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Young Women's Complex Patterns of Contraceptive Use: Findings from an Australian Cohort Study

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CONTEXT: Unintended pregnancy is common among young women. Understanding how such women use contraceptives—including method combinations—is essential to providing high-quality contraceptive care.

METHODS: Data were from a representative cohort of 2,965 Australian women aged 18–23 who participated in the 2012–2013 Contraceptive Use, Pregnancy Intention and Decisions baseline survey, had been heterosexually active in the previous six months, and were not pregnant or trying to conceive. Latent class

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analysis was employed to characterize women's contraceptive choices; multinomial logistic regression was used to evaluate correlates of membership in the identified classes.

RESULTS: The vast majority of women (96%) reported using one or more contraceptives, most commonly short-acting hormonal methods (60%), barrier methods (38%), long-acting contraceptives (16%) and withdrawal (15%). In total, 32 combinations were reported. Four latent classes of method use were identified: no contraception (4% of women); short-acting hormonal methods with supplementation (59%, mostly the pill); high-efficacy contraceptives with supplementation (15%, all long-acting reversible contraceptive users); and low-efficacy contraceptive combinations (21%); supplementation usually involved barrier methods or withdrawal. Class membership differed according to women's characteristics; for example, women who had ever been pregnant were more likely than other women to be in the no-contraception, high-efficacy contraceptive or low-efficacy contraceptive combination classes than in the short-acting hormonal contraceptive class (odds ratios, 2.0–3.0).

CONCLUSIONS: The complexity of women's contraceptive choices and the associations between latent classes and such

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characteristics as pregnancy history highlight the need for individualized approaches to pregnancy prevention and contraceptive care.

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Effective contraceptive use is the cornerstone of preconception care for young women, as it enables them to control their fertility according to their intentions and circumstances. Findings suggest that the unmet need for contraception among women overall in Australia is low; nearly 95% of women who are fertile, sexually active and not planning pregnancy use some method.[1,2] Despite this, unintended pregnancy remains a common experience. In the Understanding Fertility Management in Australia National Survey, a third of women aged 18–51 who had ever been pregnant reported at least one unintended pregnancy, and among participants aged 18–32, two-fifths reported an unintended first pregnancy (defined as mistimed, unexpected or unplanned).[3] In another national survey, 85% of Australian women aged 18–23 who reported ever having been pregnant indicated they had experienced an unintended pregnancy.[4] Three-quarters of these women reported using

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contraceptives when they experienced their first unintended pregnancy, and almost all relied on user-dependent methods.[4] That such high proportions of pregnancies are unintended despite widespread contraceptive use suggests either that the most commonly used contraceptives are ineffective or that contraceptives are ineffectively used (although social desirability may affect reporting). In addition, 30% of young women reported the use of more than one method at the time of their unintended pregnancy.[4] To improve approaches to contraceptive counseling and pregnancy prevention among young women in Australia, national-level data on the prevalence and patterns of contraceptive use are needed.

Data suggest that 15% of Australian women aged 18–44 use multiple contraceptive methods.[5] The pill (used alone or with condoms) is the most popular contraceptive choice,[6] particularly among women aged 18–24,[5] while use of highly effective, long-acting reversible contraceptives (LARCs), i.e., the hormonal intrauterine system (IUS), the copper IUD and the implant, is low.[7,8] In Australia, combining condoms with another method is most prevalent among women younger than 25 and among students.[5] Using condoms with another method provides extra protection against pregnancy; condoms are also essential for the prevention of STDs. However, condoms are not always used

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consistently. In a study of Australian clinic users aged 16–24, fewer than one-third of hormonal contraceptive users reported consistent use of condoms, and dual method use decreased as relationship length increased.[9.] Using condoms by themselves or as a supplement to method in new or casual relationships (and a decline in condom use as relationship length increased) has also been found in the United States.[9,10]

The use of condoms in combination with another method by Australian women is an important area of research, particularly given the country's increasing STD rates among women,[11] few studies have examined the wide range of contraceptive combinations women could be using. Recent qualitative research conducted in two U.S. cities has suggested that women use different combinations at various times to mask inconsistent use of a primary method or to obtain additional protection.[12] Yet simply adding more contraceptives does not necessarily improve efficacy, and this approach is not the most effective at preventing pregnancy. Identifying patterns of multiple contraceptive use that more accurately reflect actual practice could help explain why unintended pregnancy rates remain high in Australia and other developed countries.

Understanding how women use contraceptives is essential to providing high-quality contraceptive care. Recent research in the

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United States has demonstrated the relationship between the quality of care provided in a contraceptive consultation and method continuation, suggesting that taking the time to understand the individual's needs and find an appropriate method may reduce unintended pregnancies.[13] Moreover, understanding the correlates associated with multiple method use is important, as previous studies have highlighted how contraceptive use differs according to women's characteristics, such as residence, age, education, employment, number of children and access to health services.[14,15] Understanding these variables in the context of contraceptive combinations is essential to developing strategies to facilitate broader contraceptive choice and mitigate poor sexual and reproductive health outcomes.

Examination of nationally representative Australian data specifically focused on contraceptive use and unintended pregnancy is lacking.[2] This study therefore draws on data from the Contraceptive Use, Pregnancy Intention and Decisions Study (CUPID), a population-based cohort study focused on unintended pregnancy and contraceptive use. Our aim was to explore the prevalence of method combinations and the correlates of contraceptive use to gain a better understanding of the specific practices of young Australian women—and what influences them to choose these methods.

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METHODS

Study Overview

The CUPID project was a longitudinal population-based cohort study of Australian women aged 18–23 conducted by the University of Queensland and the University of Newcastle, in partnership with Family Planning New South Wales and Bayer Australia Ltd. The CUPID surveys concentrated on sexual and reproductive health histories, knowledge about and attitudes toward contraception, and use of health care. Three self-report surveys were administered at six monthly intervals on a rolling schedule. These surveys took approximately 10 minutes to complete; participants were able to skip questions that did not pertain to them. Recruitment methods have been described in detail elsewhere.[16] Briefly, participants were recruited from September 2012 to September 2013 through social media (e.g., Facebook, Twitter and other online forums used by substantial numbers of young women), traditional media (e.g., news releases, radio interviews, posters displayed in prominent public places), direct promotion through organizations such as women's health and sexual health clinics, and referral from other CUPID participants. In addition, women were recruited in person at university events (e.g., stalls at orientation week

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events) and conferences (e.g., promotional materials in conference packets). Women recruited using these approaches were demographically representative of similarly aged women in the Australian population, although with an overrepresentation of university-educated women.[16]

A total of 3,795 women completed the baseline survey; approximately 60% attrition occurred by the last follow-up in 2015. This analysis was restricted to the 2,965 women aged 18–23 who reported being heterosexually active within the previous six months, were not pregnant or trying to conceive, and answered the question about contraceptive use.

This study received ethical approval from the University of Newcastle, the University of Queensland, Family Planning New South Wales and the Australian Department of Health.

Measures

• ***Contraceptive use.*** Participants were asked to respond to the question "Thinking of the LAST TIME you had vaginal sex, did you use any of the following?" They were then given a list of contraceptives to choose from in no particular order (e.g., the pill, condom, the implant, tubal ligation, withdrawal), as well as the space to report a method that was not listed. For this study,

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responses were collapsed into eight groups on the basis of contraceptive efficacy: sterilization (vasectomy or tubal ligation); LARCs, (the IUS, the IUD and the implant); emergency contraceptive pills; short-acting hormonal contraceptives (progestogen-only contraceptive pill, combined oral contraceptive pill, vaginal ring and the injectable); barrier methods (diaphragm and condom); withdrawal; natural methods, including fertility awareness-based methods (e.g., natural family planning, rhythm method) and lactational amenorrhea; and no method.

•***Demographic characteristics.*** Analyses included measures of the following characteristics: age; educational achievement (university degree, certificate/diploma from a technical college, or high school or less); area of residence (categorized, as per the Australian government's classification system, as major city; inner regional; or outer regional, remote or very remote);[17] relationship status (single, partnered but not living together, cohabiting, or engaged or married); and employment status (employed, student, both or neither).

•***Sexual health characteristics.*** Variables in this category were age (in years) at first sexual intercourse; history of a previous pregnancy (yes or no); perceived contraceptive knowledge (excellent, very good, good, fair, no knowledge or don't know,

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which we collapsed for analysis into excellent/very good, fair and poor/none); and perceived contraceptive choice, i.e., whether participants thought they had a choice (yes, no or don't know, which we collapsed into yes and no/don't know).

•***Health service access and use.*** We included a variable for Medicare card holder status as an indicator of respondents' access to Australia's national insurance plan for medical services and prescriptions; women were categorized either as having their own card or a copy of their parent's card (indicating access), or as not having a card or needing to borrow their parent's card (indicating lack of access). We also included measures of ease of access in obtaining contraceptive advice (always or usually easy vs. always or usually difficult); having had a general practitioner visit in the last six months (yes or no); and whether participants had consulted a gynecologist, family planning clinic, sexual health clinic or women's health service in the previous six months.

Analysis

Descriptive statistics were calculated to examine use of individual and multiple contraceptive methods at the participant's last vaginal sex. To identify patterns of

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contraceptive use at that last sexual encounter, we employed latent class analysis (LCA), using the eight contraceptive categories.[18] The first LCA model fitted two classes; subsequent models fitted up to eight to describe the potential patterns of contraceptive use. The optimal number of meaningful latent classes was determined using available diagnostic fit statistics, i.e., adjusted Bayesian information criterion, Akaike information criterion, Bayesian information criterion, consistent Akaike information criterion, G^2 and entropy.[19] For all but the entropy statistic, lower values are desirable, and indicate better separation and interpretability of classes. Once we had chosen an optimal model, we assigned descriptive labels to each latent class using the item response probabilities and latent class membership probability.[20]

Univariate analyses were conducted to assess associations between contraceptive class membership and baseline characteristics, using one-way ANOVA for continuous variables and chi-square tests for categorical variables. We used multinomial logistic regression analysis to examine the sociodemographic, sexual and reproductive health characteristics that were associated with each contraceptive class, using a sequential model building approach to monitor model fit and potential collinearity. Model 1 included only

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demographic characteristics, model 2 added sexual and reproductive health variables, and model 3 added measures of health service use. For brevity, we present data from model 3 only. Given that the majority of women used short-term hormonal methods, this group was selected as the reference group.

Latent classes were determined using the PROC LCA function in SAS 9.4. All other analyses were conducted using Stata 15, with statistical significance set at $p<.05$.

RESULTS

Contraceptive Use

Method use at last vaginal sex was reported by 96% of women; short-acting hormonal contraceptives (60%) were the dominant method choice, followed by barrier methods (38%), LARCs (16%) and withdrawal (15%). Use of emergency contraceptive pills was reported by 1% of women, while natural methods were reported by 0.7% and sterilization by 0.2%. Use of a hormonal-based contraceptive, either alone or in combination with another method (excluding emergency contraceptive pills), was reported by 74% of women. Of the 41 women who reported using emergency contraceptive pills, 37% reported no other method use while 27% reported using emergency contraceptive pills in

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combination with a barrier method.

Of the contraceptive users, 66% reported using only one method, while 32% reported using two methods and 2% reported three or more. Of the women using multiple methods, 82% reported using short-term hormonal contraceptives, 75% a barrier method and 12% a LARC. Thirty-four percent of barrier method users did not use another method, while 61% used one other method (overwhelmingly short-term hormonal methods) and 5% used two or more. Method combinations used by at least 1% of women are listed in Table 1, while all 32 combinations reported by respondents are provided in Appendix Table 1 (Supporting Information).

Latent Classes of Contraceptive Use

A four-class model was determined to be the optimal model for categorizing complex contraceptive use, based on fit statistics, adequate data representation and interpretability of the classes (Table 2).[20]

The first class—which we term the no-contraception group—included 4% of women, all of whom had not used any contraceptive method at last intercourse (Table 3). The second class (short-acting hormonal methods with supplementation)

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included the majority of women (59%). All of these women used short-acting hormonal methods; one-third also used barrier methods and 13% used withdrawal. The third class (high-efficacy contraceptives with some supplementation) included 15% of respondents, who all reported using LARCs; a minority of these women had supplemented their long-active contraceptive with barrier methods (15%) or withdrawal (5%). The final class (low-efficacy contraceptive combination) included the 21% of women who relied on a combination of less-effective methods, including barrier methods (72%) and withdrawal (33%). A small proportion of these women used emergency contraceptive pills (5%) and fertility awareness–based methods (4%).

Bivariate Associations

Most variables in our analysis were associated with contraceptive class membership. The proportion of women who were university graduates was lowest in the no-contraception group (11%)—approximately half of the proportion in the short-acting hormonal contraceptive group (21%—Table 4). One-fourth of women in the no contraception and low-efficacy contraceptive groups were single (25% and 26%, respectively),

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compared with less than one-fifth of women in the short-acting hormonal contraceptives and high-efficacy contraceptive groups (19% and 18%). Twenty percent of women who used no contraceptives reported neither working nor studying, compared with 5–12% of women in the other three groups.

In terms of sexual and reproductive health characteristics, women who were not using contraceptives were more likely than women in the other groups to have ever been pregnant (43% vs. 12–32%). Poor contraceptive knowledge was reported by 12% of women in the low-efficacy contraceptive group, compared with 5–7% of women in the other groups. The proportion of women who felt they did not have a contraceptive choice was highest among women in the no contraception and low-efficacy groups (10–13% vs. 7% in the other two groups); a similar pattern was evident for the proportion of women reporting difficulty in obtaining contraceptive advice. Finally, nearly one-fifth of women in the low-efficacy contraceptive group had not seen a general practitioner in the last six months (18%), which was substantially higher than the proportion in the other groups (6–10%).

Regression Analysis

For every additional year in age, women had higher odds of

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being in the low-efficacy contraceptive group than in the short-term methods group (odds ratio, 1.1—Table 5). Women who lived in outer regional or remote areas were more likely than those who lived in a major city to be in the high-efficacy group rather than the short-acting method group (1.4). Compared with women who were single, those who were in any type of partnered relationship had lower odds of being in the low-efficacy contraceptive methods group than in the short-acting methods group (0.5–0.6). Employment status was also associated with method use; compared with women who were both working and studying, those who were only working were more likely to be not using contraceptives than to be in the short-acting method group (2.5), while those who were neither working nor studying had higher odds of not using a contraceptive (3.6) or being in the low-efficacy group (2.0) than of being in the short-acting method group.

Three of the sexual and reproductive health measures were associated with class membership. For every one-year increase in age at first sex, women had lower odds of being in the no contraceptive use (0.8) or high-efficacy contraceptive (0.9) groups than in the short-acting method group. Compared with women who had never been pregnant, those who reported a previous pregnancy had higher odds of not using contraceptives,

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or being in the high- or low-efficacy contraceptive groups than of being in the short-acting method group (2.0–3.0). There was some evidence linking perceived contraceptive knowledge to method use; women who rated their knowledge as “fair” were less likely than women who rated their knowledge as “excellent” or “very good” to be in the high-efficacy contraceptive group than the short-acting method group (0.6).

Women who had visited a general practitioner within the previous six months had lower odds than those who had not of being in the low-efficacy contraceptive group than in the short-acting contraceptive group (odds ratio, 0.3). In addition, those women who had visited a family planning or women’s health clinic in the last six months had higher odds of being in the high-efficacy contraceptive group than of being in the short-acting method group (1.3).

DISCUSSION

Our findings shed light on how young women in Australia actually use contraceptives and demonstrate the complexity of their choices. Although nearly two-thirds of women reported using only the pill or condom (the two most commonly used methods), we identified more than 30 distinct combinations of contraceptive use. These findings have important implications

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for contraceptive counseling and reproductive life planning.

It is important to note that a significant minority of women reported the use—including the multiple use—of less-effective methods such as withdrawal during their last vaginal sex, although the prevalence of exclusive withdrawal use was lower than that reported in other studies of young adults (perhaps as a result of differences in contraceptive reporting periods).[21] Given the high failure rates of these methods under typical-use conditions (e.g., 22% for withdrawal),[22] such contraceptive practices place these women at greater risk than women who use more reliable methods of experiencing an unintended pregnancy (and STDs).[4] In general, while the use of withdrawal is contextual and often location specific—the highest rates of use are in northern Africa and western Asia, and the lowest in Australia and New Zealand[23]—findings from studies, both in Australia[2] and around the world, suggest that women use withdrawal for reasons including cultural or religious beliefs,[24] quality of sexual experience,[25] convenience[26] and poor contraceptive knowledge.[27] Particularly in Australia, there is evidence to suggest that young women from culturally and linguistically diverse backgrounds may be disproportionately using withdrawal.[2]

While we were not able to explore why unemployed women were more likely than other women to use no method or the low-

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efficacious methods, financial difficulties may be involved. Although many contraceptive methods are subsidized in Australia, there are disparities in access due to out-of-pocket costs particularly for adolescents and for those with lower income.[14,23,28] The use of low-efficacy (or no) contraceptives may also reflect partner preference, including coercion, or choices made by women who possess ambivalent attitudes toward pregnancy; such attitudes are associated with lower uptake of highly effective methods.[29] Increasing our understanding of the impact of pregnancy ambivalence on contraceptive practices may be key to the prevention of unintended pregnancies in this population; research shows that women who express ambivalence toward pregnancy report inconsistent contraceptive use.[30]

The low proportion of young women using condoms, as demonstrated here and elsewhere,[31,] is concerning, given the increasing rates of STDs in Australia and the potential reproductive health impacts for women.[11] Although chlamydia, the most commonly diagnosed bacterial STD in Australia, is often asymptomatic, it can—if left untreated—progress to pelvic inflammatory disease, which can lead to chronic pelvic pain, ectopic pregnancy and tubal factor infertility.[32] While condoms are the best way to prevent STD transmission, these are often not

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used in longer-term relationships.[9,33] Australian guidelines recommend that sexually active people younger than 30 be screened for STDs regularly (and more often if an individual is engaging in sexual activities that increase transmission risk);[34] increased efforts to encourage men and women to visit their general practitioner for regular sexual health check-ups are needed.

It is important, however, that only 12% of women who were using low-efficacy methods described their contraceptive knowledge as "poor." Paradoxically, the use of relatively ineffective methods such as withdrawal may indicate strong motivation to avoid pregnancy—withdrawal may serve as an extra layer of protection. Similar to previous research, our study found that withdrawal was used more often in combination with other methods (even to support LARC use) than as the sole method.[21,25] This may represent a shift away from the expectation that the woman is solely responsible for contraceptive decision making.[35] Further research should analyze the factors underlying the agency of women in contraceptive choice, particularly the decision to adopt withdrawal as a sole or additional method.

While the pill provides women with the autonomy to control their fertility, we found in the CUPID study that short-acting hormonal methods are still widely used by young, nulliparous

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women.[4] For many women, use of such methods may not provide optimal pregnancy prevention, as contraceptive effectiveness is heavily reliant on consistent and correct use.[36] Indeed, data from the CUPID study show that nearly three-quarters of women reporting an unintended pregnancy were using contraception at the time—most often the pill, condoms or withdrawal.[4] While no method is perfect in preventing pregnancy, LARCs may be an ideal choice for many women because of their ability to eliminate user error, as well as their reversibility; fertility return after LARC discontinuation is similar to that after discontinuing short-acting hormonal methods.[37] Despite these advantages, our findings show that LARC use in Australia remains low, particularly compared with its use in European countries (although we did find much higher rates than those found in Australian clinic-based studies).[38] Similar to other researchers,[39,40] we found that the strongest correlate of highly effective contraceptive use was a previous pregnancy. Moreover, we found that women living in outer regional and remote areas had greater odds of using high-efficacy contraceptives (as opposed to short-acting hormonal methods) than women who lived in major cities. This is contrary to our assumption that use of high-efficacy contraceptives would be lower in rural areas than in urban areas as a result of limited

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access to high-quality medical care. Lucke et al. argued that although access to services is a barrier to obtaining contraceptives, general practitioners in rural areas may be more inclined than their counterparts in urban areas to promote and facilitate LARC use, because there are fewer specialists than in urban areas.[15]

Because significant numbers of women use short-acting methods inconsistently,[41] health care providers should encourage women to consider using higher-efficacy methods. In particular, the implant may be the method best suited to introducing young women to LARCs, as it is perceived to be a less-invasive method than an IUS or IUD.[42] Of course, as with any contraceptive method, the potential side effects should be discussed, particularly with methods that can alter menstrual cycles.[43] However, contraceptive counseling should encompass the range of options, both to acknowledge the fluidity of method choice and to help women obtain the maximal protection against pregnancy possible within the context of their individualized needs and preferences; in some cases, health care providers might want to consider that a single method, such as a LARC, may be a better approach than employing multiple, less-effective methods. Furthermore, withdrawal has been perceived as not being a "real" contraceptive method, even though its typical-use

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failure rate is similar to that of condoms. Because a substantial minority of young adults use withdrawal, this method should be discussed as part of any contraceptive counseling.

Young women change fertility intentions and contraceptive priorities rapidly,[44,45] and short-acting hormonal methods and lower-efficacy methods provide the user with the autonomy and flexibility to stop or switch their contraceptives according to their circumstances.[30] We found that relationship status influenced contraceptive choice; women who were not in committed relationships (and may not have been having regular sex) preferred methods that can be easily stopped and started over "temporarily permanent" methods (i.e., LARCs).[45] In particular, the lack of control over discontinuation, especially in the face of adverse side effects, may have underscored much of the hesitancy to use LARCs. For this reason, providers and sexual and reproductive health organizations recommending LARCs should remain sensitive to women's varied desires and motivations to prevent pregnancy, and should constantly review and adjust methods according to individual women's reproductive life plans. Further research, however, is required to understand what motivates women to use specific method combinations (including the use of multiple less-effective methods) when more-effective single methods are available.

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Strengths and Limitations

Our study had several strengths and a few limitations. We examined young women's contraceptive practices in a detailed and focused fashion, rather than as part of an omnibus health or sexual health survey; women were recruited on the basis of age as opposed to reproductive and sexual histories. This focus allowed for a nuanced analysis of women's contraceptive practices, and of the demographic, sexual and reproductive health characteristics associated with method choice. Furthermore, we were able to consider multiple methods rather than one main (e.g., most effective) method or dual use.

Our study has the potential for selection bias, as participants could have self-selected into the study. This may lead to overestimates of overall contraceptive use and specific method use. Women in this study, however, were broadly representative of similarly aged women in the Australian population, with the exception that university-educated women were overrepresented.[16] This disparity was controlled for in the multivariate analyses and was not associated with method choice. The decision to examine contraceptive use at the participant's last sexual intercourse may have provided an underestimate of such use compared with studies that assessed

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use during a six-month time frame.[39] However, this paper is unique in being able to provide a snapshot of young women's contraceptive use. It also must be noted that the baseline data were collected in 2012–2013, and that changes in contraceptive use, such as increased reliance on LARCs, may have occurred among young women since then.[8]

Conclusions

Our findings suggest that while the short-acting hormonal and barrier methods persist as contraceptives of choice in Australia, natural methods such as withdrawal are also popular, either as sole or supplemental methods. In addition, women often "mix and match" their methods beyond the common pill-condom combination that has previously been explored. Multiple method use among young women may reflect attempts to find the contraceptive that is best for them or the combination that meets their reproductive needs. Providers need to help young women choose their preferred contraception methods while at the same time making the women aware that methods requiring regular action by the user (particularly more "natural" methods) are less effective in preventing pregnancy. In particular, the motivation behind the use of withdrawal may elicit important

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information about the contraceptive characteristics young women prefer. Moreover, high rates of short-acting hormonal and barrier use suggest there is still room to increase the use of LARCs among young women, as recent clinical guidelines recommend.[46] By being aware of the likely complexity of women's contraceptive choices, including the factors that might influence these choices—including cost, attitudes toward future pregnancy, experience of a previous pregnancy and geographic location—providers will be better positioned to support young women avoid an unintended pregnancy.

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TABLE 1. Selected contraceptive method combinations used by women aged 18–23 at last sex, Contraceptive Use, Pregnancy Intention and Decisions survey, Australia, 2012–2013

Method					% (N=2,965)
Short-acting hormonal†	Barrier‡	LARC§	Withdrawal	None	
✓					32.7
✓	✓				18.4
	✓				12.8
		✓			11.9
✓			✓		6.1
			✓		4.6
	✓	✓			2.3
	✓		✓		1.6
✓	✓		✓		1.2
				✓	4.3

†Pill, vaginal ring and injectable. ‡Condom and diaphragm (latter was used by only one participant). §IUS, IUD and implant. *Notes:* This table presents combinations whose prevalence was >1%, which together applied to 2,843 women (96%); a full list of contraceptive combinations is presented in Appendix Table 1. LARC=long-acting reversible contraceptive.

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TABLE 2. Fit statistics and predicted class membership for latent class models

Measure	No. of classes						
	2	3	4	5	6	7	8
Fit statistics							
AIC	2357.0	1250.2	582.6	683.9	223.4	192.5	197.9
BIC	2458.9	1406.0	792.4	947.7	541.1	564.1	623.5
Consistent AIC	2475.9	1432.0	827.4	991.7	594.1	626.1	694.5
Adjusted BIC	2404.9	1323.4	681.2	807.9	372.7	367.1	397.9
G^2	2323.0	1198.2	512.6	595.9	117.4	68.5	55.9
Entropy	1.0	1.0	1.0	0.9	0.9	0.8	0.8
Class membership							
Class 1	0.15	0.08	0.04	0.04	0.04	0.04	0.00
Class 2	0.85	0.59	0.59	0.14	0.38	0.22	0.20
Class 3		0.33	0.15	0.18	0.15	0.17	0.17
Class 4			0.21	0.46	0.20	0.29	0.30
Class 5				0.19	0.07	0.12	0.12
Class 6					0.15	0.14	0.14
Class 7						0.02	0.02
Class 8							0.04

Notes: AIC=Akaike information criterion. BIC=Bayesian information criterion.

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TABLE 3. Predicted probabilities of women's class membership and item response, and prevalence of women's method use, for the selected latent class analysis model

Measure	Predicted latent class			
	No method (n=128)	Short-acting with supplementation (n=1,748)	High-efficacy with supplementation (n=463)	Low-efficacy combination (n=626)
Class membership predicted probability	0.043	0.591	0.152	0.213
Item response predicted probability				
Short-acting hormonal	0.001	1.000	0.025	0.002
Barrier	0.001	0.337	0.152	0.717
LARC	0.000	0.009	0.999	0.010
Emergency contraception	0.000	0.005	0.000	0.052
Sterilization	0.000	0.000	0.000	0.011
Withdrawal	0.000	0.125	0.053	0.327
Natural	0.000	0.000	0.000	0.035
None	0.998	0.000	0.000	0.000
Method prevalence (%)				
Short-acting hormonal	0	100	4	0
Barrier	0	34	15	72
LARC	0	<1	100	0
Emergency contraception	0	<1	0	5
Sterilization	0	0	0	<1
Withdrawal	0	12	5	33
Natural	0	0	0	4
None	100	0	0	0

Notes: Supplementation refers to use of barrier methods and/or withdrawal in combination with short-acting or highly effective methods. LARC=long-acting reversible contraceptive.

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TABLE 4. Selected demographic, sexual and reproductive health, and health service use characteristics of women in study sample, by latent class membership

Characteristic	No contraception	Short-acting with supplementation	High-efficacy with supplementation	Low-efficacy combination
Demographic				
Mean age (SD)*	20.7 (1.77)	20.6 (1.70)	20.7 (1.74)	20.8 (1.74)
Median age	21.0	21.0	21.0	21.0
Education**				
High school or less	59.1	54.4	54.1	51.4
Technical certificate/diploma	29.9	24.4	29.4	29.5
Completed university	11.0	21.2	16.5	19.1
Missing (n)†	1	8	3	2
Residence**				
Major city	61.6	67.2	59.3	67.2
Inner regional	20.0	22.8	24.1	22.2
Outer regional/remote/very remote	18.4	10.0	16.6	10.6
Relationship status***				
Single	25.2	18.9	17.8	26.3
Partnered (not living together)	24.4	43.9	33.9	37.0
Cohabiting	26.0	28.5	33.7	24.7
Engaged/married	24.2	8.7	14.6	12.0

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Employment status***				
Work and study	19.7	43.1	33.9	34.8
Work only	40.9	30.4	34.8	33.4
Study only	19.7	21.5	19.9	20.3
Not working or studying	19.7	5.0	11.5	11.5
Sexual and reproductive health				
Mean age at first sex (SD)	15.8 (1.71)	16.6 (1.74)	16.1 (1.76)	16.5 (1.87)
Median age at first sex	16	17	16	16
Ever pregnant***				
No	56.8	87.9	68.0	75.5
Yes‡	43.2	12.2	32.0	24.5
Missing (n)†	3	28	4	5
Perceived contraceptive knowledge***				
Excellent/very good	64.2	68.2	77.3	61.7
Fair	29.3	24.8	17.9	26.1
Poor/none	6.5	7.0	4.8	12.3
Missing (n)†	5	20	4	8
Perceived contraceptive choice**				
Yes	86.6	93.2	93.5	89.9
No/don’t know	13.4	6.8	6.5	10.1
Missing (n)†	1	4	1	2
Health service use and access				
Medicare card status*				
Own/have copy	87.5	82.3	88.1	82.6
Don’t own/don’t have copy	12.5	17.7	11.9	17.4
Missing (n)†	0	5	2	1

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Ease of access to contraceptive advice**				
Always/usually easy	91.7	94.4	93.8	89.5
Always/usually difficult	8.3	5.6	6.2	10.5
Missing (n)†	8	48	9	45
Consulted general practitioner in last 6 mos.***				
Yes	91.4	93.8	90.3	81.8
No	8.6	6.2	9.7	18.2
Consulted FP/women's health service in last 6 mos.***,§				
Yes	28.9	21.7	31.8	22.7
No	71.1	78.3	68.2	77.3

*p<.05. **p<.01. ***p<.001. †Missing data did not contribute to the total percentages. ‡Eighty-nine percent of these pregnancies were unintended. §Also included gynecologist or sexual health clinic. *Notes:* All values are percentages unless otherwise indicated. Percentages may not total 100.0 because of rounding. SD=standard deviation. FP=family planning.

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TABLE 5. Odds ratios (and 95% confidence intervals) from multinomial logistic regression analyses assessing associations between women's characteristics and latent class membership

Characteristic	No contraception vs. short-acting with supplementation	High-efficacy with supplementation vs. short-acting with supplementation	Low-efficacy combination vs. short-acting with supplementation
Demographic			
Age	1.04 (0.90– 1.20)	1.02 (0.94–1.10)	1.08 (1.01–1.17)*
Education			
High school or less (ref)	1.00	1.00	1.00
Technical certificate/diploma	0.86 (0.53–1.38)	1.02 (0.78–1.34)	1.10 (0.86–1.41)
Completed university	0.66 (0.34–1.30)	0.83 (0.59–1.17)	0.82 (0.60–1.12)
Residence			
Major city (ref)	1.00	1.00	1.00
Inner regional	0.61 (0.35–1.06)	1.04 (0.79–1.36)	0.91 (0.71–1.16)
Outer regional/remote/very remote	1.29 (0.74–2.27)	1.42 (1.02–1.99)*	0.80 (0.57–1.14)
Relationship status			
Single (ref)	1.00	1.00	1.00
Partnered	0.63 (0.36–1.12)	0.96 (0.70–1.32)	0.58 (0.45–0.76)***
Cohabiting	0.55 (0.31–1.00)	1.04 (0.75–1.45)	0.51 (0.38–0.68)***
Engaged/married	1.60 (0.85–3.01)	1.22 (0.80–1.87)	0.61 (0.42–0.90)*
Employment status			
Work and study (ref)	1.00	1.00	1.00
Work only	2.46 (1.43–4.24)**	1.20 (0.92–1.58)	1.19 (0.92–1.53)
Study only	1.45 (0.75–2.79)	1.03 (0.76–1.41)	0.99 (0.75–1.32)
Not working or studying	3.62 (1.77–7.42)***	1.47 (0.94–2.28)	2.00 (1.33–3.02)**
Sexual and reproductive health			
Age at first sex	0.83 (0.74–0.94)**	0.91 (0.85–0.98)**	0.99 (0.93–1.05)
Ever pregnant			
No (ref)	1.00	1.00	1.00
Yes	2.98 (1.82–4.89)***	2.39 (1.79–3.20)***	2.02 (1.52–2.69)***

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Perceived contraceptive knowledge			
Excellent/very good (ref)	1.00	1.00	1.00
Fair	1.10 (0.69–1.75)	0.64 (0.48–0.85)**	0.94 (0.74–1.20)
Poor/none	0.82 (0.33–2.00)	0.63 (0.37–1.05)	1.60 (1.11–2.28)
Perceived contraceptive choice			
Yes (ref)	1.00	1.00	1.00
No/don't know	1.41 (0.72–2.78)	0.87 (0.55–1.37)	1.25 (0.86–1.82)
Health service use and access			
Medicare card status			
Own/have copy (ref)	1.00	1.00	1.00
Don't own/don't have copy	0.95 (0.50–1.80)	0.83 (0.60–1.16)	0.97 (0.73–1.30)
Ease of access to contraceptive advice			
Always/usually easy (ref)	1.00	1.00	1.00
Always/usually difficult	1.54 (0.73–3.27)	0.09 (0.67–1.77)	1.85 (1.27–2.70)
Consulted general practitioner in last 6 mos.			
No (ref)	1.00	1.00	1.00
Yes	0.74 (0.35–1.55)	0.63 (0.42–0.93)	0.34 (0.24–0.46)***
Consulted FP/women's health service† in last 6 mos.			
No (ref)	1.00	1.00	1.00
Yes	1.10 (0.69–1.74)	1.33 (1.04–1.70)*	1.00 (0.79–1.28)

*p<.05. **p<.01. ***p<.001. †Also included gynecologist or sexual health clinic. *Notes:* ref=reference group. FP=family planning.

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