Sociodemographic correlates of antidepressant utilisation in Australia

Andrew N Page, Sarah Swannell, Graham Martin, Samantha Hollingworth, Ian B Hickie and Wayne D Hall

ABSTRACT

Objective: To investigate sociodemographic variation in antidepressant utilisation.

Design and setting: Cross-sectional analysis of antidepressant prescription under the Pharmaceutical Benefits Scheme in Australia, 2003–2005.

Main outcome measures: Antidepressant utilisation (defined daily dose/1000/day) by sex, age, socioeconomic status (SES) and geographical area.

Results: Total antidepressant utilisation increased with age. Among those aged ⩾ 15 years, female utilisation was about double that of males. About half of antidepressant utilisation was accounted for by sertraline, venlafaxine, citalopram, and paroxetine. SES differentials in antidepressant utilisation changed across age groups for males and females: among those aged ⩽ 19 years, total antidepressant utilisation was significantly less in lower SES groups ($P < 0.001$); there was no relationship to SES among 20–29-year-olds; and among those aged ⩾ 30 years, antidepressant utilisation was significantly higher in lower SES groups ($P < 0.001$). SES differences were attenuated after adjusting for urban or rural residence, but remained statistically significant. Antidepressant utilisation rates were highest in regional centres.

Conclusion: Antidepressant utilisation in Australia partially reflects sociodemographic differences in the prevalence of affective disorder. Discrepancies between treatment provision and treatment need suggest that not all social strata in Australia have equal access to these treatments.

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Antidepressant utilisation in Australia increased almost fivefold between 1990 and 2002.[1] This appears to be due to increased use of selective serotonin reuptake inhibitors (SSRIs), which increased from about 10 defined daily doses (DDD)/1000/day to 50 DDD/1000/day.[1] Trends in total antidepressant use are a potentially useful marker for health service provision and treatment.

The prevalence of depressive and anxiety disorders differs by sex, age and urban or rural residence.[2] The degree of concordance in uptake of appropriate treatments for mental disorders in different social strata may indicate whether treatment needs are being met in particular subgroups of the population. Few studies — overseas[3,4] and in Australia[5,6] — have considered geographical or socioeconomic differentials in antidepressant utilisation, despite these factors being important distal (or ultimate) risk factors for depression and suicidal behaviour,[2,7-9] and important contextual factors influencing access to health services.

If antidepressant utilisation is correlated with a higher prevalence of depression, anxiety and suicidal behaviour, there should be higher utilisation in lower socioeconomic groups and in rural and remote areas. If no correlation can be found between antidepressant use and mental disorders across social strata, this could indicate socioeconomic inequalities in access to treatment and health services.

Accordingly, we investigated whether the use of antidepressants varies by sex, age, socioeconomic status (SES) and geographical area. Specifically, we addressed the following questions: (i) how does antidepressant use differ by age group, from adolescence and young adulthood through to older age groups?; (ii) are there SES differentials in antidepressant use across the lifespan?; and (iii) are there geographical differentials in antidepressant use according to urban or rural residence as proxy markers of access to mental health services and treatment?

METHODS

Data on antidepressant utilisation in DDD/1000/day[10] for the period 2003–2005 were obtained from the Drug Utilisation Sub-Committee (DUSC) of the Pharmaceutical Benefits Advisory Council.[11] The DUSC collects data on all prescriptions in Australia that are subsidised by the Pharmaceutical Benefits Scheme (PBS).[11] When the dispensed price of a drug is less than the copayment threshold ($30.70 in 2007), patients pay the full price and the transaction is not recorded for PBS collection.[11]

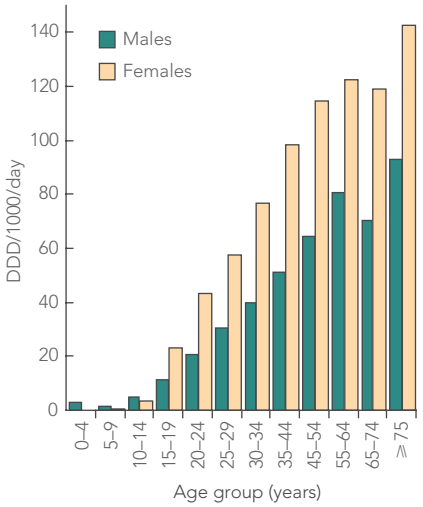
PBS data on antidepressants were aggregated by sex, 5-year age group (0 to ⩾ 85 years), statistical local area (SLA) of prescription, and Anatomical Therapeutic Chemical code. Differences in antidepressant utilisation by drug type were also investigated to establish the proportion of SSRIs used.

Corresponding populations by sex, age and SLA were obtained from the Australian Bureau of Statistics (ABS) 2001 census population. The antidepressant data relate to 3 intercensal years. Given that there are substantial boundary changes to SLAs from year to year,[7,8] which may affect antidepressant and population coding, it was necessary to code small-area data to the nearest census year for comparison on sociodemographic measures. All small-area codes were resolved to their corresponding population local government area code at the 2001 census. This approach results in a slight overestimate of absolute measures of DDD per population because the antidepressant data do not account for population growth since 2001. However, this should not affect relative differences between the levels of the sociodemographic study factors investigated in this study.

SES was based on the economic resource index of the Socio-Economic Indexes for Areas (SEIFA) for 2001 developed by the ABS from census data.[12] It is an aggregate, area-based measure of resources, such as income and expenditure, home ownership rates, dwelling size and vehicle ownership.[12] The economic resource index is a more internally consistent proxy measure of wealth than other SEIFA indices, which combine education and occupation.[7,13]

Geographical area was defined using the Rural, Remote and Metropolitan Area (RRMA) classification system.[14] For Australian small-area data, this combines population density (defined as "personal distance" and calculated as an index of remoteness) and

1 Total antidepressant utilisation by age group, Australia, 2003–2005



DDD = defined daily dose. ◆

population size. We aggregated RRMA categories into five regions: "capital cities", "other metropolitan centres", "rural centres" (comprising small and large rural centres), "other rural areas", and "remote areas" (combining remote centres and other remote areas). Data were stratified into each combination of sex, age group, geographical area and SES quintile, with corresponding DDD counts.

Statistical analysis and ethics approval

Antidepressant utilisation rates were stratified by sex and age. Three broad age groups were defined for more detailed modelling of geographical areas: children and adolescents (≤ 19 years), young adults (20–29 years) and adults (≥ 30 years).

A series of Poisson regression models of average daily DDD counts (offset by the logarithm of the population) were specified in strata of sex, 5-year age group, SES quintile, and geographical area grouping. Analyses were conducted separately for males and females to calculate estimates of antidepressant utilisation by geographical area (either population quintile of SES, or aggregated RRMA classification). Models were adjusted sequentially for age, SES, and geographical area, with relative risks calculated by taking the anti-log of beta estimates.

Analyses were carried out in SAS, version 9.01 (SAS Inc, Cary, NC, USA) using PROC GENMOD.

This study was based on aggregate, routinely collected prescription data obtained with agreement from the DUSC. Ethics approval was not required.

RESULTS

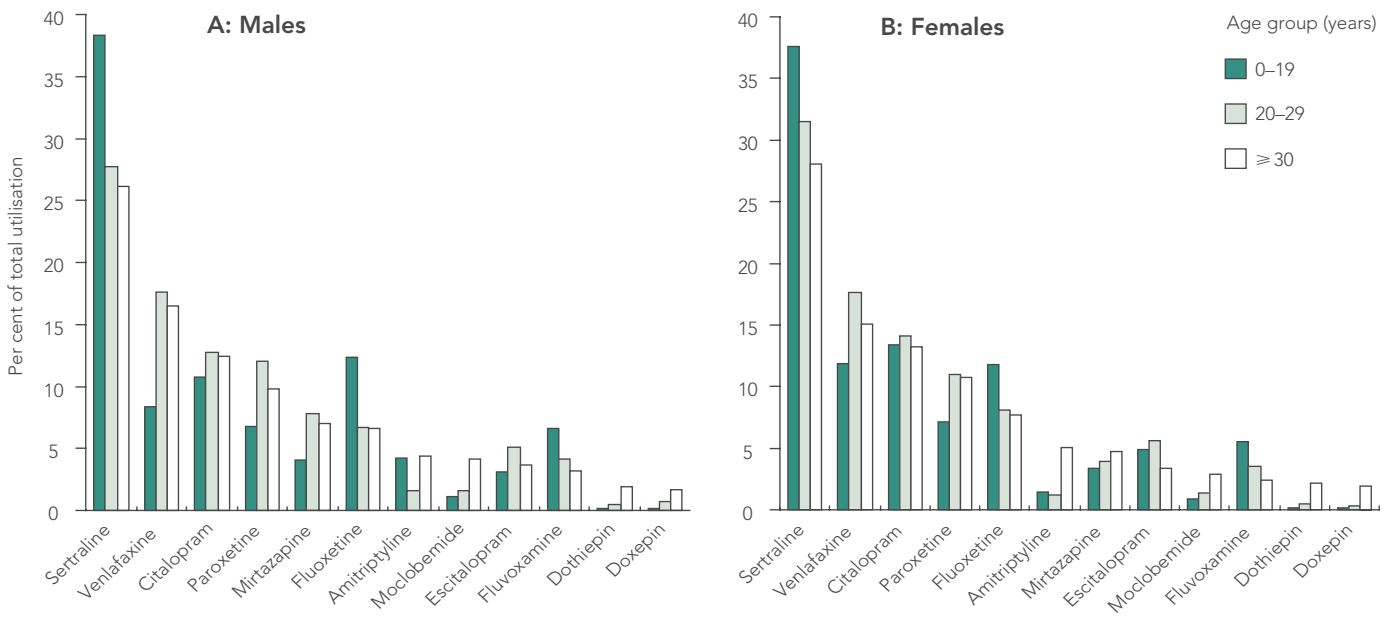
Total antidepressant utilisation increased with age and was about twice as high in females as in males among those aged 15 years and over (Box 1). In those aged under 15 years, antidepressant utilisation among boys exceeded utilisation among girls. About half of total antidepressant utilisation, across each age group and in both sexes, was accounted for by sertraline, venlafaxine, citalopram, and paroxetine (Box 2).

Area socioeconomic differentials in antidepressant use varied between age groups for males and females (Box 3, Box 4). Among those aged 19 years and younger, total antidepressant use was significantly lower in lower SES groups than higher SES groups (P for trend, < 0.001). There was no significant SES trend among those aged 20–29 years. Among those aged 30 years and over, higher antidepressant use was evident in lower SES groups compared with higher SES groups (P for trend, < 0.001).

Relative risk estimates for utilisation among those aged 19 years and younger were 0.86 (95% CI, 0.80–0.92; $P < 0.001$) for males and 0.85 (95% CI, 0.81–0.90; $P < 0.001$) for females in the lowest compared with highest SES group (Box 4). By contrast, relative risk estimates among those aged 30 years and over were 1.23 (95% CI, 1.19–1.27; $P < 0.001$) for males and 1.19 (95% CI, 1.16–1.23; $P < 0.001$) for females in the lowest compared with highest SES group (Box 4). SES differences were attenuated after adjusting for urban or rural residence, but remained statistically significant (Box 3, Box 4). The highest use occurred in older age groups, irrespective of SES (Box 1, Box 3).

Total antidepressant utilisation rates were significantly higher in rural centres compared with capital cities for all age groups (Box 3). Antidepressant utilisation was significantly higher in other metropolitan centres and rural centres than in capital cities, but significantly lower in more remote geographical categories (Box 3). This

2 Antidepressant utilisation by age group and drug type, Australia, 2003–2005



3 Sociodemographic differences in antidepressant utilisation by age group, Australia, 2003–2005

	⩽ 19 years		20–29 years		⩾ 30 years	
Characteristic	DDD/1000/day (95% CI)	*P*	DDD/1000/day (95% CI)	*P*	DDD/1000/day (95% CI)	*P*
Males						
Socioeconomic status*						
High†	5.3 (5.2–5.4)		25.4 (25.0–25.7)		55.3 (55.0–55.5)	
Q4	4.7 (4.5–5.0)	< 0.001	24.8 (23.5–26.2)	0.42	60.0 (58.2–61.7)	< 0.001
Q3	4.4 (4.1–4.6)	< 0.001	23.4 (22.1–24.8)	0.005	61.8 (60.0–63.6)	< 0.001
Q2	4.5 (4.2–4.8)	< 0.001	25.4 (23.8–27.0)	0.99	67.3 (65.2–69.4)	< 0.001
Low	4.5 (4.2–4.8)	< 0.001	26.3 (24.6–28.1)	0.30	67.8 (65.6–70.0)	< 0.001
P for trend		< 0.001		0.47		< 0.001
Urban or rural residence‡						
Capital cities†	4.8 (4.7–4.9)		25.2 (25.0–25.4)		61.2 (61.1–61.4)	
Other metropolitan centres	5.6 (5.2–6.0)	< 0.001	31.1 (29.1–33.2)	< 0.001	68.6 (66.4–70.9)	< 0.001
Rural centres	6.5 (6.1–6.8)	< 0.001	33.3 (31.5–35.2)	< 0.001	80.4 (78.4–82.5)	< 0.001
Other rural areas	4.2 (4.0–4.4)	< 0.001	24.0 (22.5–25.6)	0.14	59.8 (58.3–61.4)	0.09
Remote areas	2.7 (2.3–3.1)	< 0.001	11.9 (10.2–13.9)	< 0.001	33.9 (31.6–36.3)	< 0.001
Females						
Socioeconomic status*						
High†	7.0 (6.9–7.1)		46.9 (46.5–47.4)		94.8 (94.4–95.1)	
Q4	6.9 (6.6–7.2)	0.40	47.6 (44.9–50.5)	0.61	107.8 (104.8–110.9)	< 0.001
Q3	5.9 (5.7–6.2)	< 0.001	44.5 (41.8–47.3)	0.085	109.1 (106.0–112.3)	< 0.001
Q2	6.3 (5.9–6.6)	< 0.001	47.2 (44.2–50.5)	0.84	116.0 (112.5–119.6)	< 0.001
Low	6.0 (5.7–6.3)	< 0.001	47.3 (44.0–50.9)	0.81	113.1 (109.5–116.9)	< 0.001
P for trend		< 0.001		0.99		< 0.001
Urban or rural residence‡						
Capital cities†	6.3 (6.2–6.4)		47.1 (46.8–47.3)		105.9 (105.7–106.1)	
Other metropolitan centres	8.1 (7.7–8.6)	< 0.001	58.5 (54.5–62.8)	< 0.001	116.6 (112.9–120.5)	< 0.001
Rural centres	9.3 (8.9–9.7)	< 0.001	67.1 (63.2–71.2)	< 0.001	132.4 (129.0–135.9)	< 0.001
Other rural areas	6.7 (6.4–7.0)	0.008	50.7 (47.4–54.3)	0.028	101.9 (99.1–104.6)	0.005
Remote areas	4.2 (3.7–4.7)	< 0.001	31.0 (26.6–36.2)	< 0.001	68.5 (63.7–73.6)	< 0.001

DDD = defined daily dose. Q = quintile. * Based on the economic resource index of the Socio-Economic Indexes for Areas;[12] adjusted for age and urban or rural residence. † Referent group. ‡ Adjusted for age and socioeconomic status. ◆

inverse U-shaped pattern was evident in both sexes and was not affected by adjusting for SES.

DISCUSSION

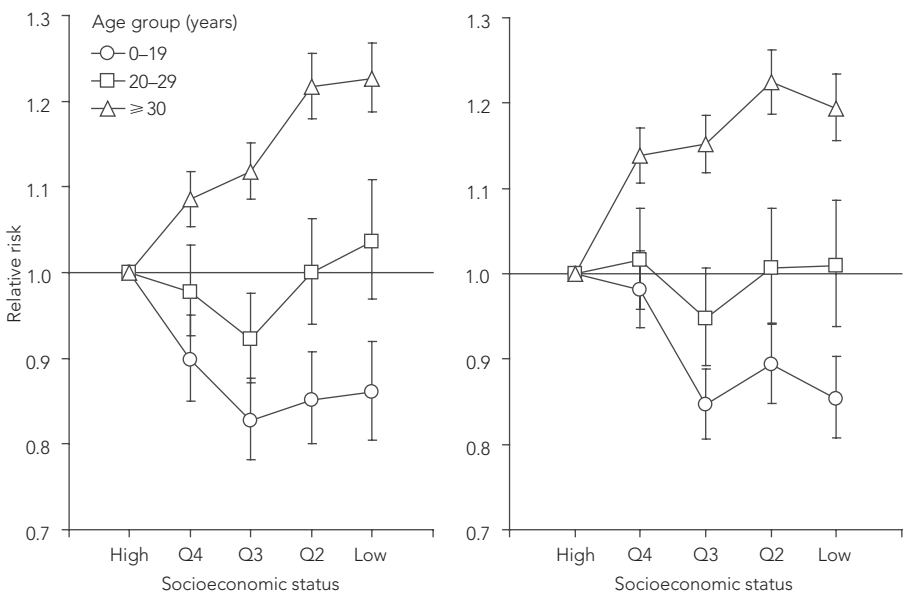
We found that patterns of antidepressant utilisation vary according to sociodemographic characteristics. Overall use increased with age, and female utilisation was higher than male utilisation after the age of 15 years. Most notably, SES differences in antidepressant utilisation varied between age groups.

There are two possible explanations for this changing socioeconomic pattern of antidepressant use. The first is that the higher antidepressant use among children and adolescents in higher SES groups may reflect that adolescents are usually treated at the request of the parents and guardians — parents in wealthier areas are more likely to seek psychiatric treatment for their children than those in less wealthy areas, who may not have the material resources or mental health literacy to do so. A study in the United States found that children from families of higher SES and with private health insurance were more likely to receive antidepressant treatment than children from lower SES families, despite the higher prevalence of mental disorders in lower SES groups.[15]

The lack of a socioeconomic gradient in the young adult group (20–29 years) is more complex. Young people are often still financially dependent on parents and guardians. Mental disorders in wealthier members of this age group may have been ameliorated by treatment, leading to increased prevalence in lower social strata, in which treatment is less likely to be received or accessed during adolescence, when the onset of mental disorders is most common.[16] Higher rates of antidepressant use among those aged 30 years and older may reflect a greater concordance between treatment need and treatment provision, with increased access to material resources in this age group.

An alternative explanation of the age changes in socioeconomic differentials in antidepressant use is social selection. Greater access to mental health services in higher SES adolescents may reflect parental and education influence. The inverse SES

4 Relative risk (95% CI) of total antidepressant utilisation by population quintile of socioeconomic status* and age group, Australia, 2003–2005



Q = quintile. * Based on the economic resource index of the Socio-Economic Indexes for Areas.[12] ◆

gradient in those aged 30 years and older may reflect social drift, whereby individuals with mental disorders gradually slide down the social scale during young adulthood because their mental disorders reduce their access to education and employment opportunities and material circumstances.

An additional important finding is the relationship between the use of antidepressants and varying degrees of remoteness. Previous findings have been equivocal as to whether the prevalence of mental disorders is higher in rural or urban areas.[17,18] There are clear differences in male suicide rates between urban and rural areas, with higher rates reported in more remote areas of Australia;[8] socioeconomic and migrant status are important factors in accounting for this difference, rather than access to mental health services.[17] Our findings on area-based utilisation differ in that the highest antidepressant use was in regional centres and the lowest use was in more rural and remote areas. This pattern, evident in both sexes, may reflect the combination of the distribution of primary care services and an increased prevalence of depressive disorders and lower access to (or utilisation of) services with increasing remoteness. This is consistent with a previous study of lower general practitioner prescription rates for mental illness in rural and remote (compared with urban) areas,[19] and with other studies that show unmet treatment need for mental disorders in urban and remote area general practice (compared with regional centres).[20]

Our study has a number of methodological limitations. First, we have assumed that antidepressant utilisation is correlated with treatment of mental disorder, as there are few conditions for which antidepressants are prescribed other than psychiatric disorder. Second, the antidepressant utilisation data we used are a selected subset of total antidepressant use in the Australian community because PBS data do not include the use of drugs obtained under the copayment threshold. The PBS data represent total enumeration of antidepressant use by: concession cardholders, those with high medication needs (ie, those who exceed the Medicare Safety Net threshold of $874.90 per calendar year[11]), and those prescriptions in the general population that exceed the copayment threshold. During the study period, all antidepressants listed on the PBS exceeded the copayment.

Third, selection bias needs to be considered in interpreting absolute levels of antidepressant use, although comparisons are probably less affected.[21] Sex and age differences in antidepressant use, by drug type, are consistent with previous studies.[1] However, recent age-specific prevalence estimates of affective disorders suggest a lower prevalence of affective disorders among those aged 55 years and older compared with younger age groups, which is at odds with the age distribution of antidepressant utilisation.[22] Higher utilisation in older age groups with a lower prevalence of mental disorders may reflect longer-term maintenance of treatment among older people.

For selection bias to account for the differences in antidepressant use by SES and geographical area, the groups represented in the PBS data would need to be more likely to reside in regional centres (and less likely to reside in remote areas) than in capital cities, and more likely to reside in high SES areas as adolescents and in low SES areas as adults aged 30 years and over. Although there is no information on the spatial distribution of concession cardholders by SES, a study of the spatial distribution of cardholders by geographical area suggests about 70% of cardholders reside in urban centres, 14% in regional centres, and 15% in remaining areas.[23] This does not reflect the pattern of geographical differences seen in antidepressant use.

Fourth, this study used small-area classifications in defining geographical strata. This may have resulted in misclassification of antidepressant utilisation by area because of boundary changes to geographical areas over time. However, previous studies have not found substantial effects of boundary changes on subsequent classification of the SLAs into broad sociodemographic strata.[7,8] Any effects are reduced by resolving SLAs to the local government area in the nearest census year to ensure consistency between antidepressant use and population denominators. The broad aggregation of SLAs into SES quintiles and broader geographical categories also mitigate any effects of misclassifying SLAs into incorrect strata.

Fifth, the demographic variables of Indigenous status and migrant status were not included in the present analysis. Previous studies of mental disorders and suicidal behaviour have shown that there are significant differences between Indigenous and non-Indigenous groups,[24] and between migrants and non-migrants in Australia.[25,26] It is likely that antidepressant use would also reflect these differentials. Unfortunately, this demographic information is not available from the PBS data and so could not be included in the present study.

Sixth, cross-level bias also needs to be considered in interpreting the findings of

the present study. This refers to an error of logical inference, where a correlation between group-level characteristics is erroneously assumed to reflect correlations between these characteristics in individuals within the areas.[27] The ecological association in the present study based on geographical measures of SES may imply that individuals of low SES have higher rates of antidepressant utilisation than individuals of high SES (in adults aged 30 years and older). Our results are consistent with a previous ecological study in the US[3] and with a study of associations between socioeconomic position and antidepressant use in individuals.[28] However, they are not consistent with other studies that have found higher antidepressant use in higher SES than lower SES groups.[15,29]

Despite these limitations, this study suggests that patterns of antidepressant utilisation partially reflect previously reported sociodemographic differences in the prevalence of affective disorders.[2] The discrepancies between antidepressant use and treatment need suggest that not all social strata have the same access to these treatments in Australian society.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Andrew N Page, BA(Psych)(Hons), PhD, Senior Lecturer in Epidemiology[1]
Sarah Swannell, BPsych(Hons), GradCertBiostat, Senior Research Technician[2]
Graham Martin, MD, FRANZCP, DPM, Professor and Director, Child and Adolescent Psychiatry[2]
Samantha Hollingworth, BSc, MPH, PhD, Senior Research Fellow[1]
Ian B Hickie, MB BS, FRANZCP, MD, Professor of Psychiatry and Executive Director[3]
Wayne D Hall, BSc, PhD, Professor of Public Health Policy[1]

1 School of Population Health, University of Queensland, Brisbane, QLD.
2 Discipline of Psychiatry, School of Medicine, University of Queensland, Brisbane, QLD.
3 Brain and Mind Institute, University of Sydney, Sydney, NSW.

Correspondence: a.page@sph.uq.edu.au

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