

(549) to obtain information on cervical cancer screening. The proportion listening was only 15%, however, IVR could enumerate the contacts made, unlike other methods such as radio broadcasts, where reach is unknown. Unscreened and older women made greater use of IVR than screened women or younger women. This was encouraging since these are recognised risk groups towards whom intervention should ideally be directed. The IVR call was acceptable to women and inexpensive.

Under-screened women's most commonly selected barrier message was embarrassment, which was consistent with other studies.¹⁹⁻²⁰ While only a small proportion listened to information messages, it is of interest that among older women, the under-screened were significantly more likely to listen than the correctly screened, given that older women have generally lower screening rates than younger women.¹⁴

A comparable alternative to IVR calls was mailed pamphlets. However, IVR was not only less expensive than pamphlets, and more often used, but could also accurately record the number who listened without expensive follow-up.

The successful study outcome suggests that the IVR method would be useful to increase screening rates since those most at risk were the heaviest users of the system. However, no conclusion could be reached on IVR effect on cervical screening rates. Accordingly, a controlled randomised trial is planned to evaluate its efficacy in increasing screening rates. Then, the potential for linking IVR to a database to issue reminders in the same manner as Pap Test Register postal reminders needs to be explored.

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The mental health status of young adult and mid-life non-heterosexual Australian women

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In Australia and overseas, lesbian and bisexual women have been shown to have poorer mental health than heterosexual women.¹⁻⁴ The one Australian study combined women and men in two age-cohorts (20-24 and 40-44 years) and found depression, anxiety and suicidality were higher in bisexual and lesbian/gay people than heterosexual people.¹ Bisexuals had more current adverse life events, less support from family and friends and more financial problems. Combining women and men meant that it was impossible to ascertain whether lesbian and bisexual women were particularly at risk of poorer mental health in that study.

It is well documented that women suffer higher levels of depression and anxiety, in part due to risk factors including biological factors, persistent psychosocial stressors, gender-based discrimination, more negative life-events and experiences of abuse.^{5,6} Women who do not identify as heterosexual may be particularly vulnerable to higher levels of mental health morbidity. In addition, Australia has one of the highest rates of youth suicide in the world at more than 18 per 100,000, yet same-sex attraction as a risk factor has only recently been acknowledged in policy and programs.⁷ This is despite international evidence that same-

sex attracted youth are more likely to attempt suicide.⁸

In this study we contribute to the Australian and international evidence regarding the mental health status of women according to sexual orientation using data collected as part of the Australian Longitudinal Study on Women's Health (ALSWH). We compare the mental health outcomes (depression, anxiety, self-harm and suicidality) of early adult and mid-life women classified as mainly heterosexual, bisexual and lesbian with those classified as exclusively heterosexual using multiple mental health measures and explore the extent to which stress, abuse and social support might explain differences.

Methods

Study population

Data were generated from the ALSWH, which involves more than 40,000 women from three age-based cohorts who were randomly selected in 1996 and complete surveys every three years. This paper is based on cross-sectional analysis of a survey completed by the younger and mid-age cohorts. The older cohort was not included because surveys of this group do not include sexual orientation questions. Details about

Abstract

Objectives: To compare the mental health status of early adult and mid-life Australian women according to sexual orientation.

Methods and sample: Cross-sectional analyses of the Australian Longitudinal Study on Women's Health (ALSWH) surveys for the younger (22-27 years) and mid-age (50-55 years) cohorts. Women were classified into one of four groups: exclusively heterosexual, mainly heterosexual, bisexual and lesbian.

Regression analyses were used to examine the effects of sexual orientation on mental health after adjusting for age, region of residence and education and to assess the potential mediating roles of stress, abuse and social support.

Results: Younger, mainly heterosexual, bisexual and lesbian women had poorer mental health outcomes than exclusively heterosexual women on all outcome measures except anxiety in lesbian women, even after adjustment for age, region and education. Mid-age mainly heterosexual women had poorer mental health on all outcomes except for medically diagnosed anxiety and bisexual women had significantly higher odds of self-harm than exclusively heterosexual women. All non-heterosexual women in both cohorts reported higher levels of stress and lifetime abuse. Controlling for stress, abuse and social support attenuated the mental health findings.

Conclusions: The poorer mental health in young non-heterosexual women and mid-life mainly heterosexual women highlights the need for health care providers to be particularly sensitive to mental health issues in these women. Stress, social support and lifetime abuse may play a role in explaining the poorer mental health and discrimination may also be important.

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the survey design and characteristics of the sample have been reported elsewhere.⁹

The initial response rates for survey 1 in 1996 were 41% (n=14,792) for the younger cohort and 54% (n=14,200) for the mid-age cohort. The two surveys that we have analysed were the first for each cohort in which the sexual orientation question was included. These were survey 2 of the young women, collected in 2000 when they were aged 22-27 years; and survey 3 of the mid-life women, collected in 2001 when they were 50-55 years of age. The retention rate for the younger survey 2 was 71% and for the mid-age survey 3 was 89%. The samples for this paper consist of the 9,260 (96%) young women and 10,299 (94%) mid-life women who provided information about their sexual orientation.

Measures

Main predictor variable

Women indicated which of the following five categories best described their sexual orientation: 'I am exclusively heterosexual', 'I am mainly heterosexual', 'I am bisexual', 'I am mainly homosexual (lesbian)', or 'I am exclusively homosexual (lesbian)'. For analysis, women who selected 'I am mainly homosexual' and those reporting 'I am exclusively homosexual' were combined and for this paper are called 'lesbian'. Women who refused to answer the question or were unsure about their sexual orientation were excluded from the analysis.

Outcome variables

1. Mental health status. The Mental Health Index Scale (MH) was used to measure mental health status. MH is a subscale of the well-validated Medical Outcomes Study 36-Item Short Form Health Survey (SF-36).^{10,11} It includes five items relating to the stem: "... give the one answer that comes closest to the way you have been feeling during the past four weeks". Each item is rated on a six-point scale from 'none of time' to 'all of the time'. The possible range of scores for MH is 0-100, with higher scores indicating better mental health status.

2. Depression. Several measures of depression were used. First, the Center for Epidemiologic Studies Depression Scale (CES-D), which includes 10 items relating to the stem: "... indicate how often you have felt this way during the last week" using a four-point Likert scale.¹² The possible range of scores is 0-30, with higher scores representing a higher degree of depressed mood. For women with only one missing response, a value was imputed using the mean of the responses to remaining items. Missing data were imputed for 3.7% of the younger cohort (n=340 women) and 4.7% of the mid-age cohort (n=485).

Women were also asked three individual questions regarding depression: "Have you ever been told by a doctor that you have depression (not postnatal) in the last 4 years?" (yes/no); "In the last 12 months, have you had depression?" (none, rarely, sometimes and often); and "During the past 4 weeks, how many different types of medication have you used for depression?" (none, one, two, three and four or more). For self-reported depression, responses were divided into two categories: none and

rarely versus sometimes and often. We also divided the responses into two categories for use of prescription medication: none versus one, two, three and four or more. There are some limitations with the self-report question on depression in the last 12 months, as it is not clear whether respondents report depressive disorder or depressed mood. The same limitation applies to the anxiety in the last 12 months question below.

3. Anxiety. Participants were asked two questions: "Have you ever been told by a doctor that you have an anxiety disorder in last 4 years?" (yes/no) and "In the last 12 months have you had episodes of intense anxiety" (none, rarely, sometimes and often). For this analysis, responses to the self-report anxiety were divided into two categories: none and rarely versus sometimes or often.

4. Self harm/suicidal ideation. Two questions were used to assess thoughts and experience of self-harm/suicide: "In the past week, have you been feeling that life isn't worth living?" (yes/no) and "In the past 6 months have you ever deliberately hurt yourself or done anything that you knew might have harmed or even killed you?" (yes/no).

Confounding variables

In preliminary analyses, age, education and region of residence were found to be associated with sexual orientation and some outcome measures. Therefore, all analyses were adjusted for the confounding effects of these factors. The informant's highest level of education was used as a measure of socio-economic status (SES) and was treated as a nominal measure. Region of residence was also a nominal variable with informants classified as residing in either a metropolitan, rural or remote setting.

Possible mediating variables

1. Stress. The Perceived Stress Questionnaire for Younger Women (PSQYW) was developed by the ALSWH research team to measure level and perceived sources of stress.¹³ The PSQYW asks "Over the last 12 months, how stressed have you felt about the following areas of your life?" regarding 10 items from five life domains including: family of origin, relationships with others, own health, work and money, and study. Women's responses to the PSQYW were averaged, and higher mean scores on the scale indicated higher degrees of stress. Missing data were treated as recommended by ALSWH. Women with partial missing data had a mean score computed using an average score based on the number of valid responses.

2. Abuse. Abuse was measured by the question: "Have you ever experienced any form of physical, mental, emotional or sexual abuse or violence, either as a child or in an adult relationship or at any other time?" (yes/no).

3. Social support. The degree of social support was assessed by a modified version of the Medical Outcomes Study (MOS) Social Support Scale.¹⁴ The stem question was "How often is each of the following kinds of support available to you if you need it?", with six items to assess social support in five dimensions: emotional support, information support, tangible support, positive

social interaction and affectionate support. The final score is the sum of the six items with a possible range of 6-30 with higher scores indicating stronger social support.

Data analysis

The data were weighted to correct over-sampling of women in non-metropolitan areas of Australia. Mean comparisons and independent-samples *t*-tests were used to assess the differences for continuous variables (including MH, CES-D and PSQYW), and ordinary least square regression (OLS) was used to adjust for confounding and potential mediating variables. In the case of binary outcomes, bivariate associations were computed as odds ratios (OR) with chi-square tests and 95% CIs, and logistic regression was used to adjust for confounding and potential mediating variables. Sexual orientation, education and region of residence were modelled as sets of dichotomous dummy variables. For the main predictor, sexual orientation, 'exclusively heterosexual' women formed the reference category in all analyses. Separate models were developed for the younger and middle-age cohorts. Analysis was undertaken using Intercooled Stata 7.0 statistics package (Stata Corporation, College Station, Texas).

Results

Younger cohort

The proportions of women selecting each sexual orientation category were: "I am exclusively heterosexual" 91.4% (n=8,482), "I am mainly heterosexual" 6.8% (n=634), "I am bisexual" 0.8% (n=75), "I am mainly homosexual (lesbian)" 0.3% (n=32), or "I am exclusively homosexual (lesbian)" 0.6% (n=60). Women who were unsure about their sexuality or refused to answer (n=409) were excluded from analyses.

There were noteworthy differences across levels of abuse and stress by sexual orientation, all of which we regard as potential

mediating factors for mental health (see Table 1). Mainly heterosexual (64.9%), bisexual (64.8%) and lesbian (61.8%) women were more likely to report abuse, compared with exclusively heterosexual women (37.8%), and also exhibited higher levels of mean stress over the previous 12-month period. In terms of social support, mainly heterosexual and bisexual women reported marginally lower levels of support than lesbian women, although the odds ratios overlap, while lesbian women had equivalent levels of social support as exclusively heterosexual women.

All non-heterosexual women were more likely to report poorer mental health (MH) and exhibit higher depression scores (CES-D), after adjusting for demographic factors (see Table 3). These differences were attenuated, and became non-significant, when stress, social support and abuse were included in models. With respect to the binary outcomes (see Table 2), all non-heterosexual younger women were significantly more likely to exhibit poorer mental health than were women who were exclusively heterosexual. The only exception to these findings was that levels of doctor-diagnosed and self-reported anxiety for lesbian women were not significantly different to exclusively heterosexual women. Including social support, abuse and stress in the models attenuated, but did not obliterate, the effects. The odds of self-harm were much higher in the non-heterosexual groups and these effects remained high even after adjustment for demographic and potentially mediating factors (see Table 2).

Mid-age cohort

Compared with the younger cohort, a greater proportion of mid-age women selected their sexual orientation as exclusively heterosexual, 97.4% (n=10,035); less as mainly heterosexual, 1.2% (n=122), bisexual 0.2% (n=16); mainly homosexual (lesbian) 0.2% (n=19); and slightly more as exclusively homosexual (lesbian) 1.0% (n=107).

Table 1: Social support, stress (mean score) and abuse by sexual orientation by age cohort: mean, per cent (%) and 95% confidence interval (95%CI).

	Young women				Mid-life women			
	Mean	%	95%CI	n	Mean	%	95%CI	n
Mean stress								
Exclusively heterosexual	0.94	-	0.93-0.96	8,218	0.60	-	0.59-0.62	9,689
Mainly heterosexual	1.2	-	1.2-1.3	606	0.73	-	0.62-0.83	121
Bisexual	1.4	-	1.2-1.6	73	0.66	-	0.45-0.88	15
Exclusively/mainly homosexual	1.3	-	1.2-1.5	90	0.73	-	0.62-0.84	123
Social support								
Exclusively heterosexual	24.6	-	24.5-24.8	8,218	22.9	-	22.8-23.1	9,689
Mainly heterosexual	23.1	-	22.6-23.5	606	21.3	-	19.9-22.7	121
Bisexual	22.5	-	21.0-24.0	73	21.1	-	16.6-25.5	15
Exclusively/mainly homosexual	24.4	-	23.1-25.6	90	23.9	-	22.5-25.3	123
Abuse								
Ever experienced any form of abuse								
Exclusively heterosexual	-	37.8	36.6-38.9	8,008	-	36.2	35.0-37.5	8,938
Mainly heterosexual	-	64.9	60.5-69.1	587	-	50.4	38.5-62.2	106
Bisexual	-	64.8	51.8-75.9	73	-	74.8	40.8-92.8	13
Exclusively/mainly homosexual	-	61.8	50.2-72.1	90	-	57.1	45.6-67.9	117

Table 2: Depression, anxiety and self-harm by sexual orientation by age cohort: per cent (%), odds ratio (OR) and 95% confidence interval (95% CI).

	%	Young women		n	%	Mid-life women		n
		Adjusted OR ^a (95% CI)	Adjusted OR ^b (95% CI)			Adjusted OR ^a (95% CI)	Adjusted OR ^b (95% CI)	
Depression								
Doctor-diagnosed depression in last four years								
Exclusively heterosexual	10.9	—	—	8,132	11.2	—	—	9,595
Mainly heterosexual	24.2	2.57 ^c (2.1-3.22)	1.98 ^c (1.56-2.53)	603	21.8	2.21 ^d (1.23-3.95)	1.85 ^d (1.02-3.36)	119
Bisexual	29.6	3.26 ^e (1.81-5.86)	2.09 ^e (1.09-4.0)	73	8.7	0.76 (0.20-2.79)	0.58 (0.15-2.31)	15
Exclusively/mainly homosexual	26.2	2.92 ^f (1.71-5.0)	1.98 ^f (1.15-3.41)	90	18.4	1.77 (0.99-3.22)	1.49 (0.83-2.69)	123
Self-report depression in last year								
Exclusively heterosexual	18.7	—	—	8,207	32.8	—	—	8,843
Mainly heterosexual	37.6	2.59 ^f (2.1-3.1)	2.0 ^f (1.62-2.46)	606	51.3	2.25 ^g (1.38-3.69)	1.83 ^g (1.06-3.17)	105
Bisexual	46.3	3.59 ^g (2.14-6.03)	2.29 ^g (1.22-4.31)	73	35.2	1.19 (0.28-5.06)	0.92 (0.22-3.82)	14
Exclusively/mainly homosexual	40.7	3.00 ^h (1.86-4.83)	1.96 ^h (1.18-3.27)	90	26.5	0.75 (0.45-1.27)	0.60 ^h (0.36-1.00)	111
Prescription medication for depression in last four weeks								
Exclusively heterosexual	4.0	—	—	8,069	7.0	—	—	9,627
Mainly heterosexual	8.7	2.3 ⁱ (1.63-3.24)	1.71 ⁱ (1.18-2.46)	598	13.9	2.17 ^j (1.07-4.41)	1.80 (0.85-3.79)	120
Bisexual	15.0	4.1 ^k (1.95-8.43)	2.5 ^k (1.17-5.34)	70	3.0	0.42 (0.05-3.29)	0.33 (0.04-2.75)	15
Exclusively/mainly homosexual	15.3	4.40 ^l (2.25-8.62)	3.01 ^l (1.50-6.07)	89	11.3	1.71 (0.84-3.47)	1.45 (0.73-2.90)	123
Anxiety								
Doctor-diagnosed anxiety disorder in last four years								
Exclusively heterosexual	4.6	—	—	8,132	6.6	—	—	9,595
Mainly heterosexual	11.0	2.52 ^m (1.85-3.43)	1.90 ^m (1.38-2.61)	603	12.3	2.05 (0.99-4.21)	1.75 (0.83-3.68)	119
Bisexual	15.4	3.63 ⁿ (1.76-7.51)	2.35 ⁿ (1.10-5.03)	73	2.9	0.45 (0.06-3.57)	0.38 (0.05-2.92)	15
Exclusively/mainly homosexual	9.3	2.1 (0.94-4.6)	1.41 (0.67-2.95)	90	7.3	1.14 (0.49-2.63)	0.93 (0.39-2.23)	123
Self-report anxiety disorder in last 12 months								
Exclusively heterosexual	7.9	—	—	8,207	19.6	—	—	9,205
Mainly heterosexual	16.9	2.35 ^o (1.82-3.04)	1.73 ^o (1.32-2.26)	606	34.2	2.24 ^p (1.33-3.77)	2.0 ^p (1.11-3.61)	102
Bisexual	23.1	3.4 ^q (1.82-6.20)	2.04 (0.95-4.4)	73	6.1	0.29 (0.08-1.35)	0.25 (0.05-1.10)	14
Exclusively/mainly homosexual	12.6	1.63 (0.83-3.22)	1.0 (0.51-1.96)	90	21.8	1.18 (0.65-2.11)	1.01 (0.55-1.85)	114
Suicide/self harm								
Feeling life is not worth living in last week								
Exclusively heterosexual	6.5	—	—	8,214	7.0	—	—	9,677
Mainly heterosexual	10.6	1.66 ^r (1.22-2.25)	1.09 (0.78-1.53)	604	16.1	2.87 ^s (1.51-5.46)	2.40 ^s (1.14-5.02)	121
Bisexual	15.2	2.44 ^t (1.21-4.92)	1.28 (0.56-1.91)	73	19.0	3.62 (0.77-17.96)	3.46 (0.73-18.51)	15
Exclusively/mainly homosexual	18.4	3.39 ^u (1.83-6.29)	2.12 ^u (1.15-3.9)	90	14.0	2.31 ^v (1.16-4.61)	2.26 ^v (1.07-4.75)	123
Hurt or tried to kill themselves in last six months								
Exclusively heterosexual	2.7	—	—	8,214	0.8	—	—	9,676
Mainly heterosexual	11.1	4.3 ^w (3.11-5.93)	3.11 ^w (2.20-4.38)	605	4.0	5.05 ^x (1.48-17.29)	4.59 ^x (1.23-17.35)	121
Bisexual	18.7	8.02 ^y (4.1-15.8)	4.81 ^y (2.48-9.34)	73	16.1	24.34 ^z (3.62-163.94)	24.57 ^z (4.06-148.82)	15
Exclusively/mainly homosexual	17.3	7.88 ^{aa} (4.33-14.72)	5.64 ^{aa} (2.88-11.05)	90	2.0	2.35 (0.42-13.05)	2.12 (0.38-11.89)	123

Notes:

(a) Adjusted for age, region of residence, and highest education.
 (b) Adjusted for age, region of residence, highest education, abuse, social support, and stress.
 (c) $p < 0.001$. (d) $p < 0.01$. (e) $p < 0.05$.
 In testing for statistical significance and estimating odds ratios those who were 'exclusively heterosexual' were treated as the reference group.

Mainly heterosexual women exhibited significantly lower levels of social support and greater stress than those who were exclusively heterosexual (see Table 1). Consistent with the finding for younger women, mid-age lesbian women reported comparable levels of social support, on average, to exclusively heterosexual women. As was the case for the younger cohort, there was a clear association between sexual orientation and experience of abuse (see Table 1). Bisexual (74.8%), lesbian (57.1%) and mainly heterosexual women (50.4%) were more likely to report ever having experienced abuse, compared with exclusively heterosexual women (36.2%). Mainly heterosexual and lesbian women had twice the odds of reporting to "feel that life was not worth living" in the previous week, compared with exclusively heterosexual women. Bisexual women had much higher odds of reporting deliberately hurting or attempting to kill themselves in the past six months.

Whereas younger non-heterosexual women appeared, as a group, more likely to report poorer mental health across each measure, the picture for mid-age women was less consistent. For this cohort, mainly heterosexual women displayed the poorest mental health (see Tables 2 and 3). Controlling for demographic, experience of stress, social support and abuse, mainly heterosexual women had approximately twice the odds of exclusively heterosexual women to have experienced doctor-diagnosed depression (last four years), self-reported depression (last 12 months), self-reported anxiety episode (last 12 months) and exhibited poorer mental health (MH) during the four weeks prior to being surveyed. There were no significant differences in likelihood of being diagnosed by a doctor with an anxiety disorder

between non-heterosexual women and those who were exclusively heterosexual after adjusting for the effects of demographic, stress, social support and abuse factors.

Women who were mainly heterosexual were more likely than exclusively heterosexual women to exhibit higher depression scores (CES-D), and to have used prescription medication for depression in the past four weeks. However, these differences became statistically non-significant when demographic, stress, social support and experience of abuse factors were modelled (see Tables 2 and 3).

Discussion

This study demonstrates that minority sexual orientation is associated with higher levels of mental health morbidity in Australian women but that the patterns vary according to life stage. Among younger women (22-27 years), mental health morbidity is higher among all groups of non-heterosexual orientation, whereas higher levels of mental health morbidity were only consistently found among mainly heterosexual women in the mid-age cohort (50-54 years). In fact, mid-age lesbian women had marginally higher or similar levels of mental morbidities as exclusively heterosexual women, although they still had more than two times the odds of experiencing feelings of suicidality. With only 16 mid-age bisexual women it is impossible to draw any conclusions about the patterns of mental health morbidities in this group, although there is a suggestion that their risk of self-harm may be elevated.

The only other known Australian community-based study, by

Table 3: Mental health and depression scores by sexual orientation by age cohort: mean, regression coefficient (b) and 95% confidence interval (95%CI).

	Mean	Young women		n	Mean	Middle-aged women		n
		Adjusted b ^a (95% CI)	Adjusted b ^b (95% CI)			Adjusted b ^a (95% CI)	Adjusted b ^b (95% CI)	
Mental health scale								
Exclusively heterosexual	68.9	—	—	8,198	73.9	—	—	9,645
Mainly heterosexual	62.8	-5.83 ^a (-7.41 - -4.24)	-0.78 (-2.14-0.57)	606	67.7	-6.67 ^a (-10.84 - -2.50)	-3.55 ^a (-6.75 - -0.35)	121
Bisexual	61.6	-6.89 ^b (-11.9 - -1.88)	0.58 (-3.65-4.80)	73	72.5	-2.21 (-15.18-10.77)	0.11 (-10.76-10.93)	15
Exclusively/mainly homosexual	63.0	-5.78 ^b (-10.11 - -1.40)	-0.13 (-3.56-3.30)	90	72.3	-1.80 (-6.02-2.41)	0.17 (-3.24-3.58)	123
Depression scale								
Exclusively heterosexual	7.3	—	—	8,030	6.0	—	—	9,378
Mainly heterosexual	9.4	2.04 ^c (1.51-2.57)	0.40 (-0.04-0.85)	595	7.7	1.99 ^d (0.82-3.35)	0.87 (-0.11-1.84)	114
Bisexual	10.9	3.46 ^e (1.93-4.98)	1.0 (-0.24-2.24)	73	6.8	1.18 (-3.36-5.71)	0.47 (-3.30-4.42)	15
Exclusively/mainly homosexual	9.8	2.46 ^f (0.88-4.05)	0.59 (-0.69-1.88)	89	6.1	0.23 (-0.91-1.38)	-0.39 (-1.40-0.61)	119

Notes:

(a) Adjusted for age, region of residence, and highest education.
 (b) Adjusted for age, region of residence, highest education, abuse, social support, and stress.
 (c) $p < 0.001$. (d) $p < 0.01$. (e) $p < 0.05$.
 In testing for statistical significance and estimating regression coefficients those who were 'exclusively heterosexual' were treated as the reference group.

Jorm et al., is a 20-year longitudinal study of adult mental health that began with a questionnaire completed by 4,824 women and men in two age groups, 20-24 and 40-44.¹ Bisexual and homosexual women and men (combined) were compared with heterosexual women and men and the highest levels of anxiety and depression were found in the bisexual groups, although homosexuals also had higher levels than heterosexuals. Suicidality was similarly high for bisexuals and homosexuals.

Our study extends the findings of this study in a number of important ways: first, by limiting our study to women we are able to discern to what extent sexual orientation is an important mental health risk factor for women; second, by examining many different mental health outcomes and demonstrating a consistent pattern of findings across them we can be confident that the findings of our study are robust; third, because we had a larger sample we were able to explore potential differences in patterns of mental health morbidity among Australian women in early adult and mid-life; and, finally, using data collected on stress, abuse and social support we were able to explore the potential importance of these variables in explaining the patterns we observe. We turn to exploring potential explanations below.

The determinants of the higher prevalence of mental health morbidity cannot be defined by our study; however, the marked attenuation of the regression coefficients in all analyses is highly suggestive that increased perceived stress, increased rates of lifetime abuse and reduced social support play a role. All of these potential mediators can be related to sexuality-based discrimination, where discrimination is defined as deliberate social exclusion, rejection and subsequent isolation.¹⁵ A number of studies have found an association between experiences of sexuality-based discrimination and poorer mental health status.^{16,17} Compared with heterosexual people, lesbian and gay people with mental illness have suffered significantly more day-to-day and lifetime discrimination, almost half of which they directly relate to their sexuality.¹⁸ There are no measures of discrimination within the ALWHS surveys.

Daily stress is an important predictor of mental ill health,¹⁹ and all categories of non-heterosexual women in both age cohorts reported higher levels of stress but some of the differences did not reach statistical significance (see Table 1). While reasons for these higher levels are not discernible by this study, other studies have attributed it to experiences of homophobia and to internalised homophobia.¹⁹

Reduced social support and alienation from the community is known to be a social determinant of stress and reduced well-being,²⁰ and is an important predictor of depression in lesbians who experience reduced social support from friends.¹⁹ Younger bisexual and mainly heterosexual women and mid-age mainly heterosexual women had lower levels of social support, which is consistent with Jorm et al.'s findings among the bisexual people.¹ Jorm et al. showed that people with a bisexual orientation were more likely to have an absence of positive social support from family. By contrast, the lesbian and heterosexual people in both our study and in Jorm et al. had equivalent levels of social support,

indicating that bisexuality and a mainly heterosexual orientation appears to be more socially marginalising.

Disturbingly high levels of lifetime abuse were reported among all non-heterosexual groups in both cohorts. Almost two-thirds of the younger and at least half of the mid-age non-heterosexual women in the study had experienced abuse, compared with just over one-third of the heterosexual women. This study did not determine when the abuse occurred, the gender of the perpetrator, or whether the abuse was directly related to the respondent's sexuality. Higher levels of abuse of non-heterosexual women have also been reported in other studies.²¹⁻²³ Homophobic abuse including bullying, verbal abuse and physical violence is shown to be a specific manifestation of discrimination that contributes to poor mental health among lesbian and gay people.¹⁷ Homophobic bullying contributes to low self-esteem and lack of social confidence,²⁴ and abuse leads to increased levels of chronic stress, substance use and suicide.²⁵ A study of gay, lesbian and bisexual people over 60 years old showed an association between current mental health and past abuse, regardless of when the abuse occurred; and also that abuse due to sexual orientation had a more powerful negative effect on mental health than other crimes.²⁴ Our study cannot draw any conclusions regarding the association between abuse and mental health, although it is interesting that the mid-age lesbian women report higher levels of abuse than the heterosexual women, while their mental health status apart from suicidal thoughts is similar to the heterosexual women. No studies to date that we can identify have fully determined the reasons for the higher prevalence of abuse among non-heterosexual women.

Perhaps the most concerning finding of this study is the higher prevalence of recent suicidality and self harm among non-heterosexual women. In both age groups, non-heterosexual women had approximately twice the odds of feeling life was not worth living in the previous week (suicidality) and the estimates were only partly attenuated by adjustment for abuse, social support and stress, suggesting that other factors were involved. Much higher levels of self-harm were found among all non-heterosexual groups in both age groups, although this did not reach statistical significance in mid-age lesbian women.

The reasons for the high levels of suicidality are not clear. Sexuality-based discrimination appears to be associated with suicidality in other studies,²⁷⁻²⁹ but distinguishing between cause and effect remains difficult.

Study limitations

The proportions of lesbian (0.9% younger, 1.2% middle aged) and bisexual (0.8% younger, 0.2% middle aged) women in our study are very similar to those found in other population-based samples.^{1,30-32} As with other studies in the area, our definition of sexuality was based on one question. Our question referred to sexual orientation, however respondents may have answered using a number of meanings including identity, sexual behaviour or sexual attraction. Also, the meanings applied to each category may be different for each age group. It is more likely that women selecting lesbian or bisexual are actually referring to their identity,

which tends to imply a connection with the lesbian or bisexual community. Women selecting mainly heterosexual may be choosing this category on the basis of their sexual behaviour or attraction. Their lack of a specific identity may contribute to their marginalisation and poorer mental health. It is important that sexuality measures capture the multiple dimensions of sexuality (attraction, behaviour and identity) so that risk groups can be better described and a more nuanced understanding of the ways in which sexuality is associated with mental health can be ascertained.³² Because this analysis is cross-sectional it is impossible to determine the causal order of events and make any claims to causality.

Conclusion

The marked increase in mental health morbidity found in various non-heterosexual early adult and mid-life subgroups suggest that it is necessary for health care providers to actively explore mental health including suicidality with their non-heterosexual patients. It is imperative that public health policy makers consider sexuality when developing policy and public health interventions. It is possible that policies that alleviate sexuality-based discrimination may reduce social isolation, abuse and stress and improve the mental health of non-heterosexual women. This study has highlighted various differences in mental health status between two age cohorts of women. The ALWHS provides an opportunity to follow these cohorts longitudinally, which will help to determine whether such differences are age or cohort related. Beyond this study, it is crucial that future research explores the reasons for the poorer mental health of non-heterosexual women, particularly the potential importance of sexuality-based discrimination.

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