

Contraceptive patterns for women with diagnosed mental health conditions: findings from a prospective cohort study

Melissa L. Harris

Melissa.Harris@newcastle.edu.au

Hunter Medical Research Institute

Nicholas Egan

University of Newcastle

Begashaw M. Gebresillassie

University of Newcastle

Tesfaye R. Feyissa

Deakin University

Tesfalidet Beyene

University of Newcastle

Catherine Chojenta

University of Newcastle

Research Article

Keywords: Contraception, mental health, unintended pregnancy, young women

Posted Date: October 8th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10570859/v1>

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Additional Declarations: Competing interest reported. Associate Professor Melissa Harris is an Associate Editor for Reproductive Health. All decisions on this manuscript were made by another senior editor. The authors declare that they have no other competing interests.

Abstract

Background

Mental health conditions such as depression, anxiety and severe mental illness (SMI), are increasing globally among young women. These conditions can influence sexual behaviour, partner dynamics, and healthcare engagement, increasing the risk of unintended pregnancy, sexually transmitted infections, and adverse pregnancy outcomes. Contraceptive decision making may also be shaped by the cognitive, emotional and social challenges associated with mental health disorders. Despite this, evidence on contraceptive patterns among young women with mental health conditions remains limited, particularly in Australia. This study aimed to investigate patterns of contraceptive use among young Australian women with mental health conditions.

Methods

Data from 15,244 young women enrolled in the Australian Longitudinal Study on Women's Health (ALSWH), born 1989–1995 were analysed. Latent transition analysis was employed to explore patterns of contraceptive use among women with diagnosed mental health conditions. A multinomial mixed-effects model examined associations between mental health conditions and contraceptive use.

Results

Contraceptive use at the last vaginal sexual encounter was similar for women with and without a mental health condition (approximately 86%), however, contraceptive patterns differed. Compared to women without a mental health condition using the oral contraceptive pill, women with a mental health condition had higher odds of using hormonal long-acting reversible contraception (LARC) and condoms (OR = 1.52;95%CI = 1.30–1.79) or other contraception and condoms (OR = 1.44;95%CI = 1.18–1.76). In sensitivity analyses, women with SMI had twice the odds of using LARC and condoms (OR = 1.92;95%CI = 1.30–2.83), and other combined contraceptive methods with condoms (OR = 1.66;95%CI = 1.10–2.49), compared to women without SMI using the oral contraceptive pill. However, women with SMI also had greater odds of not using any contraception than women without SMI using the pill.

Conclusions

The findings highlight the need for contraceptive counselling that is responsive to the needs of young women with mental health conditions. Integrating tailored contraceptive support into routine mental health care, particularly for women with SMI, who demonstrated higher odds of non-use, may help support informed contraceptive decision-making. Strengthening healthcare provider communication, improving access to clear contraceptive information, and supporting informed, person-centred choices may reduce the risk of unintended pregnancy and sexually transmitted infections and enhance reproductive autonomy for young women with mental health conditions.

PLAIN ENGLISH SUMMARY

Mental health conditions are increasing among young women and can affect their relationships, wellbeing and ability to access healthcare. These factors may increase the risk of unintended pregnancy and sexually transmitted infections. Understanding how young women with mental health conditions use contraception is important for supporting informed contraceptive decision-making and reducing health risks. This study examined contraceptive use among a large group of Australian women and explored whether mental health conditions influenced contraceptive choices. We found that contraceptive use was similar for women with and without mental health conditions, however method choice differed. Compared with women without mental health conditions who used the pill, women with mental health conditions were more likely to use long-acting reversible contraception (LARC) with condoms, or other lower-efficacy methods with condoms. These differences were even stronger among women with severe mental illness. Women in this group were almost twice as likely to use LARC with condoms or other combined methods, but they were also more likely to use no contraception at all. These findings show the importance of providing contraceptive counselling that meets the needs of women with mental health conditions. Offering tailored support as part of routine mental health care, improving communication between health professionals, and helping women make informed contraceptive choices, especially those with severe mental illness, may reduce the risk of unintended pregnancy and sexually transmitted infections.

BACKGROUND

Mental health conditions are a significant public health issue, affecting approximately 970 million people globally in 2019, with women disproportionately affected (1–3). Common conditions, such as anxiety and depression, affect up to 69% of women (4), while more severe disorders such as bipolar disorder and schizophrenia have lifetime prevalence rates of around 1%, often with greater illness burden and distinct symptom patterns compared to men (5–7). Similar trends have been observed in Australia (8), where the prevalence of mental health conditions continues to rise (8), particularly among those aged 16–24 years, the group with the highest rates of mental health conditions (9, 10). Data from the Australian Longitudinal Study on Women's Health (ALSWH), a national cohort study of Australian women, has shown that by early adulthood, 70% of women born between 1989 and 1995 had been diagnosed with (or treated for) at least one mental health condition, with rapid increases beginning in adolescence.

This life stage (i.e., adolescence and young adulthood) is also a time associated with an increased risk of unintended pregnancy and sexually transmitted infections (STIs) (8). In Australia, unintended pregnancy accounts for around 40% of pregnancies (11) and cohort evidence indicates that of the pregnancies among women aged under 25 years, around 85% are unintended (12). Women with mental health conditions face even greater risk. Recent meta-analytic evidence suggests that 65% of pregnancies among women with psychiatric vulnerability (including mood, psychotic and substance use disorders) are

unintended, with 34% higher odds of experiencing unintended pregnancy than women without psychiatric vulnerability (13). Individual studies report similar trends, with 63% of women with major psychiatric disorders reporting an unintended pregnancy compared to 19% among women without mental health conditions (14). Prospective evidence also indicates that young women with depression or stress symptoms are more likely to experience unintended pregnancy (14% and 15%, respectively) compared to women without these symptoms (9%) (15).

Contraceptive decision-making is particularly complex for women with mental health conditions, as depressive and anxiety symptoms can erode motivation and problem-solving required for timely contraceptive use, affect decision-making and increase reliance on highly user-dependent methods such as condoms, and interact with psychosocial distress or psychotropic medication use in ways that may hinder engagement with healthcare and contribute to inconsistent contraceptive use over time (16–18).

These findings underscore the heightened reproductive health risks for young women with mental health conditions and the importance of targeted strategies to support contraceptive decision-making in this population. However, current evidence suggests that women with mental health conditions have higher rates of contraception non-use, misuse, and discontinuation. However, findings on method choice, particularly regarding use of highly effective long-acting reversible contraception (LARC) are inconsistent, with some studies reporting lower uptake and others indicating more complex or combined method use among women with mental health symptoms (16, 19, 20). These inconsistencies highlight the need to clarify how mental health conditions influence contraceptive patterns over time. Contraceptive decision-making is additionally shaped by clinical, psychosocial and demographic factors, including condition severity, treatment regimens, age, geographical location, relationship status, education, parity and reproductive history (21).

Despite these complexities, the impact of mental health conditions on contraceptive behaviour remains poorly understood. Previous research, however, has largely relied on cross-sectional designs, which limit insights into temporal patterns and transitions in contraceptive use (22, 23). This highlights the need for a better understanding of how contraceptive behaviour evolves among women with diagnosed mental health conditions over time. This study therefore aims to address this gap by examining longitudinal patterns contraceptive use over time among young Australian women diagnosed with mental health conditions, using nationally representative cohort data.

METHODS

Study design and participants

Data were obtained from the 1989-95 cohort of the ALSWH, a population-based study focused on the health and wellbeing of Australian women. Women from this cohort were recruited using an open recruitment strategy involving online and offline methods including paid Facebook advertising, peer referral and incentives (24). Women recruited through these methods were found to be demographically representative of similarly aged women in the Australian population, except for an overrepresentation of Australian-born and tertiary-educated women (25). Women were eligible for inclusion in this analysis if they a) completed at least one survey in either 2013 (Survey 1), 2015 (Survey 3) or 2017 (Survey 5) when the women were aged 18–24 years, 20–26 years and 22–28 years, respectively; b) completed the survey questions related to contraceptive use; c) consented to having their survey data linked to administrative health data via Medicare (Australia's universal health insurer) and were deemed at risk of an unintended pregnancy at the surveys of interest. Women were not at risk of a future unintended pregnancy if they reported a current pregnancy, were trying to become pregnant or if their partner could not have children. Of the 17,010 women who completed the baseline survey, 15,244 women (90% of the original cohort) met the eligibility requirements. Details regarding the sample are described in Harris et al., 2022 (26).

Measures

Contraceptive use

Contraceptive use was assessed in a similar fashion to Harris et al (26). Participants were asked to report on the method(s) of contraception used at last vaginal sex from a multi-selection list of six options: “the pill”; “condoms”; “Implanon” (i.e., progestogen-only implant); “Mirena” (i.e., progestogen IUD); “other contraceptive”; and “none”. At Survey 1, for women who reported using other forms of contraception not listed, they had the opportunity to provide their chosen method as part of a free-text option. For analysis, the progestogen-only implant and progestogen IUD were combined into a single “hormonal LARC” item.

Mental health conditions

For this analysis, mental health conditions of interest included mood disorders (e.g., major depressive disorder); anxiety and stress-related disorders (e.g., generalised anxiety disorder); psychotic disorders (e.g., schizophrenia); personality disorders (e.g., borderline personality disorder) and eating disorders (e.g., anorexia nervosa). To increase reporting accuracy, the presence of a mental health condition was ascertained using multiple data sources and employing a disease-specific algorithm developed in concert with a perinatal psychiatrist. While the methods employed are described in detail elsewhere (8), case ascertainment was achieved using survey data and linked administrative health data, including individual state and territory-based Admitted Patient Data Collections (APDC) for psychiatric-related hospital admissions; the Pharmaceutical Benefits Scheme (PBS) for prescribed medications used in the treatment of the mental health conditions of interest, and the Medicare Benefits Schedule's (MBS) Better Access Scheme items for specified mental health conditions and included services.

For inclusion as a ‘case’, women were required to have either (a) one or more indication(s) in either the APDC or MBS; (b) indication in two or more ALSWH surveys; or (c) two or more disease-related prescriptions within a 12-month period, reported in two separate calendar years. Where a medication had multiple

indications for treatment (e.g., Duloxetine is indicated in the treatment of conditions such as major depression and generalised anxiety disorder and is also indicated for painful diabetic peripheral neuropathy), medication ascertainment was used if there was an indication for that condition from another data source (e.g., was also captured through MBS or survey data).

As part of a sensitivity analysis, we also examined the impact of severe mental illness (SMI) on contraceptive choice across time. Here, severe mental illness was ascertained in a similar fashion to Ruggeri and colleagues, which focused on severe and persistent psychiatric-related conditions (e.g., schizophrenia, bipolar disorder) identified in the state-based hospital admissions data for the following ICD-10 AM codes, F20-F29 and F31-39 (27).

Covariates

Sociodemographic variables included age (years), country of birth (Australia; other English speaking; other), area of residence (categorised according to the ARIA+ classification system as major cities; inner regional; outer regional/remote/very remote), highest educational qualification (year 12 or below; certificate/diploma; university), relationship status (partnered; unpartnered), and possession of a government-subsided Health Care Card (yes; no) was included as a surrogate for socioeconomic status.

Health-related factors included smoking status (current smoker; non-smoker), alcohol consumption (non-drinker; low risk drinker; infrequent drinker; risky/high risk drinker) (28), illicit drug use in the last 12 months (yes; no), body mass index (BMI: underweight [$< 18.5 \text{ kg/m}^2$]; healthy weight [≥ 18.5 and $< 25 \text{ kg/m}^2$]; overweight [≥ 25 and $< 30 \text{ kg/m}^2$]; obese [$\geq 30 \text{ kg/m}^2$]) (29) and chronic disease comorbidity (yes; no). Chronic disease was defined as the presence of diabetes, cardiac disease, asthma and autoimmune disease and was ascertained in a similar fashion to the main predictor variable (8).

Reproductive health factors included history of pregnancy (yes; no), and history of pregnancy termination (yes; no). Given contraceptive methods are often used for non-contraceptive reasons, we also adjusted for the presence or absence of self-reported gynaecological conditions such as polycystic ovarian syndrome (yes; no), endometriosis (yes; no), and the experience of menstrual symptoms such as irregular periods, heavy period, or severe period pain 'often' (yes; no).

Statistical analysis

Latent transition analysis was used to group women into latent statuses over time based on reported contraceptive combinations (21). The latent statuses refer to multiple contraceptives being used simultaneously. For example, "LARC and condom" refers to women who used both LARCs and condoms concurrently. Women could move between latent statuses over time, and we estimated the probabilities of these transitions. The final latent status groups for this analysis are described in detail in Harris et al (26). Briefly, these included: Condom (Status 1) characterised by high probability of condom use with some supplementation of the oral contraceptive pill; Pill and condoms (Status 2) characterised by high probability of pill and condom use; Pill (Status 3) characterised by high probability of oral contraceptive pill use and little supplementation of condoms; LARC and condom (Status 4) characterised by high probability of hormonal LARC use but with some condom supplementation; Other and condom (Status 5) which was characterised by high probability of other contraceptive method use (e.g., withdrawal, fertility-awareness methods) and some condom use; and None (Status 6) which captured the absence of any active contraceptive methods. Women were included in the analysis at each time point where they were at risk of an unintended pregnancy, up to a maximum of three times. The latent status assigned at each survey could vary over time.

Latent transition analysis was performed using the PROC LTA procedure (The Methodology Centre, Penn State) in SAS 9.4 software. Contraceptive data were entered into separate latent transition models, each with three to eight latent statuses. The optimal LTA model was selected based on clinical interpretability, latent class separation and G^2 , Akaike Information Criterion and Bayesian Information Criterion. Models with instances of very low membership probabilities across the time points ($< 2\%$) were excluded to reduce numerical estimation issues in subsequent regression models. A classify-analyse approach was used to assign each participant to the latent class with the greatest posterior probability. A multinomial mixed-effects model using generalised structural equation modelling was fitted to the data using Stata 15, with the assigned latent status describing contraceptive use as the multinomial outcome, and the time-varying predictors of a diagnosed mental condition, sociodemographic factors, health behaviours, and reproductive history as covariates. We also included a binary indicator variable describing whether the participant had any physical chronic conditions (diabetes, cardiac disease, asthma, autoimmune arthropathies and connective tissue disease, inflammatory bowel disease, multiple sclerosis, thyroid disease), as these have been shown to influence contraceptive choices (26). Correlation between observations was accounted for by treating participant ID as a random intercept. We conducted a complete-case analysis, excluding participants with missing data.

RESULTS

Sample characteristics

In 2013 (when aged 18–24 years), 52.2% of women reported having been diagnosed with a mental health condition. Lifetime prevalence increased over time, with two-thirds of the cohort reporting having been diagnosed with a mental health condition by 2017 (when aged 22–28 years). In 2013 (Survey 1), few meaningful differences in the sociodemographic characteristics of women with and without a mental health condition were noted, except for achieving university qualifications and possession of a health care card (see Table 1). Women with a mental health condition, however, were more likely to be current smokers (27.7% vs 14.2%), have previously been pregnant (18.7% vs 9.9%), had a pregnancy termination (8.5% vs 4.9%) and experienced menstrual symptoms often (42.7% vs 31.1%). These differences were consistent across the observation period (see Supplementary Table S1).

Table 1
Characteristics of women from the 1989-95 cohort at Survey 1 in 2013 (aged 18–24 years), by
mental health status (n = 14,150).

Factor	Level	Mental health condition	
		No	Yes
		n = 6766	n = 7384
		n (%)	n (%)
Sociodemographic			
Age (years), mean (SD)		20.7 (1.7)	20.7 (1.7)
Country of birth	Australia	6140 (90.7%)	6844 (92.7%)
	Other ESB	249 (3.7%)	236 (3.2%)
	Non-ESB	287 (4.2%)	212 (2.9%)
	Missing	90 (1.3%)	92 (1.2%)
Area of residence	Major cities	5098 (75.3%)	5478 (74.2%)
	Inner regional	1110 (16.4%)	1339 (18.1%)
	Outer regional/Remote/Very remote	556 (8.2%)	564 (7.6%)
	Missing	2 (< 1%)	3 (< 1%)
Highest qualification	Year 12 or below	3226 (47.7%)	3675 (49.8%)
	Certificate/Diploma	1720 (25.4%)	2335 (31.6%)
	University	1817 (26.9%)	1370 (18.6%)
	Missing	3 (< 1%)	4 (0.1%)
Relationship status	Partnered	1971 (29.1%)	2515 (34.1%)
	Non-partnered	4791 (70.8%)	4866 (65.9%)
	Missing	4 (0.1%)	3 (< 1%)
Health care card	No	4924 (72.8%)	4552 (61.6%)
	Yes	1837 (27.2%)	2829 (38.3%)
	Missing	5 (0.1%)	3 (< 1%)
Health factors			
Smoking	Non-smoker	5808 (85.8%)	5339 (72.3%)
	Current smoker	958 (14.2%)	2045 (27.7%)
	Missing	0 (0.0%)	0 (0.0%)
Alcohol consumption	Low risk drinker	4199 (62.1%)	4041 (54.7%)
	Non-drinker	261 (3.9%)	477 (6.5%)
	Rarely drinks	2047 (30.3%)	2538 (34.4%)
	Risky/High risk drinker	259 (3.8%)	328 (4.4%)
	Missing	0 (0.0%)	0 (0.0%)
Body mass index	Underweight	481 (7.1%)	575 (7.8%)
	Healthy	4226 (62.5%)	4059 (55.0%)
	Overweight	1221 (18.0%)	1429 (19.4%)
	Obese	674 (10.0%)	1119 (15.2%)
	Missing	164 (2.4%)	202 (2.7%)
Reproductive health			
History of pregnancy	No	6094 (90.1%)	6000 (81.3%)
	Yes	669 (9.9%)	1383 (18.7%)
*PCOS=Polycystic Ovarian Syndrome; ESB=English speaking background			

Factor	Level	Mental health condition	
		No	Yes
		n = 6766	n = 7384
		n (%)	n (%)
Sociodemographic			
	Missing	3 (< 1%)	1 (< 1%)
History of terminations	No	6429 (95.0%)	6748 (91.4%)
	Yes	332 (4.9%)	624 (8.5%)
	Missing	5 (0.1%)	12 (0.2%)
Menstrual symptoms	No	4661 (68.9%)	4228 (57.3%)
	Yes	2105 (31.1%)	3156 (42.7%)
	Missing	0 (0.0%)	0 (0.0%)
Parity	Zero	6598 (97.5%)	6991 (94.7%)
	One	130 (1.9%)	297 (4.0%)
	Two or more	38 (0.6%)	96 (1.3%)
	Missing	0 (0.0%)	0 (0.0%)
History of PCOS*	No	6601 (97.6%)	7004 (94.9%)
	Yes	165 (2.4%)	380 (5.1%)
	Missing	0 (0.0%)	0 (0.0%)
History of endometriosis	No	6675 (98.7%)	7122 (96.5%)
	Yes	91 (1.3%)	262 (3.5%)
	Missing	0 (0.0%)	0 (0.0%)
*PCOS=Polycystic Ovarian Syndrome; ESB=English speaking background			

Contraceptive trends over time

Table 2 highlights the trends in contraceptive use for women in the 1989-95 cohort with and without a mental health condition across the observation period. The proportion of women using some form of contraception at their last vaginal sexual encounter in 2013 (Survey 1) was similar for women with and without a diagnosed mental health condition (86.2% vs 89.8%). Similar differences were observed across time, with 87.6% of women with a diagnosed mental health condition users of contraception in 2017 (Survey 5) compared to 90.0% of women without a mental health condition. When focused on specific methods, women with a diagnosed mental health condition had lower use of the pill at baseline (51.8% vs 58.9%). Pill use decreased over time for both groups. By 2017, 41.3% of women with a mental health condition were pill users compared to 50.9% of women without a mental health condition. Women with a diagnosed mental health condition, however, were found to be higher users of hormonal LARC across the observation period, with 14.3% users in 2013 compared to 10.5% for women without a mental health condition. LARC use was found to increase for both groups over time, and by 2017, almost a quarter of women with a mental health condition were users of some form of hormonal LARC, compared to 17.7% of women without a mental health diagnosis. Around 13% of women with a mental health diagnosis and 10% of women without a diagnosis were non-contraceptive users across the observation period. Tables related to the latent transition model, including latent status membership probabilities, latent transition probabilities and model diagnostics, are presented in Harris et al. (26).

Table 2
Contraceptive trend over time by mental health conditions in the 1989-95 cohort.

Contraceptive	Mental health conditions		Mental health conditions		Mental health conditions	
	Survey 1 (2013)		Survey 3 (2015)		Survey 5 (2017)	
	No	Yes	No	Yes	No	Yes
	n = 6766	n = 7384	n = 3137	n = 4684	n = 2450	n = 4767
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Any contraception	6079 (89.8%)	6368 (86.2%)	2868 (91.4%)	4118 (87.9%)	2206 (90.0%)	4177 (87.6%)
Pill	3982 (58.9%)	3826 (51.8%)	1884 (60.1%)	2310 (49.3%)	1247 (50.9%)	1968 (41.3%)
Condom	3117 (46.1%)	2968 (40.2%)	1321 (42.1%)	1771 (37.8%)	952 (38.9%)	1730 (36.3%)
Progestogen-only implant	622 (9.2%)	849 (11.5%)	321 (10.2%)	624 (13.3%)	270 (11.0%)	603 (12.6%)
Progestogen IUD	86 (1.3%)	207 (2.8%)	98 (3.1%)	261 (5.6%)	165 (6.7%)	504 (10.6%)
Other methods	25 (0.4%)	53 (0.7%)	91 (2.9%)	201 (4.3%)	96 (3.9%)	257 (5.4%)
No contraception	687 (10.2%)	1016 (13.8%)	269 (8.6%)	566 (12.1%)	244 (10.0%)	590 (12.4%)
Number of contraceptives	0	687 (10.2%)	1016 (13.8%)	269 (8.6%)	566 (12.1%)	244 (10.0%)
	1	4233 (62.6%)	4643 (62.9%)	2030 (64.7%)	3086 (65.9%)	1688 (68.9%)
	2+	1846 (27.3%)	1725 (23.3%)	838 (26.7%)	1032 (22.0%)	518 (21.1%)
Note: Types of contraceptives do not add to 100% due to being able to choose multiple contraceptive methods.						

Contraceptive combinations

Based on interpretability, a six-status model was preferred over the five-status model (see Harris et al. (26)). In particular, the six-status model was able to demonstrate the complex use of both condoms and the pill. The seven-status model had low status membership probabilities and was therefore unsuitable. In the six-status model (see Harris et al. (26)), the first status, denoted as "Condom" included women predicted to use condoms (100% probability) with some supplementation of the oral contraceptive pill (6% probability). The second status, "Pill and condom" was characterised by use of both the pill (91% probability) and condoms (94% probability). The third status was described as "Pill" as it was dominated by the use of the oral contraceptive pill (100% probability), with a low probability of condom use (10% probability). The fourth status, described as "LARC and condom", was dominated by hormonal LARC use (100% probability) with supplementation with condoms (19% probability). The fifth status, termed "Other and condom", included women predicted to use 'other' methods of contraception not captured in the main survey questions (100%) alone or with supplementation by condoms (18% probability). The final status "None" captured the absence of any form of contraception. Across all three time points in the six-status model, Status 3 ("Pill") was the most prevalent contraceptive status and, as such, was selected as the reference class for subsequent analysis. Furthermore, the pill also makes sense as a contraceptive against which to make comparisons, as it has traditionally been the most popular contraceptive choice for young women.

Contraceptive use according to mental health status

Following the adjustment for sociodemographic, health, and reproductive factors, the presence of a mental health condition was associated with 52% increase in the odds of LARC and condom use (OR = 1.52, 95% CI = 1.30–1.79) and a 44% increase in odds of using other contraception combined with condoms (OR = 1.44, 95% CI = 1.18–1.76) compared to women without a mental health condition using the pill, respectively (see Table 3). There was no evidence of an association between the presence of a mental health condition and use of condoms alone, pills and condoms, and no contraception.

Table 3

Multinomial mixed-effect model for factors associated with contraceptive use by diagnosed mental health status for the ALSWH 1989-95 cohort.

Factor	Condom		Pill & condom		None		LARC & condom		Other & condom	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Mental health condition										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.97	0.88, 1.08	0.93	0.85, 1.01	1.07	0.96, 1.20	1.52	1.30, 1.79	1.44	1.18, 1.76
Age (years)	0.99	0.96, 1.03	0.92	0.89, 0.95	1.05	1.01, 1.08	0.93	0.89, 0.98	1.08	1.02, 1.14
Country of birth										
Australia (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Other ESB	1.06	0.82, 1.38	0.98	0.77, 1.24	0.91	0.69, 1.21	1.42	0.93, 2.17	1.33	0.86, 2.04
Non-ESB	1.87	1.45, 2.42	0.79	0.62, 1.02	1.71	1.30, 2.23	1.11	0.72, 1.71	1.67	1.07, 2.61
Area of residence										
Major cities (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Inner regional	0.92	0.81, 1.05	1.03	0.92, 1.15	0.95	0.83, 1.08	1.13	0.93, 1.37	0.86	0.67, 1.11
Outer regional/remote/very remote	1.02	0.85, 1.22	1.15	0.98, 1.35	1.12	0.93, 1.34	1.55	1.20, 2.01	1.44	1.06, 1.95
Education										
Year 12 or below	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Certificate/diploma	0.96	0.85, 1.08	0.96	0.86, 1.08	1.06	0.94, 1.19	1.21	1.02, 1.45	1.03	0.82, 1.29
University/higher degree	0.92	0.81, 1.04	1.11	1.00, 1.24	0.66	0.58, 0.76	1.19	1.00, 1.43	0.74	0.58, 0.94
Relationship status										
Partnered (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Unpartnered	1.52	1.38, 1.68	2.16	1.97, 2.38	0.97	0.87, 1.07	1.09	0.94, 1.26	1.28	1.07, 1.54
Health care card status										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	1.07	0.96, 1.18	1.00	0.91, 1.10	1.09	0.97, 1.21	1.24	1.07, 1.44	1.00	0.81, 1.23
Smoking status										
Non-smoker (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Current smoker	1.31	1.15, 1.50	0.77	0.68, 0.88	1.82	1.59, 2.07	1.44	1.19, 1.75	1.26	0.99, 1.60
Alcohol consumption										
Low risk drinker (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Non-drinker	2.15	1.75, 2.65	1.41	1.16, 1.73	2.44	1.97, 3.02	1.25	0.91, 1.70	1.56	1.07, 2.26
Rarely drinks	1.22	1.10, 1.35	1.04	0.95, 1.15	1.46	1.31, 1.63	0.98	0.84, 1.13	1.01	0.83, 1.24
Risky / high risk drinker	1.23	0.96, 1.56	0.80	0.62, 1.03	1.26	0.98, 1.62	0.93	0.65, 1.34	1.37	0.87, 2.15
Recent illicit drug use										
Notes: Reference latent status = Status 4 ("pill"); ESB = English-speaking background; PCOS = Polycystic ovarian syndrome; Reference status = Status 4 (pill only); Parity was not included in the models due to overlap with pregnancy history. A LARC here refers to the use of hormonal long-acting reversible contraception (progestogen-only implant and the progestogen IUD). Copper IUD is included as part of "other" contraception.										

Factor	Condom	Pill & condom		None		LARC & condom		Other & condom		
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.87	0.79, 0.97	0.60	0.55, 0.66	1.14	1.02, 1.27	1.00	0.86, 1.16	1.00	0.82, 1.22
Body Mass Index										
Healthy weight (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Underweight	1.07	0.89, 1.30	0.88	0.74, 1.05	1.18	0.97, 1.44	0.82	0.60, 1.10	0.76	0.49, 1.20
Overweight	1.13	1.00, 1.27	1.31	1.18, 1.46	1.23	1.08, 1.39	1.35	1.14, 1.60	1.36	1.10, 1.69
Obese	1.66	1.43, 1.93	1.43	1.24, 1.64	1.66	1.43, 1.93	2.28	1.84, 2.83	1.69	1.31, 2.18
History of pregnancy										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	3.36	2.75, 4.10	1.20	0.97, 1.49	5.56	4.58, 6.75	4.32	3.27, 5.72	4.15	3.04, 5.66
History of terminations										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.52	0.40, 0.68	0.60	0.45, 0.81	0.50	0.40, 0.64	0.98	0.68, 1.41	0.80	0.55, 1.17
Menstrual symptoms										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	3.13	2.82, 3.48	1.33	1.21, 1.47	2.97	2.65, 3.32	3.57	3.09, 4.13	2.47	2.04, 2.99
History of PCOS										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.87	0.69, 1.09	0.97	0.79, 1.20	1.13	0.91, 1.41	0.49	0.35, 0.70	0.73	0.50, 1.05
History of endometriosis										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.69	0.51, 0.93	1.32	1.01, 1.71	0.80	0.60, 1.07	2.13	1.40, 3.26	1.17	0.75, 1.82
Physical comorbidity										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.89	0.78, 1.00	1.09	0.98, 1.22	0.92	0.81, 1.05	1.11	0.92, 1.35	1.23	1.00, 1.51
Time										
Survey 1 (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Survey 3	1.00	0.89, 1.12	0.96	0.87, 1.07	0.76	0.67, 0.86	1.72	1.47, 2.02	6.18	4.65, 8.21
Survey 5	1.49	1.27, 1.76	0.77	0.66, 0.89	1.07	0.89, 1.27	3.90	3.06, 4.96	8.83	6.23, 12.52
Notes: Reference latent status = Status 4 ("pill"); ESB = English-speaking background; PCOS = Polycystic ovarian syndrome; Reference status = Status 4 (pill only); Parity was not included in the models due to overlap with pregnancy history. A LARC here refers to the use of hormonal long-acting reversible contraception (progestogen-only implant and the progestogen IUD). Copper IUD is included as part of "other" contraception.										

Sensitivity analysis

In all, 3.4% of women reported having SMI at Survey 1 in 2013. The prevalence of SMI increased over time, reaching almost 5% by Survey 5 in 2017. When we examined the association between SMI and contraceptive use over time, women with SMI had a 34% (95% CI = 1.03–1.73) increase in odds of being non-contraceptive users compared to women without SMI who used the pill only (see Table 4). In contrast, women with SMI also had a 92% (95% CI = 1.30–2.83)

and 66% (95% CI = 1.10–2.49) increase in odds of using LARC and condoms and other contraception and condoms compared to women without SMI using the pill alone, respectively.

Table 4

Multinomial mixed-effect model for factors associated with contraceptive use by diagnosed severe mental health status for the ALSWH 1989-95 cohort.

Factor	Condom		Pill & condom		None		LARC & condom		Other & condom	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Severe mental health condition										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	1.21	0.93, 1.58	0.85	0.65, 1.11	1.34	1.03, 1.73	1.92	1.30, 2.83	1.66	1.10, 2.49
Age (years)	0.99	0.96, 1.03	0.92	0.89, 0.95	1.05	1.01, 1.08	0.93	0.89, 0.98	1.08	1.02, 1.14
Country of birth										
Australia (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Other ESB	1.07	0.82, 1.39	0.98	0.78, 1.24	0.91	0.69, 1.21	1.43	0.94, 2.18	1.33	0.86, 2.04
Non-ESB	1.88	1.46, 2.43	0.80	0.62, 1.02	1.70	1.30, 2.23	1.08	0.70, 1.67	1.64	1.05, 2.57
Area of residence										
Major cities (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Inner regional	0.92	0.81, 1.05	1.03	0.92, 1.16	0.95	0.83, 1.09	1.14	0.94, 1.38	0.86	0.67, 1.11
Outer regional/remote/very remote	1.02	0.85, 1.22	1.15	0.98, 1.35	1.12	0.93, 1.34	1.54	1.19, 1.99	1.42	1.05, 1.93
Education										
Year 12 or below	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Certificate/diploma	0.96	0.85, 1.08	0.96	0.86, 1.07	1.06	0.94, 1.20	1.22	1.02, 1.45	1.03	0.82, 1.29
University/higher degree	0.92	0.82, 1.04	1.12	1.00, 1.25	0.66	0.58, 0.76	1.19	0.99, 1.42	0.73	0.57, 0.93
Relationship status										
Partnered (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Unpartnered	1.52	1.38, 1.68	2.17	1.97, 2.38	0.97	0.87, 1.07	1.08	0.93, 1.25	1.28	1.06, 1.54
Health care card status										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	1.06	0.96, 1.17	0.99	0.90, 1.09	1.08	0.97, 1.21	1.25	1.08, 1.45	1.01	0.82, 1.24
Smoking status										
Non-smoker (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Current smoker	1.30	1.14, 1.49	0.77	0.67, 0.87	1.82	1.59, 2.07	1.48	1.22, 1.79	1.29	1.01, 1.64
Alcohol consumption										
Low risk drinker (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Non-drinker	2.13	1.73, 2.62	1.40	1.15, 1.71	2.43	1.96, 3.00	1.26	0.92, 1.71	1.57	1.08, 2.28
Rarely drinks	1.21	1.09, 1.34	1.04	0.95, 1.14	1.46	1.31, 1.63	0.98	0.85, 1.14	1.02	0.83, 1.25
Risky / high risk drinker	1.23	0.96, 1.56	0.80	0.62, 1.03	1.26	0.98, 1.62	0.94	0.66, 1.35	1.37	0.87, 2.16
Recent illicit drug use										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.87	0.78, 0.96	0.60	0.55, 0.66	1.14	1.02, 1.27	1.02	0.88, 1.19	1.03	0.84, 1.25

Factor	Condom		Pill & condom		None		LARC & condom		Other & condom	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Body Mass Index										
Healthy weight (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Underweight	1.07	0.89, 1.29	0.88	0.74, 1.05	1.18	0.97, 1.44	0.82	0.61, 1.11	0.76	0.49, 1.20
Overweight	1.13	1.00, 1.27	1.31	1.18, 1.46	1.23	1.08, 1.39	1.36	1.14, 1.61	1.37	1.10, 1.69
Obese	1.66	1.43, 1.92	1.42	1.24, 1.64	1.66	1.43, 1.93	2.31	1.86, 2.87	1.71	1.33, 2.21
History of pregnancy										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	3.34	2.74, 4.08	1.20	0.97, 1.49	5.55	4.58, 6.74	4.38	3.31, 5.78	4.21	3.08, 5.74
History of terminations										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.53	0.41, 0.68	0.60	0.45, 0.81	0.51	0.40, 0.64	0.98	0.68, 1.40	0.80	0.54, 1.17
Menstrual symptoms										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	3.12	2.81, 3.46	1.32	1.20, 1.46	2.98	2.66, 3.33	3.63	3.14, 4.19	2.51	2.08, 3.04
History of PCOS										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.86	0.69, 1.08	0.97	0.79, 1.20	1.13	0.91, 1.41	0.50	0.35, 0.71	0.74	0.51, 1.06
History of endometriosis										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.69	0.51, 0.93	1.30	1.00, 1.69	0.81	0.60, 1.08	2.21	1.45, 3.37	1.21	0.77, 1.88
Physical comorbidity										
No (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Yes	0.88	0.78, 1.00	1.09	0.98, 1.21	0.93	0.81, 1.05	1.14	0.94, 1.39	1.25	1.02, 1.55
Time										
Survey 1 (ref.)	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Survey 3	1.00	0.89, 1.12	0.96	0.87, 1.06	0.76	0.67, 0.86	1.77	1.51, 2.08	6.34	4.77, 8.43
Survey 5	1.48	1.26, 1.74	0.76	0.65, 0.88	1.07	0.90, 1.28	4.13	3.25, 5.25	9.31	6.58, 13.18
Notes: Reference latent status = Status 4 ("pill"); ESB = English-speaking background; PCOS = Polycystic ovarian syndrome.										
Parity was not included in the models due to overlap with pregnancy history. A LARC here refers to the use of hormonal long-acting reversible contraception (progestogen-only implant and the progestogen IUD). Copper IUD is included as part of "other" contraception.										

DISCUSSION

This study examined patterns of contraceptive use among young Australian women with mental health conditions, including those with SMI, over a five-year period. Overall, contraceptive use was high and similar across groups (approximately 86%), however method choice differed. Women with mental health conditions had higher odds of combining methods including high efficacy LARC methods with condoms and lower efficacy methods and condoms. This preference was even stronger among women with SMI. However, women with SMI were also less likely to use any form of contraception compared to women without SMI who predominantly used the pill. While the uptake of LARC is encouraging, persistent gaps in contraceptive use among women with SMI highlight ongoing vulnerabilities and unmet reproductive health needs.

Contraceptive use patterns in this study were found to be comparable to US estimates among women experiencing frequent mental distress (30). Self-reported use of any form of contraception in our cohort across time (86.2%-90%) was found to be higher than that reported in an Australian state-based cross-sectional study (71.7%) (22). This difference may reflect variations in the measurement, ascertainment of mental health or cohort design. Although we noted high overall contraceptive use, our analyses showed that women with mental health conditions, especially those with SMI, had significantly higher odds of using LARC compared to women without a mental health condition. This pattern of increasing LARC use over time, aligns with national data showing that hormonal LARC use in Australia doubled between 2006 and 2018 (31). These trends suggest that there is growing awareness and adoption of LARC in this population. However, our findings clarify that this adoption often occurs in combination with other methods such as condoms, indicating a layering of contraceptive methods rather as opposed to monotherapy. This finding is supported by other cohort-based research involving young Australian women (21). Given the effectiveness of LARC in preventing unintended pregnancy, these findings reinforce the need to promote informed choice and equitable access to LARC for young women with mental health conditions while recognising the complex behavioural context in which decisions are made.

Despite prevalent LARC-containing use among women with mental health conditions, our findings indicate that contraceptive behaviours within this group are complex. Women with mental health conditions had 44% higher odds of using less effective contraceptive methods, frequently in combination with other lower efficacy methods, compared with women without mental health conditions who predominantly used the pill. This finding is consistent with the available evidence demonstrating that women with depression and stress are more likely to use less effective contraceptive methods (20, 22). While condom use is critical for STI prevention, overall condom use and dual protection did not differ between women with and without a mental health condition, indicating that STI prevention remains an unmet need for young women with mental health conditions. Patterns of layering lower efficacy methods is supported by previous cohort research involving young Australian women and recent evidence from this cohort of women with other chronic health conditions (21, 26). Given reported high-risk sexual behaviours and adverse pregnancy outcomes among some women with mental health conditions (32–34), reliance on less effective or inconsistent contraceptive approaches may further increase vulnerability to unintended pregnancy.

We also found that women with SMI had 34% greater odds of non-use of contraception compared with women without SMI who used the pill. This finding is consistent with previous research from this cohort and other chronic disease populations, where non-use of contraception was more common among women with autoimmune disease or cardiac conditions (26). These patterns suggest that chronic disease, including mental health conditions, is associated with persistent gaps in contraceptive access and use. Women with SMI often face additional vulnerabilities, such as reproductive coercion, substance use, and high-risk sexual behaviours, which can complicate contraceptive decision-making and sustained use (35–37). These patterns are consistent with evidence that depressive and anxiety symptoms can impair motivation, planning, partner communication and engagement with healthcare, shaping method choice and contributing to inconsistent use (18). Together these intersecting challenges highlight the need for comprehensive, non-judgmental contraceptive counselling that integrates pregnancy and STI prevention, addresses structural and psychosocial barriers, and supports informed, autonomous decision-making within stigma-free clinical environments.

While young women with mental health conditions should be supported to choose contraceptive methods aligned with their reproductive goals, our findings point to an underutilisation of highly effective LARC and suggest there are gaps in preconception contraceptive counselling in Australia, particularly for those with SMI. International evidence shows low rates of contraceptive counselling among chronic disease populations, even when teratogenic medications are prescribed (38, 39). The reasons behind limited contraceptive use and counselling among women with mental health conditions is not well understood; however, it may stem from multiple factors, including misperceptions about fertility, uncertainty regarding pregnancy risks and concerns about interactions between psychotropic medications and contraceptives that can impede patient-provider discussions (40–44). Like women with other chronic health conditions, health system barriers may also play a role, with mental health symptoms dominating clinical consultations, thus leaving little time to discuss reproductive health needs. Evidence suggests that many clinicians feel uncomfortable or inadequately trained to discuss contraception, citing stigma, perceived disease complexity, and unfamiliarity with method safety for women experiencing psychological distress (40–42, 45). These intersecting challenges highlight the need for proactive, stigma-free, and integrated contraceptive counselling that addresses knowledge gaps, medication concerns, and structural barriers.

The findings from this study therefore provide important implications for strengthening contraceptive care for women with mental health conditions, including those with SMI who showed lower overall contraceptive use, greater reliance on less effective methods and limited uptake of dual protection. Integrating routine contraceptive counselling into mental health care is paramount, as depressive and anxiety symptoms can increase the cognitive burden associated with user-dependent methods, increasing the risk of misuse and method discontinuation (40). Embedding structured reproductive health assessments within mental healthcare may help address these challenges and support ongoing reproductive healthcare. This aligns with recommendations for women with chronic illness that advocate for structured reproductive health assessments within mental health care (26, 40, 46).

Improving equitable access to LARC is also critical for addressing these gaps. National initiatives including the Women's Health Strategy 2020–2030 and recent Senate Inquiry into Universal Access to Sexual and Reproductive Healthcare (which led to an historic women's AU\$573 million health funding package) emphasise the need to expand service availability, lowering costs, and enhancing referral pathways (47, 48). Aligning these reforms with mental health services would help ensure women with complex needs can access their preferred contraceptive options equitably.

Strengthening provider training across mental health, primary care, and psychiatric care is essential. Clinicians require education on how psychological symptoms influence contraceptive behaviour, method safety (including for women experiencing psychological distress), and non-coercive, trauma-informed contraceptive counselling principles (40). Incorporating evidence-based guidance that addresses knowledge gaps, misperceptions about fertility, uncertainty regarding pregnancy risks and concerns about psychotropic-contraceptive interactions can improve communication and support accurate, consistent, and person-centred care (40, 45, 49).

Finally, the limited uptake of dual protection observed in our study highlights the need for tailored messaging and counselling that address both pregnancy and STI prevention. Women with mental health conditions may face additional challenges, such as substance use, partner dynamics, or reproductive

coercion, which increase STI vulnerability (35–37, 40). Counselling should therefore include supportive, affirming discussions about sexual safety and condom use, framed in a way that avoids stigma and recognises the broader psychosocial context in which women make contraceptive decisions.

A key strength of the study is its methodological rigour. We applied latent class analysis techniques to classify and identify distinct contraceptive combinations, providing a nuanced understanding of contraceptive behaviour. The use of longitudinal data allowed the observation of changes in contraceptive use over time among women with mental health conditions (including those with SMI). Additionally, linking survey data with administrative health records improved the accuracy of mental health case ascertainment. Given that contraceptive use and the risk of an unintended pregnancy are dynamic across the reproductive life course (50), we excluded women not at risk of a future unintended pregnancy at each of the time points. Few studies have accounted for this in longitudinal research (51). Despite these strengths, the findings should be interpreted considering its limitations. First, while we were able to examine contraceptive use at bi-yearly intervals, the questions regarding contraceptive use were not as detailed after Survey 1. Unfortunately, we were unable to measure use of the depo injection or copper IUD. Due to minimal self-reports of their use at Survey 1, these items were included as ‘other’ contraception. As such, we have potentially overestimated the use of low-efficacy methods. Also, there may have been some bias in the sample due to differential loss to follow-up. It has been found that active poor mental health is a predictor of loss to follow-up in longitudinal studies (including the ALSWH) (26). Additionally, while we examined contraception over time using latent transition analysis, to account for time-varying covariates (including mental health status), we employed a classify-analyse approach. We acknowledge that this approach may induce some measurement error due to the uncertainty in latent status classification (52). Further, while the ALSWH is broadly representative of the Australian population, women from culturally and linguistically diverse backgrounds are currently underrepresented, which may limit the applicability of results to these populations. We also lacked data on provider-level factors, including the quality and content of contraceptive counselling, which may have influenced women’s contraceptive decisions.

Conclusion

This study found that young Australian women with mental health conditions used contraceptive methods at comparable rates to their peers without such conditions. Although LARC usage was relatively high among this group, women with mental health conditions were also more likely to use less effective contraceptive methods, indicating a pattern of inconsistent contraceptive behaviour. These findings emphasise the need for targeted education and counselling strategies that promote informed use of highly effective methods, especially among young women at increased risk of unintended pregnancy and STIs. Personalised contraceptive counselling and support should be integrated into mental health care services to ensure reproductive autonomy and address the complex relationship between mental health, contraceptive choice, and access.

Declarations

Ethics approval and consent to participate

All data for this project were obtained from the ALSWH (see www.alswh.org.au/ for further details), approved under their Expression of Interest process (EOI A696) and provided in de-identified form. The ALSWH was conducted in accordance with the ethical principles of the Declaration of Helsinki. This project has ongoing ethical clearance from the University of Newcastle and University of Queensland’s Human Research Ethics Committees. Ethical approval for linkage of ALSWH survey data to the Admitted Patients Data Collections (APDC) was received from the NSW Population and Health Services Research Ethics Committee and other equivalent state and territory-based committees. Linkages to the National Death Index (NDI) was approved by the Australian Institute of Health and Welfare Ethics Committee. Women provided explicit written informed consent to participate in the ALSWH as well as for linkage to de-identified administrative health records prior to 2005. From 2005, an ‘opt-out’ consent process was approved by the data custodians and relevant ethics committees for data linkage, with participants regularly reminded of this process. ALSWH participants who decline health record linkage are excluded from data linkage requests.

Consent for publication

Not Applicable

Competing Interests

Associate Professor Melissa Harris is an Associate Editor for Reproductive Health. All decisions on this manuscript were made by another senior editor. The authors declare that they have no other competing interests.

Funding

Associate Professor Melissa Harris was funded through an Australian Research Council Discovery Early Career Researcher Award (DE190101134) to undertake this work.

Author Contribution

MLH was responsible for the study concept. MLH and NE contributed to the study design and analysis plan. NE conducted the analysis. MLH and NE contributed to case ascertainment data acquisition. MLH, BMG, TRF and TB drafted and revised the manuscript. MLH, NE, BMG, TRF, TB and CC reviewed the draft for intellectual content. All authors take responsibility for its content. All authors read and approved the final manuscript.

Acknowledgement

The research on which this paper is based was conducted as part of the Australian Longitudinal Study on Women's Health by the University of Queensland and the University of Newcastle. We are grateful to the Australian Government Department of Health, Disability and Ageing for funding and to the women who provided the survey data. The authors acknowledge the Australian Government Department of Health, Disability and Ageing for providing MBS and PBS data; and the Australian Institute of Health and Welfare (AIHW) as the integrating authority. The authors also acknowledge the following (1) The Centre for Health Record Linkage (CHeReL), NSW Ministry of Health and ACT Health, for the NSW and ACT Admitted Patients Data Collections; (2) Queensland Health as the source for Queensland Hospital Admitted Patient Data Collections; and the Statistical Analysis and Linkage Unit (Queensland Health) for the provision of data linkage; (3) The Linkage, Data Outputs and Client Services teams at Data Linkage Services Western Australia as well as the Data Custodians of the WA Hospital Morbidity Data Collections, and the Midwives Notification System; (4) SA NT DataLink, SA Health, and Northern Territory Department of Health, for the SA Public Hospital Separations and NT Public Hospital Inpatient Activity Data Collections; (5) The Department of Health Tasmania, and the Tasmanian Data Linkage Unit, for the Public Hospital Admitted Patient Episodes Data Collection; and (6) Victorian Department of Health as the source of the Victorian Admitted Episodes Dataset and the Centre for Victorian Data Linkage (Victorian Department of Health) for the provision of data linkage. Finally, we acknowledge Peta Forder (Centre for Women's Health Research, University of Newcastle) and Professor Marie-Paul Austin (School of Psychiatry, University of NSW) for their support in developing and refining the disease-specific algorithm used to ascertain mental health conditions.

Data Availability

ALSWH survey data are owned by the Australian Government Department of Health and Aged Care and, due to the personal nature of the data collected, release by the ALSWH is subject to strict contractual and ethical restrictions. Ethical review of the ALSWH is conducted by the Human Research Ethics Committees at the University of Queensland and the University of Newcastle. De-identified data are available to collaborating researchers when a formal request to make use of the material has been approved by the ALSWH Data Access Committee. The committee is receptive of requests for datasets that are required to replicate results. Information on applying for ALSWH data is available from <https://aus01.safelinks.protection.outlook.com/?url=https%3A%2F%2Falswh.org.au%2Ffor-data-users%2Fapplying-for-data%2F&data=05%7C02%7CMelissa.Harris%40newcastle.edu.au%7C80aee1f9c3944fc8dcf908deff13080d%7C85542c9feaa74e7489b5aadeb181fe60%7C0>. In addition, linked administrative data have been provided by third parties. In order for these linked data to be accessed through the ALSWH, every data user must be added to the applicable Data Use Agreements and Human Research Ethics Committee protocols.

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