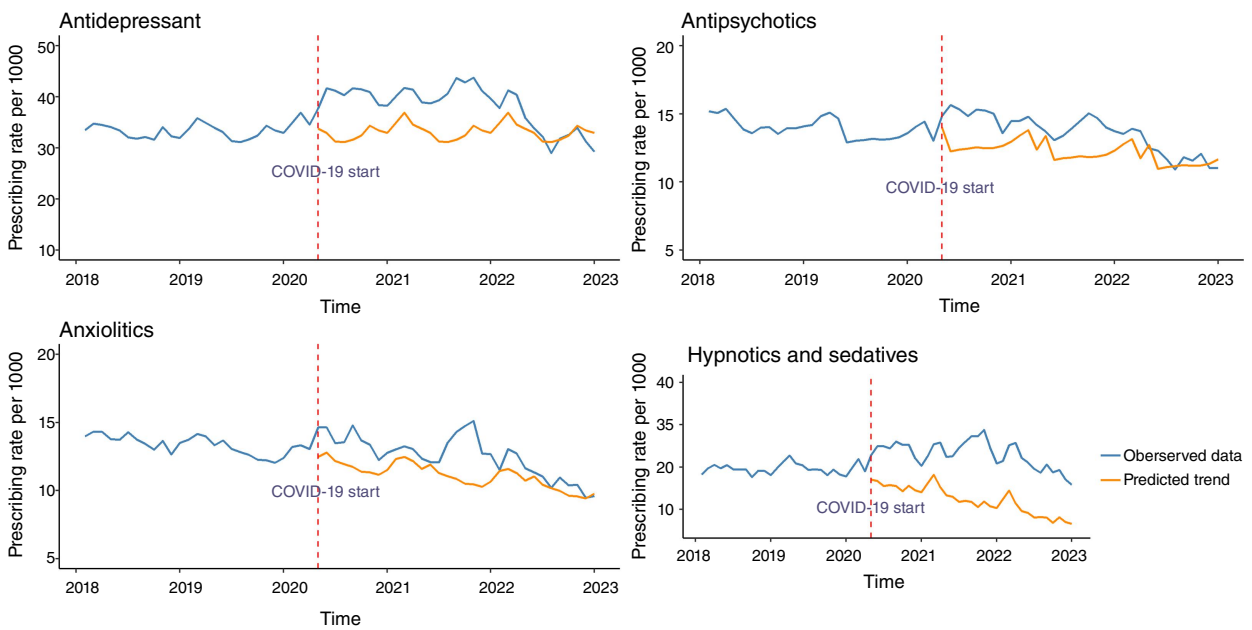

Fig. 2. Trends of first-time psychotropic medication prescribing at general practice in NSW and Victoria, 2018–2022.

practices. There was no significant association between sex and prescribing of antipsychotics and anxiolytics in our study.

The rate of prescribing psychotropic medications was higher in patients aged 60+ years in all psychotropic medications compared with the 20–39 year age group. The 40–59 year age group received a higher rate of antidepressant prescribing and a lower rate of antipsychotic prescribing compared to the 20–39 year age group. The higher prescribing rates for older age groups are consistent with prior literature in Australia and elsewhere,[5,17,19] highlighting the age-related increase in psychotropic medication prescriptions. This may be related to the growing tendency of overprescription and overuse of psychotropic medications particularly in older people, as observed in Australia[20,21] and other developed countries.[22,23]

Our findings highlighted a consistent increase in psychotropic medication prescriptions across the study period, aligning with the Australian Institute of Health and Welfare report that indicates an increase in mental health-related prescription rates from 16% in 2014–15 to 18% in 2021–22.[5] The increase in psychotropic medications, particularly during the COVID-19 pandemic years, supports the existing literature that reported increased mental health issues and related health services use during the pandemic.[24,25]

First time prescribing rates also increased during the initial year of the COVID-19 pandemic, which is consistent with a study that investigated antidepressant use during year one (2020) of the pandemic and reported an increased use at a greater rate than past decades in Australia,[26] and another study from France indicating an increased use of psychotropic medications during the COVID-19 pandemic.[8] However, there were decreasing filling of hypnotics and antidepressant prescriptions in the USA in the early weeks of COVID-19.[27] Similarly, a study in Canada indicated a decrease in new prescriptions for antidepressants and anxiolytics in the 3 months after COVID-19 restrictions were implemented, but an increase in the new use of antidepressants and antipsychotics at the end of 2020 was observed.[28] The spike in first time psychotropic medication prescribing began in the early months of 2020, before the implementation of COVID-19 containing measures in Australia. This could be attributed to the 2019–20 bushfire season, which has contributed to substantial mental health issues.

Patients in the lower and middle SES categories had higher rates of psychotropic medication prescribing compared to those in high SES. This finding is in line with previous research in Australia, which showed dispensing rates of antipsychotics for people aged 65 years and over were lower in areas of high SES.[29] This is also in agreement with studies from Norway that reported higher rates of prescribing in low SES young adults[30] and another study from Sweden that showed individuals with low income were more likely to utilise more psychotropic medications than their high income counterparts.[31] This can be due to the vulnerability of people in the low SES for multiple health problems and, as findings indicated, low SES being related to higher levels of anxiety and depression.[30]

Overall, the findings of our study highlighted variations in psychotropic medication prescribing by sex, age, and SES, implying the need for targeted service considerations in the population group with higher rates of prescribing. It is essential to underscore the need for a tailored approach in psychotropic medication prescribing that comprehensively considers the complex interplay of gender, age, and socioeconomic status.

Strength and Limitations of the study

Our results are based on a large sample of general practices across two states in Australia, with data extracted from electronic health records and therefore closely representing general practice activity. The data reflects the vast majority of mental health prescriptions, since GPs prescribed over 85% of all mental health medications in Australia in 2021–22. However, the study results are based on medication prescriptions and do not necessarily reflect patient behaviour. Therefore, we do not know if the patients are filling the prescriptions and using the medications as directed by their general practitioners. These medications could also be prescribed for medical indications other than mental.

Conclusions

Females, people aged 60+ years, and people with low and moderate SES had higher rates of psychotropic medication prescribing. The study also highlighted a consistent increase in prescribing rates over time, particularly during the COVID-19 pandemic, underscoring the importance of monitoring and adapting mental health care services to meet the evolving needs of the population, including in response to outlier events (such as a pandemic). It is important that health care planners and policy makers monitor and account for population diversity and equity.

Supplementary material

Supplementary material is available online.

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Data availability. The data that support this study cannot be publicly shared due to ethical and privacy reasons. Data will be available upon reasonable request to the corresponding author with permission from Outcome Health.

Conflicts of interest. Authors do not have any conflicts of interest.

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Author affiliations

[A]Australian Institute of Health Innovation, Faculty of Medicine, Health and Human Sciences, Macquarie University, NSW 2109, Australia.

[B]Discipline of Pharmacy, Graduate School of Health, University of Technology Sydney, Broadway, Sydney, NSW 2007, Australia.

[C]Eastern Melbourne Primary Health Network, Vic., Australia.

[D]Aurora Primary Care Research Institute, Vic., Australia.