Antipsychotic prescribing in New Zealand between 2008 and 2015
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ABSTRACT
AIM: To examine antipsychotic prescribing trends in New Zealand adults from 2008–2015.
Methods: Antipsychotic prescribing data was sourced via the Ministry of Health. Data were examined by year, type of drug, ethnicity, gender, age and location of district health board.
RESULTS: All individuals dispensed an antipsychotic were included. Rates of antipsychotic prescribing rose from 1.88% to 2.81%, an increase of 49% over the seven years. Most of the increase was in atypical antipsychotics (particularly quetiapine and olanzapine), which accounted for 82% of total antipsychotics in 2015. Māori were prescribed more antipsychotics than non-Māori. Asian people had the lowest rate of prescribing (0.86%). The highest rate of antipsychotic use was in European females aged 65 plus.
CONCLUSION: Rates of antipsychotic prescription are increasing. Most of this change is in prescribing atypical antipsychotics. Young Māori males and elderly European females are most likely to receive antipsychotics.

Antipsychotics are a heterogeneous class of medications used to treat psychotic symptoms—such as delusions, hallucinations or paranoia—principally in schizophrenia and bipolar disorder, but also in major depression and anxiety. Typical antipsychotics are ‘first-generation’ antipsychotic drugs—discovered in the 1950s—that act predominantly by reducing dopamine levels in the brain. Atypical (or ‘second-generation’) antipsychotics were developed more recently; they act on a range of receptors such as acetylcholine, noradrenaline and serotonin in addition to dopamine. The first atypical antipsychotic, clozapine, was discovered in the 1960s.

Atypical drugs have been gradually replacing typical antipsychotics over time. Verdoux et al reviewed pharmacoepidemiological studies and reported a marked increase in antipsychotic prescription in most countries since the introduction of atypical antipsychotics.

To our knowledge, there has been no detailed analysis of antipsychotic use in New Zealand. Hálfdánarson et al reported general trends in antipsychotic use from 2005–2014 in 16 countries, 10 of which were population census data, including New Zealand. However, their study was primarily a between-country comparison.

Objectives
The objectives of this study were to examine antipsychotic prescribing trends in New Zealand adults from 2008 to 2015, by antipsychotic type, age, ethnicity, gender and district health board location. Our hypothesis was that antipsychotic prescribing rates in New Zealand are increasing.

Method
Antipsychotic prescribing data was sourced via the Ministry of Health. The dataset contains every person in New Zealand who had been prescribed antipsychotic medication. This data is collected by The Pharmaceutical Management Agency of New Zealand (PHARMAC) via the National Health Index (NHI) number—a unique identifier assigned to every person who uses health services in New Zealand. The number of prescriptions with an NHI number rose to 90% in 2008, and to 98% in 2015.
The dataset lists the number of patients collecting prescriptions for antipsychotic medication within each district health board (DHB), five-year age bracket, gender and ethnicity (Māori, Pacific, Asian and ‘Other’). The ‘Other’ category includes the following ethnic groups: European, Middle Eastern, Latin American, African and ‘Other Ethnicity’. For simplicity we named this category ‘European/Other’. Data for eight consecutive years—2008 to 2015—was examined by ethnicity.

The prescription rates were broken down into each antipsychotic class, and then broken down into individual drugs within each class. The data is presented over the four-year period from 2012 to 2015 because this data is more complete.

For the national prescribing rates, four age brackets were used: 15–24, 25–44, 45–64 and 65+. The exception was individual DHB comparisons, where all ages were included, as only the total DHB populations were available.

Population data were obtained from the Ministry of Health to calculate dispensing rates. As age group data was available for each ethnicity, the population aged 15 and over could be calculated. The ethnic groups used are based on the ethnic groups from the PHARMAC database.

Bias
This is a census of all New Zealand prescribing data so there is no sampling bias.

Statistics
Microsoft Excel was used to analyse the data. Data are descriptive and presented as population prevalence.

Results
National rates
In 2015, 2.81% of all New Zealanders aged 15 and over were prescribed an antipsychotic (2.94% of females and 2.67% of males), an increase of 49% from the 2008 rate of 1.88%.

Ethnicity
Figure 1 shows the distribution of antipsychotic prescribing by ethnicity. 3.37% of Māori were prescribed antipsychotics in 2015, compared to 3.15% of the European/Other category, 1.87% of Pacific Islanders and 0.86% of Asians.

Since 2008, adult antipsychotic prescribing has increased across all ethnicities. Māori rates increased 60%, Pacific rates by 50%, European/Other rates increased by 52% and Asian rates by 53%.

Gender
Figures 2 and 3 show the distribution of antipsychotic prescribing by gender, ethnicity and age in 2015. Female and male antipsychotic use varied with ethnicity and gender. The highest rate of antipsychotic use in females was European/Other (3.38%) followed by Māori (3.16%). This trend was reversed for males, where Māori were dispensed at the highest rate (3.61%) followed by European/Other (2.92%).

Figure 1: Percentage of New Zealand adults dispensed antipsychotics over time, by ethnicity.
Age and ethnicity

The highest user of antipsychotics in 2015 was European/Other females aged 65+ (5.04%), followed by Māori males aged 25–44 (4.77%) and Māori females aged 65+ (4.09%).

For males, Māori dispensing rates were higher in each age bracket except 65+, where European/other had the higher rate. For females, rates were highest for Māori between ages 25 and 64, and highest for European/other in the 15–24 and 65+ ranges.

In 2015, the greatest ethnic difference in dispensing rates was between Māori and Asian males. Māori males received antipsychotics at 7.2 and 5.0 times that of Asian males in the 25–44 and 15–24 age brackets, respectively. For people aged 45+, females received more antipsychotics than males across all ethnicities.

Geographic distribution

Figure 4 shows the distribution of antipsychotic prescribing by DHB in 2015. Significant geographic differences were found. The highest rate was in the West Coast: 2.1 times the lowest rate in Counties Manukau.

Drug classes

Figure 5 shows the total prescriptions by antipsychotic class in New Zealand over the years 2012 to 2015. The total number of prescriptions for antipsychotics has increased from 439,000 in 2012 to 501,000 in 2015, a 14% increase in three years. There was a 15.2% increase in atypical antipsychotics and a 6.1% increase in typical antipsychotics.

Quetiapine and olanzapine are the two drugs that largely accounted for the...
increasing numbers prescribed atypical antipsychotics; they increased by 24% and 22%, respectively, over the three-year period. Dispensing of risperidone and clozapine decreased by 4.7% and 14% over this period. Two drugs accounted for 69% of the typical antipsychotics in 2015: haloperidol (49%) and levopromazine (20%).

Atypical antipsychotics accounted for 87% of the total antipsychotics dispensed in 2015 and typical antipsychotics accounted for 13%, which was a slight drop from 2012. Māori and Pacific males were disproportionately prescribed clozapine. Clozapine was prescribed at 3.9 times for Māori and 2.3 times for Pasifika compared to European/Other males in 2015. Māori and Pacific females were also more likely to be prescribed clozapine. Clozapine was prescribed at 2.7 times for Māori and 2.0 times for Pasifika compared to European/Other females in 2015.

Figure 4: Antipsychotic use by DHB in 2015.

Note the all-ages DHB populations were used instead of the 15+ population, so rates are lower.

Figure 5: Total prescriptions by antipsychotic class in New Zealand 2012–2015.

Antipsychotic medication included ‘typical’ antipsychotics, ‘atypical’ antipsychotics and lithium carbonate.
‘Typical’ antipsychotics: butyrophenones (haloperidol and haloperidol decanoate), phenothiazines (chlorpromazine hydrochloride, fluphenazine decanoate, levomepromazine maleate, pericyazine, pipothiazine palmitate and trifluoperazine hydrochloride) and thioxanthenes (flupenthixol decanoate, zuclopenthixol decanoate and zuclopenthixol hydrochloride). ‘Atypical’ antipsychotics: clozapine, aripiprazole, olanzapine, paliperidone, quetiapine, risperidone, ziprasidone and amisulpride (a benzamide).
Discussion

National rates
The number of New Zealanders taking antipsychotic medication has risen to 1 in 36 New Zealand adults (2.81%) in 2015, a 49% increase since 2008. Overall antipsychotic use varies greatly among countries. Hálfdánarson et al reported rates in 2014 were highest in Taiwan at 7.8% and lowest in Lithuania (1.2%) and Colombia (0.3%). In Australia rates were 1.7% in 2014, and in the US publicly insured patients had a rate of 4.0%. The New Zealand rate therefore appears to sit in the middle of countries where data is available. Our rate of increase appears quite high. The Australian increase was 36% between 2006 and 2014, for example.

Antipsychotic drug classes
The absolute number of prescriptions increased by 13% in three years, but the proportion of the total prescriptions made up by each drug class is stable. Atypical antipsychotics increased from 86.4% in 2012 to 87.4% in 2015. Typical antipsychotics decreased from 13.6% in 2012 to 12.6% of the total prescriptions in 2015.

Quetiapine, olanzapine, clozapine and risperidone made up 93% of all atypical antipsychotics in 2015. Quetiapine and olanzapine largely account for the increasing numbers of atypical antipsychotics, with 24% and 22% increases in dispensing from 2012–2015, respectively. Risperidone dispensing decreased by 4.7% over the three years.

A similar pattern was reported in Australia by Stephenson et al. They noted a 218% increase in atypical antipsychotic dispensing from 2000 to 2011. The drugs showing the largest increases were quetiapine and risperidone, but olanzapine was the most prescribed atypical at 36%. In contrast, there was a 61.2% decrease in the dispensing of typical antipsychotics.

Ethnicity
Significant ethnic differences were evident. Māori were more likely to be prescribed antipsychotics than European/Other people (1.87% vs 3.15%), although Pacific rates are increasing at the same rate as European/Other. Asian people were far less likely to be prescribed antipsychotics than other ethnicities (0.86% in 2015). Māori and Pacific males and females were prescribed clozapine at rates that were disproportionately higher than the total antipsychotic rates.

Gender, age and ethnicity
European/Other and Asian females received antipsychotic medication at 1.16 and 1.25 times the male rate, respectively. However, the opposite was true for Māori and Pacific people, where males received antipsychotics at 1.14 and 1.13 times the female rates, respectively. Overall, females were prescribed antipsychotics at 1.10 times the male rate. Māori males aged 25–44 received more antipsychotics than any other male subgroup. For Māori females, European/Other, Asians and Pacific people, those aged 65+ received antipsychotics at the highest rate. It is likely that much of this prescribing would be off-label low-dose medication for sleep.

Gender and age differences in prescribing have been reported in other countries. Trifiro et al, examining prescribing patterns in Italian general practitioners, found that women and patients aged over 65 were more likely to receive an antipsychotic medication. Marston et al reported that females, older people and people from the most deprived areas in the UK were more likely to be prescribed an antipsychotic.

Hálfdánarson et al reported that 48.6 out of 1,000 New Zealanders (4.9%) aged 65+ (compared with 3.0% aged 20-64) were dispensed an antipsychotic in 2014. Taiwan had the highest use with 146/1,000 (14.6%) of those aged 65+ receiving an antipsychotic in 2013. The number of Australians prescribed an antipsychotic in 2014 rose from 1.8% for 20–64 year-olds to 3.3% for those aged 65+.

Geographic distribution
Prescribing trends differed geographically. For example, West Coast DHB prescribed antipsychotics at more than double the rate of Counties Manukau DHB in 2015. The reasons for this variability in prescribing are unknown. It seems unlikely that numbers of individuals suffering from psychoses vary.
by up to two-fold across different DHBs. Differences reported more likely reflect local prescribing practices.

Generalisability

The results of this study are generalisable to New Zealand and most other developed countries, especially those with a colonised native population and other diverse ethnic populations.

Limitations

Although a patient is prescribed a medication, they may not have taken it. It is likely that many antipsychotics are prescribed off-label for sleep (particularly low dose quetiapine).

Conclusion

The prevalence and distribution of antipsychotic prescribing appears somewhat arbitrary. Rates of prescribing vary dramatically across countries and generally appear to be increasing. In New Zealand, rates vary by geographical location, ethnicity, gender and age. This arbitrariness is concerning. Antipsychotics have significant adverse effects, and long-term safety and/or effectiveness data are lacking. Antipsychotics are often prescribed ‘off-label’ for sleep and anxiety, which probably explains the high rate in older women.

Our results suggest some obvious questions. Why are rates of antipsychotic drug prescribing rising steadily? There is no evidence that rates of psychosis in New Zealand are increasing so the rise appears to be related to other indications—low doses for anxiety and sleep and high doses for behavioural control perhaps? Why do Māori and Pacific Island males aged 25–44 receive more antipsychotics than other males, and why are they much more likely to receive clozapine? Are they more likely to be psychotic or is their ethnicity part of the reason?

These questions need to be explored and ongoing systematic monitoring of antipsychotic prescribing is of major public health importance. Our data suggest we need to more critically examine when and why we prescribe antipsychotics. Given their toxicity and the lack of evidence around much of the prescribing we may need to look at health policy changes to ensure more rational use of these drugs.

Competing interests:

Nil.

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