Recent Australian suicide trends for males and females at the national level: Has the rate of decline differed?

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Abstract

Objectives: In keeping with international public health policy development, suicide prevention in Australia has received increasing attention. The mid to late 1990s saw the introduction of a range of co-ordinated national prevention programmes. Since 1997, suicides have decreased, but the comparative rates of decline for males and females have not been well studied at the national level.

Methods: Standardised suicide rates were calculated for males and females, using data from 1997 to 2005. Linear models (ordinary least squares) were used to calculate rates of decline, with trends compared for males and females.

Results: Male suicides appear to have fallen more rapidly than female suicides.

Conclusions: Australian males, an ‘at risk’ demographic, appear to be experiencing benefits from the existence of current national suicide prevention strategies and related social changes. It is recommended that greater consideration be given to researching risk factors such as intimate partner violence, sexual abuse, and substance dependence, for Australian female suicide.

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1. Introduction

In keeping with international public health policy development, suicide prevention in Australia has become an increasingly prominent concern throughout the past decade. Although localised suicide prevention efforts have been underway for many years (e.g., ‘Lifeline’, a community-based telephone counselling service founded in 1963), the mid to late 1990s saw the introduction of a range of co-ordinated national programmes in response to growing alarm at the ongoing rise in suicides, particularly among males. Suicide in Australia rose consistently throughout the 1970s and 1980s, reaching a peak in 1997 with 2720 deaths in a total population of 18,517,564.

In 1995 the Australian Federal Government introduced the National Youth Suicide Prevention Strategy (NYSPS). The NYPS was followed in 1999 by the National Suicide Prevention Strategy (NSPS). Other prevention efforts such as ‘beyondblue: the National Depression Initiative’, ‘youthbeyondblue’, and the ‘Living is for Everyone (LIFE) Framework’ (which
seeks to foster collaborative ties between suicide prevention efforts across multiple sectors of the community) have been operating nationally since 2000. These strategies adopt a broad focus, seeking to reach the community at large. They are composed of provisions such as awareness raising, information provision, support services (including counselling, mental healthcare assistance, and related crisis intervention services), and recognition of special needs and diversity.

Despite the very general nature of the national prevention programmes and their staggered introduction, the underlying intent is to reach identified risk groups such as males (who account for around 80% of all suicides in Australia, consistent with international observations), rural residents, individuals with substance dependence problems, people with mental illnesses, and Aboriginal and Torres Strait Islander peoples [1]. It is recognised that these risk groups may overlap, and may have multiple unmet needs.

Briefly, the prevention programmes aim to act through a combination of ‘direct’ measures, for example by bringing to the attention of males the prevalence of depression in men, and delivering care, and ‘indirect’ measures such as raising the awareness level of family members of an at risk individual. There is an emphasis on promoting initiatives that aim to address risk and protective factors for suicide, including coping strategies for life stressors, and propensity towards help-seeking behaviour.

The fall in overall suicide rates in Australia since the late 1990s has been interpreted as evidence that increased attention to suicide prevention coupled with related changes such as greater public awareness of mental health and improved psychiatric treatments [2] have begun to exert overall influences on the incidence of suicide in Australia. Despite international attention to the influence gender has on suicide rates and aetiology, little research has evaluated whether Australian trends in suicide have differed between genders since the peak in suicides in 1997. Additionally, even though both male and female suicide has declined, it has not been determined if those declines have occurred at a comparable rate.

It can be speculated that the broad-based nature of suicide prevention strategies and related social changes across Australia would be associated with equal declines in suicide for males and females, but an alternative outcome is possible. As a result of using a broad and multifaceted focus in order to reach at risk groups by direct and/or indirect means, the gender most at risk of completing a suicide may also have been most responsive to the current suite of prevention initiatives. Presumably, this would be evidenced by a more pronounced rate of decline among male suicides than female suicides. A difference in the rate of decline between males and females could also indicate a potential need to design additional, gender-specific policies and programmes of prevention that could feasibly be implemented within the current national framework.

Additionally, despite the national implementation of prevention programmes, it is acknowledged that notable inequalities in service provision and access to appropriate ongoing treatment for issues such as depression and substance dependence still exist [3]. The extent and location of these shortcomings is generally indexed by comparing suicide rates among specific demographic groups such as urban males and rural males, an approach that is extremely useful in elucidating spatial and other demographic variation in suicide. However, a national benchmark for suicide trends by gender against which suicide patterns among select subgroups can be contrasted would enable clearer quantification of divergence since the overall downwards trend began in 1997, and subsequent identification of prevention priorities.

The Australian situation also provides a natural quasi-experimental design whereby method restriction versus generalised intervention can be examined. In 1996, Australia introduced firearms legislation that is considered among the most stringent in the developed world. It has been reported that although the downwards trend in firearm homicide rates did not change, the rate of decline in firearm suicide accelerated following the introduction of Australia’s 1996 firearms legislation [4]. While hanging is the most commonly used suicide method in Australia, accounting for over half of all suicides [5], firearms have received significant attention, presumably due to their relatively high lethality and the ability of legislation to reduce legal access to that method.

However, given that declines in nonfirearm suicide occurred post-1996 it is unclear whether the accelerated rate of decline in firearm suicide after the introduction of strict legislation can be attributed to legal reform. It is possible that the accelerated rate of decline was
simply in keeping with the more general patterns of decline that began to emerge in the late 1990s. Although psychosocial means of suicide prevention are widely recognised as vital in any prevention effort, method restriction via legislative intervention may provide a helpful complement to broader interventions. However, international research in this field has produced varied results, particularly with regard to method substitution and the ability of method restriction to address overall suicide figures (e.g., refs. [6–12]).

It is important to consider the possible occurrence of displacement following method restriction approaches in addressing, particularly, male suicide in Australia. While an experimental approach to this question is difficult, it is possible to gain an indicator of method substitution by using a suitable control group. Ideally, the control group would be subjected to the same social changes as the firearm suicide group, but not likely to be affected by legislative reform. Since the number of females in Australia who commit suicide using firearms is very low, the contribution of firearms to the overall female suicide rate is minimal. By extension, any method substitution following legislative change would not be expected to have notable influence on female suicide rates. As such, female nonfirearm suicide rates provide a proxy control against which male firearm and nonfirearm suicide can be compared.

If the rate of decline in male firearm suicides differed from the rate of decline observed for female suicides, it would be reasonable to suggest that the decline in male firearm suicides arose at least in part from the legislative reforms. If, however, the rate of decline in male firearm suicides did not differ from the rate of decline for female nonfirearm suicides, it would suggest that the legislative reform did not exert an impact ‘over and above’ the impact of broader social reforms such as increased funding for mental health and heightened public awareness of suicide and mental illness.

Whether or not the removal of access to firearms was associated with displacement to another method would not be revealed by comparison of male firearm suicide with female suicide rates, because that cannot address possible displacement effects within gender. For this reason, the rate of decline in male firearm was also compared with male nonfirearm suicide, to assess whether there was evidence that males who may have committed firearm suicide instead selected a different method following the legislative reforms. If substitution occurred, it would be expected that there would emerge an increasing downward trend in firearm deaths after the introduction of firearms legislation, but a compensatory lesser downward (or even upward trend) in nonfirearm-related deaths over the same period. Therefore, if there was method substitution, it would be expected that male nonfirearm suicides would fall less rapidly than male firearm suicides.

It was not the purpose of the current study to evaluate the impacts of particular interventions. The intent of this investigation was simply to compare rates of decline, to evaluate possible gender differences in the overall downwards trends in suicide at the national level and to gain an indicator of the presence or otherwise of method substitution in male suicide trends. The downwards trend in suicides was contextualised against, but not treated as causally related to, two theoretically plausible influences of national suicide prevention strategies: an equal rate of decline in male and female suicides due to the generalised nature of the prevention efforts, or a greater rate of decline in male suicides due to the intent of the prevention programmes to preferentially target those of designated risk status, through a generalised series of initiatives. Therefore, the current study tested whether male and female suicide rates at the national level have undergone approximately equal rates of decline in the past years, or whether there is evidence that male suicide rates have decreased at a more rapid rate than female suicides.

2. Materials and methods

Publicly available data on raw suicide numbers from 1921 to 2005 were obtained from the Australian Bureau of Statistics. Suicide incidence by method data were obtained for the period 1997–2005.

Population data for males and females were also obtained from the ABS, which enabled gender-based standardisation of suicide rates per 100 000 population, based on mid-year population estimates for each year.

The starting point selected for evaluation of comparative trends in suicide rates between males and females was 1997. This was chosen because it represented the point at which suicides were at their highest in Australia, and the point from which the overall decline in suicides has subsequently become apparent. This allowed examination of what has occurred in Aus-
Fig. 1. Suicide rates in Australia, 1921–2005, by gender. Rates represent the number of deaths per 100,000 population, with calculations based on gender-specific population numbers.

Australia since suicide levels reached their peak and then reversed their trend.

It must be clearly noted that the question of interest did not relate to absolute levels of suicide, nor did it pertain to the relative contribution of male versus female suicides to the total observed rate, or modelling the impacts of any intervention event. Rather, the variable of relevance was whether the rate of decline over the period 1997–2005 was comparable between firstly, males and females and, secondly, male firearm suicide and female suicide/male nonfirearm suicide.

Data were treated as independent observations, and trends within gender calculated using a linear model of the form $y = a + bX$ (ordinary least squares method) where $b$ refers to the rate of change over time. Emphasis was placed upon maximising the fit between observed and modelled values. Trends were compared by including an interaction term in the model, to establish whether the rates of decline diverged over time. Analyses were undertaken using SPSS.

3. Results

Fig. 1 shows an historical overview of suicide rates in Australia for males and females.

The primary objective of the study was to provide an overall assessment of whether male and female suicide rates have declined at similar rates since 1997. Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Male population</th>
<th>Female population</th>
<th>Male total</th>
<th>Female total</th>
<th>Male firearm</th>
<th>Female firearm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>9203171</td>
<td>9314393</td>
<td>2143</td>
<td>577</td>
<td>309</td>
<td>21</td>
</tr>
<tr>
<td>1998</td>
<td>9294674</td>
<td>9416597</td>
<td>2150</td>
<td>533</td>
<td>218</td>
<td>17</td>
</tr>
<tr>
<td>1999</td>
<td>9396548</td>
<td>9529307</td>
<td>2002</td>
<td>490</td>
<td>257</td>
<td>13</td>
</tr>
<tr>
<td>2000</td>
<td>9505331</td>
<td>9648049</td>
<td>1860</td>
<td>503</td>
<td>213</td>
<td>10</td>
</tr>
<tr>
<td>2001</td>
<td>9630652</td>
<td>9782588</td>
<td>1935</td>
<td>519</td>
<td>242</td>
<td>20</td>
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<tr>
<td>2002</td>
<td>9735133</td>
<td>9887846</td>
<td>1817</td>
<td>503</td>
<td>207</td>
<td>11</td>
</tr>
<tr>
<td>2003</td>
<td>9873447</td>
<td>9999199</td>
<td>1736</td>
<td>477</td>
<td>185</td>
<td>9</td>
</tr>
<tr>
<td>2004a</td>
<td>9990513</td>
<td>10100991</td>
<td>1661</td>
<td>437</td>
<td>164</td>
<td>5</td>
</tr>
<tr>
<td>2005a</td>
<td>1010836</td>
<td>10217773</td>
<td>1657</td>
<td>444</td>
<td>136</td>
<td>11</td>
</tr>
</tbody>
</table>

a Denotes that suicide figures for that year are likely to be higher than ABS data indicate.
provides raw suicide numbers for males and females, and population numbers.

The data for male and female suicides overall were well fit by the model. In terms of overall trends within gender, both male and female suicide rates have undergone downward trends since 1997 (males: slope = −0.925, $R^2 = 0.962$; females: slope = −0.204, $R^2 = 0.882$, see Fig. 2). However, there was a significant difference in the downwards trend in suicide overall between males and females, with male suicides falling at a faster rate over time than female suicides ($p < 0.05$). Fig. 2 shows observed and predicted rates of suicide overall for males and females.

Trends for male firearm suicides were compared with female nonfirearm and male nonfirearm suicide. Again, there were downwards trends in all groups (male firearm: slope = −0.201, $R^2 = 0.832$; male nonfirearm: slope = −0.725, $R^2 = 0.919$; female non-
firearm: slope = −0.189, $R^2 = 0.891$). Male firearm suicide and female nonfirearm suicide did not differ significantly in their rate of decline ($p = 0.779$). Male nonfirearm suicide fell significantly faster than either male firearm suicide ($p < 0.05$) or female nonfirearm suicide ($p < 0.05$). Fig. 3 shows observed and predicted rates.

4. Discussion

It is important to highlight that the current study did not seek to establish the precise nature of the relationship between the implementation of national suicide prevention strategies and the ongoing declines in suicide that have occurred. Although there is a distinct temporal relationship between improved suicide prevention strategies and declining youth suicide rates [13], the purpose of the present work was simply to provide retrospective examination of net trends that have emerged since the rate of suicide in Australia began to decline.

At the national level, it appears that male suicide rates overall underwent a more rapid rate of decline than female suicide rates overall. While not inferring causality, the current results suggest that in overall terms, the increased emphasis on detection and early intervention may have enhanced the likelihood of suicide prevention among males relative to females. Given that males are substantially over-represented among suicide completions in Australia, and that increases in male suicide drove the overall increases in suicide in Australia until the late 1990s, the decline in male suicide is a positive finding.

Contextualised against the implementation of national suicide prevention programmes and their potential role in suicide reduction, the apparently greater decline in male suicide than female suicide is consistent with the hypothesis that the gender at highest risk of suicide can be reached through programmes with a very broad focus. However, the results should not be taken to imply that specific high risk groups (for example, rural residents undergoing financial hardship, with the associated variable of limited proximity to support services) within the general male risk group are equally responsive to prevention programmes. Rather, the current study complements extant literature by providing a national rate of decline for males and females against which trends for other, purposely selected subgroups can be compared. It also provides a standardised measure enabling broad international comparisons.

The results may indicate a need for an ongoing investigation regarding means through which at risk females can be reached. Although Australian females overall are less likely than males to commit suicide, it would appear beneficial to implement national programmes aimed at specific high risk groups within the female demographic. There is also a need for ongoing research into clinical and behavioural risk factors for female suicide in general, and suicide among young women, since existing research tends to focus primarily on male suicide and its precipitating factors.

A key component of Australia’s national suicide prevention strategies has been the normalisation of help-seeking behaviours; that is, reducing social stigma surrounding mental illness and encouraging individuals who are experiencing emotional distress and suicidal ideation to seek help. Improving the level of help-seeking behaviour among males (as well as the ability to access suitable services) has consistently been identified as a priority for action in Australia [14,15], and addressing male reluctance to seek help has become an important factor in prevention initiatives. For example, advertising campaigns depicting males suffering from depression have played a prominent role in public awareness campaigns. Continuation of such campaigns appears prudent, but the current observations for female suicide rates may highlight a need for similar strategies aimed at a female audience, to address barriers in female help-seeking.

The possibility of barriers to female help-seeking, while worthy of further investigation, should nonetheless be viewed with caution. Presumably, suicide prevention strategies are equally accessible to both genders. However, females are generally more likely to be aware of mental health issues and to use healthcare resources than males [16–18]. It is therefore puzzling, in light of these considerations, as to why male suicides have seemingly fallen at a greater rate than female suicides. A possible explanation lies with factors external to suicide prevention strategies and associated help-seeking behaviours.

Although the underlying hypothesis against which this study was contextualised was that suicide prevention strategies have contributed to the observed declines, the importance of other variables cannot be
overlooked. There are two broad categories where alternate mediators for the findings must be considered: contributors to suicide prevention and contributors to suicide. Regarding alternate factors contributing to the prevention of suicide, a primary candidate is the increased therapeutic use of antidepressants.

In Australia, there has been a linear increase in the prescription of antidepressants, and it has been suggested there this may be viewed as a key mediator for suicide prevention. Hall et al. [19] found a notable increase in antidepressant prescription from 1991 to 2000. Although this was not associated with declines in overall rates of suicide, there was a strong association between groups with high exposure to antidepressants and the groups in which the rate of suicide fell. A selection of pertinent arguments relate to the hypothesis that antidepressant prescription may contribute to suicide prevention; for example, that depression is a risk factor for suicide, and that the prescription of antidepressant drugs often occurs in conjunction with other assessments and interventions that may act in combination with medication to reduce suicidal behaviour [19].

Many other social circumstances contributing to the incidence of suicide are likely to have altered in the past decade, and these changes may have contributed differently to male versus female suicide. Male suicide in Australia rose at a far more rapid rate than female suicides throughout the 1970s and 1980s, which suggests that the occurrence of male suicides in Australia is more strongly influenced by proximal factors (risk and/or protective) than female suicides. This has implications for gender-specific public health policy and suicide prevention campaigns.

There are suggestions that economic variables in particular may contribute substantially to Australian male suicide, but not Australian female suicide [20–22]. Berk et al. [20], for example, found that for Australian males overall the suicide rate was significantly and positively associated with housing loan interest rates and unemployment rate, but that those same variables were negatively associated with female suicide. Similarly, Page et al. [21] demonstrated that low socio-economic status (SES) in Australia was associated with an increased suicide risk for males, but not for females. It has also been shown that that male suicide was positively associated with three different ABS measures – the index of relative socio-economic disadvantage (IRSED), the index of economic resources (IER), and the index of education and occupation (IEO) – whereas female suicide was positively associated with the IER only [21]. Knowledge of SES and suicide in Australia was extended by Page et al. [22] whose analysis of trends in young Australian male suicide revealed that declines were limited to middle and high socio-economic status groups, while the low SES group displayed a continued increase.

In considering alternative hypotheses to explain the results of the current study, it can be speculated that national prevention strategies may have been equally effective in reaching both males and females, but underlying shifts in the factors most likely to affect male suicide rates could have played an additional role in the observed declines. For example, overall unemployment rates for males decreased throughout the study period [23]. Second, it is possible that social shifts are a primary predictor of suicide among males and account for a greater component of the decline than prevention programmes. It would be desirable to extend the current pilot study in order to model differential relationships of external social factors to male and female suicide rates in Australia both historically and in recent years. Work currently in preparation will examine this question more closely.

The rate of decline in male firearm suicide did not differ significantly from the rate of decline in female nonfirearm suicide. However, the decline in male nonfirearm suicide was significantly faster than either male firearm suicide or female nonfirearm suicide. These results are inconsistent with the intuitive expectation that method restriction of firearms would lead to faster declines in male firearm suicide relative to male nonfirearm suicides and female nonfirearm suicides. These results are inconsistent with the intuitive expectation that method restriction of firearms would lead to faster declines in male firearm suicide relative to male nonfirearm suicide (which may be affected by method substitution) and female nonfirearm suicide (which is assumed to be influenced by social but not legislative change).

Based on the current results, it could not be concluded that restriction of firearms was associated with a faster rate of decline in firearm suicide relative to nonfirearm suicides. The results do not offer evidence for displacement from firearm to other suicide methods among males. If substitution occurred, it would be expected that the downwards trend for male nonfirearm suicides would be slower than the downwards trend for male firearm suicides and female nonfirearm suicides. This did not occur.
It must be emphasised that this study was conducted on a broad-scale, Australia-wide basis, in order to establish national trend benchmarks. Other researchers have found evidence for method substitution at the local level. For example, De Leo et al. [24] noted that the decline in firearm suicide in one Australian state, Queensland, was offset by an increase in hanging suicides. Therefore, the current results indicate the need for examination of trends in suicide method at the local level, and comparisons with national trends, before any definitive conclusions about method restriction and substitution can be drawn. At the policy level, the current results highlight the possibility that social change coupled with prevention strategies emphasising detection and early intervention may contribute more strongly than method restriction to reducing suicide rates in Australia.

Two methodological considerations should be noted for this study. It could be argued that using an earlier starting point for the analysis, or analysing a series of different epochs, would generate different trends and therefore give a different picture of the results. This was not considered problematic in the current study, because in practical terms the question of relevance was whether the downward trend that emerged from 1997 onwards was consistent between males and females—not whether those downward trends were a statistical byproduct of the high suicide levels in the late 1990s.

A second consideration is data quality. ABS figures appear to ‘under count’ suicides, relative to coronial records [25,26], yet ABS figures are a primary data source for researchers in the field. Specifically, ABS data do not take into account coroners cases that were ‘open’ at the time of annual ABS data collation. As a consequence, it is possible that the figures used in this research—which were based solely on ABS data and thus not able to take into account open coroners records—are lower than the actual incidence of suicide in Australia. Additionally, the National Coroners Information System (NCIS), who hold records from 2000 onwards, advise that ABS figures for 2005 are likely to rise [27].

The extent and nature of potential undercounting of suicides is not yet known. Should information about this issue come to light, it would be necessary to revisit the current analyses. Depending on the extent of potential data inaccuracies, it may be that the fall in suicides for one or both genders has been less pronounced than ABS data indicate. It may also be that one gender is more likely to commit suicide in a manner that increases the likelihood of a case remaining open for a longer period of time—single motor vehicle fatalities, for instance. This in turn could impact upon the outcome of comparisons of the rate of decline in suicide between males and females; for example, it may be that male suicides have not fallen as rapidly as the current data suggest. Therefore, it is advisable that the analyses presented herein be repeated at regular intervals to allow for corrections in data, as well as provide a longitudinal perspective.

5. Conclusions

There is a clear need to continue evaluating trends in suicide by gender at the national level, and to facilitate comparisons between general and specific demographic trends. It is also recommended that in keeping with international recommendations [28–30] greater consideration be given to researching risk factors such as intimate partner violence, sexual abuse, and substance dependence, for Australian female suicide. In general, however, the current results provide an encouraging indicator that Australian males, an ‘at risk’ demographic, appear to be experiencing some degree of benefit from the existence of current national suicide prevention strategies and related social changes.

References


