Disparities in utilisation of combined oral contraceptives in Aotearoa New Zealand: A cross-sectional whole-of-population study.

THOMAS, Caryn <http://orcid.org/0000-0003-3837-5476>, BRAUND, Rhiannon, BOWDEN, Nicholas, HOBBS, Matthew, KOKAUA, Jesse and PATERSON, Helen <http://orcid.org/0000-0002-8240-082X>

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ORIGINAL ARTICLE

Disparities in utilisation of combined oral contraceptives in Aotearoa New Zealand: A cross-sectional whole-of-population study

Caryn Thomas[1,2], Rhiannon Braund[2], Nicholas Bowden[3,4], Matthew Hobbs[5,6], Jesse Kokaua[7] and Helen Paterson[1]

[1]Department of Women's and Children's Health, Otago Medical School, University of Otago, Dunedin, New Zealand

[2]New Zealand Pharmacovigilance Centre, Division of Health Sciences, University of Otago, Dunedin, New Zealand

[3]Department of Women's and Children's Health, University of Otago, Dunedin, New Zealand

[4]A Better Start National Science Challenge, Auckland, New Zealand

[5]Faculty of Health, University of Canterbury, Christchurch, New Zealand

[6]GeoHealth Laboratory, Geospatial Research Institute, University of Canterbury, Christchurch, New Zealand

[7]Va'a O Tautai – Centre for Pacific Health, Division of Health Sciences, University of Otago, Dunedin, New Zealand

Correspondence: Caryn Thomas and Dr Helen Paterson, Department of Women's and Children's Health, Otago Medical School, PO Box 56, Dunedin 9054, New Zealand. Email: caryn.thomas@postgrad.otago.ac.nz; matt.hobbs@canterbury.ac.nz

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Aims: The combined oral contraceptive (COC) is the most commonly used hormonal contraceptive in Aotearoa New Zealand (Aotearoa/NZ). Currently there is limited data available on who uses COC in Aotearoa/NZ. The aims were to (i) define the population of reproductive-aged females in Aotearoa/NZ in 2018 and identify the rate of COC use among this group and (ii) describe the sociodemographic and geographic characteristics of the population of COC users compared to the general population of reproductive-aged females in 2018.

Methods: This whole-of-population cross-sectional study used the Integrated Data Infrastructure, a large research database managed by Statistics New Zealand. Females aged 16–50 years with complete sociodemographic and geographic information in 2018 from Aotearoa/NZ's estimated resident population were included. COC dispensing records to this cohort were identified from the national Pharmaceutical Collection. This paper reports descriptive counts of COC use and employs generalised linear regression with a binomial distribution and a log link to estimate adjusted risk ratios (aRR) of COC use for key sociodemographic and geographic subgroups.

Results: Of 1 113 750 individuals in the study, 159 789 (14.3%) were dispensed as COC in 2018. European/other individuals were most likely to use COC (aRR: 2.72, 2.67–2.78), and Pacific Peoples were least likely (aRR: 0.56, 0.55–0.58) to use COC. Individuals residing in the most deprived quintile had less COC use than individuals in the least deprived quintile (aRR: 0.73, 0.72–0.74).

Conclusion: Our study is able to highlight significant disparities in use by ethnicity, area-level deprivation, and geographic factors.

KEYWORDS

contraception, family planning, Integrated Data Infrastructure, oral contraceptive, unintended pregnancy

INTRODUCTION

Approximately 53% of pregnancies in Aotearoa New Zealand (Aotearoa/NZ) are unintended,[1,2] similar to the proportion reported in the USA.[3] A variety of sociodemographic factors have been associated with higher rates of unintended pregnancy in Aotearoa/NZ, which include age, income, parity and ethnicity,[1,4] with financial barriers potentially preventing access to acceptable contraceptives.[4] Māori, the indigenous people of Aotearoa/NZ, and Pacific Peoples, descendants of ethnic groups who migrated from other parts of the Pacific region, are disproportionately over-represented in unintended pregnancy rates.[1,4] Moreover, Māori and Pacific women are less likely to have their contraceptive needs met by a modern (sterilisation, hormonal, intrauterine contraceptive, spermicide or barrier) method when not trying to get pregnant, compared to non-Māori and non-Pacific women.[5]

Oral contraceptives have been reported to be the most commonly used reversible contraceptive method by women in Aotearoa/NZ, the USA, the UK and Europe.[5–8] Findings from the 2017–2019 National Survey of Family Growth in the USA indicated 14% of women aged 15–49 years in the USA used oral contraceptive pills, with use decreasing with age from 21.6 to 6.5% in women aged 20–29 to 40–49 years, respectively.[8] Racial disparities in the USA were also reported, where women of European origins have greater use.[8]

Current evidence on combined oral contraceptive (COC) usage patterns in Aotearoa/NZ is limited to dated studies and those with small samples, restricted populations or clinical focus and/or limited ability to adjust for confounders.[5,9–13] A study of Aotearoa/NZ Family Planning clinic users found that the proportion of contraceptive starts being COC declined from 43% in 2009 to 23% in 2019.[14] The study also found variability in the type of contraception initiated by ethnicity and area-level deprivation that was not explained by cost nor access barriers alone.[14] In 2019, Māori and Pacific clients and clients from more deprived areas were significantly more likely to start a subdermal implant than were European/other and Asian clients. European/other and Asian clients and clients from less-deprived areas were significantly more likely to start COC and intrauterine contraceptives.[14]

Aotearoa/NZ has a unique medications funding model through the government Pharmaceutical Management Agency (PHARMAC). This provides an opportunity for whole-of-population research not possible in most countries, as each person has a unique health identifier and access to a national health system that provides subsidised medicines. The aims of this study were to use contemporary population-level data to (i) define the population of reproductive-aged females in Aotearoa/NZ in 2018 and identify the rate of COC use among this group and (ii) describe the sociodemographic and geographic characteristics of the population of COC users compared to the general population of reproductive-aged females in 2018.

MATERIALS AND METHODS

Study design

This national cross-sectional study used data from the Integrated Data Infrastructure (IDI), a large research database curated and managed by Statistics New Zealand (Stats NZ).[15] The IDI holds microdata about people and households from administrative data sets and surveys from New Zealand government agencies and non-governmental organisations. Data are probabilistically linked at the individual level and are de-identified.[15] COC dispensing data for the 2018 calendar year were chosen for analysis as they represent the most recent year of data without any nationwide shortages.[16] This project has been reviewed and approved by the University of Otago Human Ethics Committee (Health), reference: H20/020.

Study population

The base population was the estimated resident population in Aotearoa/NZ in the calendar year of 2018 of females aged 16–50 years on 31 December 2018[17] and who were alive on 1 January 2018. This age range was chosen so individuals were not included before their 15th birthday. Individuals were included only if their 16th–50th birthday was in 2018. Individuals with missing key sociodemographic and/or geographic data and individuals living overseas or who spent more than six months overseas in 2018 were excluded from further analysis.

Stats NZ currently typically collects data about sex by asking individuals whether they are male or female, without including the terms 'sex' or 'gender' in the question. We are restricted to the standards in the administrative data currently available, and we acknowledge that this results in limited inclusiveness and potential exclusion of intersex, transgender and non-binary populations.

COC medication dispensing

The outcomes of interest were dispensations of any PHARMAC-subsidised COC during the 2018 calendar year. Dispensing data are captured within the Pharmaceutical Collection, a national data set of all PHARMAC-subsidised medications[18] prescribed by approved prescribers to an eligible person and dispensed at community pharmacies. Eligibility is given to those funded for public care, including all individuals with citizenship, with permanent residency or on long-term work visas.[19] COCs were defined as oral contraceptive pill formulations with both a progestin and an oestrogen component and were identified in the Pharmaceutical Collection using brand names of COC subsidised by PHARMAC in 2018.[20] The progestins in these medications were norethisterone, levonorgestrel, desogestrel and cyproterone acetate. The oestrogen component in these medications was ethinyloestradiol. One of the formulations of COC included cyproterone acetate 2 mg with ethinyloestradiol 35 mcg and 7

inert tabs (PHARMAC-subsidised brand name Ginet[20]), which is licensed for its non-contraceptive anti-androgenic indications and not for use solely as a contraceptive, although it should only be used in those also desiring contraception.[21]

COC dispensing was used as a proxy for use, assuming individuals used those scripts filled. Dichotomous variables were generated indicating COC use if an individual had at least one dispensing for a COC during the study period. An individual's COC use status was determined irrespective of how many dispensations were received, days of supply or duration of use; each individual was counted only once.

Sociodemographic and geographic information

Sociodemographic information was extracted from the IDI Personal Details Table and included age (16–20, 21–30, 31–40 and 41–50 years) and total ethnicity by major ethnic groups using Stats NZ classifications (European/other; Māori; Pacific Peoples; Asian; and Middle Eastern, Latin American and African (MELAA)). Total ethnicity means individuals can identify with more than one ethnic group.[22] A total ethnicity approach was used to allow individuals to identify with all ethnic groups they align to.

Individuals' addresses on 31 December 2018 were assigned to geographic meshblocks, a Stats NZ area code usually representing 30–60 households. Meshblocks were then linked to a Geographic Classification for Health (GCH) area and the New Zealand Index of Deprivation, 2013 (NZDep2013). GCH is a five-category urban–rural classification based on area population size and driving time to larger settlements,[23] and NZDep2013 is an area-level index of relative socio-economic deprivation derived from variables in the 2013 census.[24] NZDep2013 was collapsed into quintiles, with quintile one representing the least deprived group.

Procedure

Data were sourced from the September 2020 refresh of the IDI, extracted using SAS Enterprise Guide 7.1 and analysed using Stata/MP 16.1 within the secure IDI environment by an approved researcher. Stats NZ confidentiality requirements were adhered to.

Data analysis

Reporting of analyses was informed by the Reporting of Studies Conducted Using Observational Routinely-Collected Health Data (RECORD) guideline.[25] Observed rates of COC use by sociodemographic and geographic subgroups were generated. Unadjusted and adjusted risk ratios (RR) and associated 95% confidence intervals of COC dispensing were generated using generalised linear regression with a binomial distribution and a log link.[26] Adjusted RRs were adjusted for age, ethnicity, area-level deprivation and rurality. Statistical significance for a two-tailed test was determined with $\alpha = 0.05$.

RESULTS

A total of 1 129 383 individuals were identified as being part of the estimated resident population in 2018. Of these, 15 633 were excluded from further analysis due to missing key sociodemographic and/or geographic information. Of the remaining 1 113 750 people, 159 789 (14.3%) COC users were identified (Fig. 1).

COC use decreased with increasing age, where approximately one in four women aged 16–20 years used COCs compared to only one in 25 among those aged 41–50 years. COC use decreased with increasing area-level deprivation, where individuals living in the least deprived areas had approximately twice the observed rate of COC use compared to those living in the most deprived areas. Use was highest in European/other individuals and lowest in Pacific Peoples. There was little difference between rates of COC use by those in urban and rural settings (see Table 1).

After adjusting for confounders the relationship of less COC use with increasing age remained, as did the relationship of less use with increasing area-level deprivation. COC use varied significantly by ethnicity. There were small but significant differences in use by rurality, with those living outside of the most urban areas significantly less likely to use COC (see Table 2).

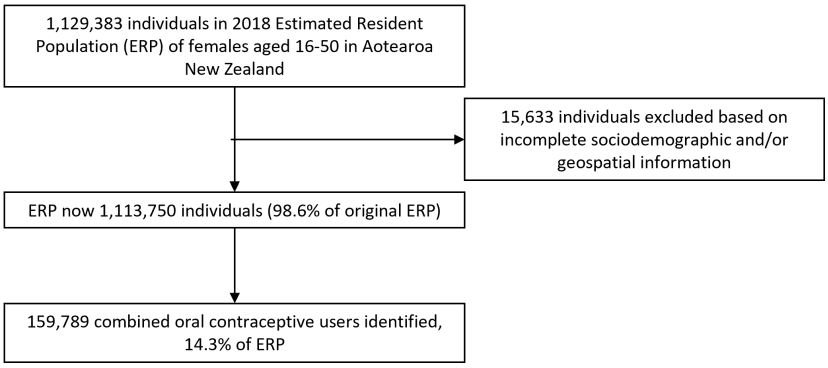

FIGURE 1 Flowchart of included participants in study cohort.

TABLE 1 Counts of dispensing of COCs to the Aotearoa/New Zealand 2018 estimated resident population by sociodemographic and geographic subgroups.

	ERP, *N*	Any COC user (%*N*)
Total, N	1 113 750	159 789 (14.35)
Age (years)		
16–20	150 894	40 092 (26.57)
21–30	336 576	72 324 (21.49)
31–40	312 432	34 242 (10.96)
41–50	313 848	13 131 (4.18)
Ethnicity[†]		
European/other	734 880	137 442 (18.70)
Māori	201 093	23 898 (11.88)
Pacific Peoples	99 627	5964 (5.99)
Asian	223 314	16 362 (7.33)
MELAA	24 330	2 586 (10.63)
NZDep2013 quintile		
1 (least deprived)	224 748	38 238 (17.01)
2	219 831	35 406 (16.11)
3	218 190	33 675 (15.43)
4	220 233	30 741 (13.96)
5 (most deprived)	230 751	21 723 (9.41)
GCH urban/rural classification		
U1 (most urban)	752 022	106 344 (14.14)
U2	184 074	27 564 (14.97)
R1	115 764	17 061 (14.74)
R2	51 726	7449 (14.40)
R3 (most rural)	10 164	1371 (13.49)

Sum of all *N* for each ethnicity will be larger than the overall total *N* for the ERP as the total response approach allows individuals to belong to more than one ethnic group.
[†]Total response approach to ethnicity used so individuals could belong to more than one category. There is a reference for each (not shown).
COC, combined oral contraceptive; ERP, estimated resident population; GCH, Geographic Classification for Health; MELAA, Middle Eastern, Latin American and African; NZDep2013, New Zealand Index of Deprivation, 2013.

TABLE 2 Unadjusted and adjusted RRs for dispensing of COCs to the Aotearoa New Zealand 2018 estimated resident population by sociodemographic and geographic subgroups.

	Unadjusted RR of any COC dispensing (95% CI)		Adjusted RR of any COC dispensing (95% CI)	
Age (years)				
16–20	1 (reference)		1 (reference)	
21–30	0.81 (0.80–0.82)	***	0.84 (0.83–0.85)	***
31–40	0.41 (0.41–0.42)	***	0.42 (0.41–0.42)	***
41–50	0.16 (0.15–0.16)	***	0.14 (0.14–0.15)	***
Ethnicity[†]				
European/other	3.17 (3.13–3.21)	***	2.72 (2.67–2.78)	***
Māori	0.80 (0.79–0.81)	***	0.82 (0.81–0.83)	***
Pacific Peoples	0.39 (0.39–0.40)	***	0.56 (0.55–0.58)	***
Asian	0.45 (0.45–0.46)	***	0.87 (0.85–0.89)	***
MELAA	0.74 (0.71–0.76)	***	1.04 (1.01–1.08)	*
NZDep2013 quintile				
1 (least deprived)	1 (reference)		1 (reference)	
2	0.95 (0.93–0.96)	***	0.97 (0.95–0.98)	***
3	0.91 (0.90–0.92)	***	0.93 (0.92–0.95)	***
4	0.82 (0.81–0.83)	***	0.89 (0.88–0.90)	***
5 (most deprived)	0.55 (0.54–0.56)	***	0.73 (0.72–0.74)	***
GCH urban/rural classification				
U1 (most urban)	1 (reference)		1 (reference)	
U2	1.06 (1.05–1.07)	***	0.97 (0.96–0.98)	***
R1	1.04 (1.03–1.06)	***	0.91 (0.90–0.92)	***
R2	1.02 (1.00–1.04)		0.93 (0.91–0.95)	***
R3 (most rural)	0.95 (0.91–1.00)		0.92 (0.88–0.97)	***

*$P < 0.05$, **$P < 0.01$ and ***$P < 0.001$.
Adjusted RRs were adjusted for age, ethnicity, NZDep2013 quintile and GCH urban/rural classification.
[†]Total response approach to ethnicity used so individuals could belong to more than one category. There is a reference for each (not shown).
CI, confidence interval; COC, combined oral contraceptive; ERP, estimated resident population; GCH, Geographic Classification for Health; MELAA, Middle Eastern, Latin American and African; NZDep2013, New Zealand Index of Deprivation, 2013; RR, risk ratio.

DISCUSSION

This whole-of-population study in Aotearoa/NZ found that 14.3% of reproductive-aged females were dispensed a COC in 2018. Although COCs were widely used across sociodemographic and geographic subgroups, disparities were evident.

Differences in the rate of COC use between age groups were expected as there are known changes in contraceptive use with age, for example, higher fertility rates between ages 30 and 34 years and higher rates of permanent contraceptive method use among women aged 35–49 years.[5,27] This may also be partly explained by the increase in venous thromboembolism risk with increasing age being considered during contraceptive decision-making.[28] However, the relationship between COC use and age was more extreme in this study than in the USA over a comparable time period.[8]

This study found significant observed ethnic differences in use of COC, supporting the findings of other studies in Aotearoa/NZ and in the USA that showed significant ethnic differences in contraceptive use patterns.[5,8,14,29] This study also identified significant differences in COC utilisation by area-level deprivation, in line with the findings of Messenger et al.[14] from NZ Family Planning clinics of higher COC use among clients from less-deprived areas. Importantly these significant socio-economic, ethnic and geographic differences remained after adjusting for confounding

differences. For example, Māori and Pacific Peoples are more likely to live in areas of high socio-economic deprivation, and Pacific Peoples more likely to live in major urban areas.[30]

The disparities identified may indicate that some variation in COC utilisation could have been due to ongoing inequity in access; inequities in supply of other funded medicines to Māori and Pacific Peoples have been identified and described previously.[31–33] Use of other contraceptive methods also varies by ethnicity in Aotearoa/NZ, with Māori and Pacific women having higher utilisation of the subdermal implant.[9,14] Potential reasons for these differences in patterns of contraception use could include access inequity, prescriber bias, personal preference and regional policy variation. Given the wider context provided by the available literature and reports in Aotearoa/NZ, the association between lower COC uptake and increased area-level deprivation may indicate that access barriers remain.[4]

Access to a range of contraceptive methods, the right to have or to not have children and a patient-centred non-coercive approach to reproductive health counselling are vital for reproductive autonomy and reproductive justice.[34,35] Several studies conducted in the USA have found evidence of race and socioeconomic status influencing provider recommendations for certain contraceptive methods.[36–39] An improved understanding of whether patient-centred contraceptive counselling with shared decision-making occurs in Aotearoa/NZ, and whether and where there is unmet need[40] for contraception, will allow for further interpretation of these findings; do people use – or not use – COC because of clinician preferences or because of their own preferences?

More research is needed to understand why COC use appeared lower in more rural areas. One reason may have included variation in the rates of in-clinic dispensing in different areas. When COCs are dispensed in-clinic, information on who the medication was dispensed to is not captured in the Pharmaceutical Collection.

Although these data included only the use of COC and not the progestin-only pill, the proportion of females of reproductive age in Aotearoa/NZ who used COC in 2018 is comparable to the proportion using any oral contraceptive pill in the USA,[8] suggesting higher comparative total usage of oral contraceptives in Aotearoa/NZ. Use of COC was slightly lower in Aotearoa/NZ (14.3%) than in the UK (16.2%).[6]

Use of contemporary, whole-of population data strengthens the study findings, providing insights into COC dispensing patterns on a nationwide scale and mitigating selection bias concerns. Use of the IDI also gives more robust data on sociodemographic characteristics and enables linkage to a range of geographical measures. Linked customs data allowed the study to restrict the population to those who were in the country for at least six months of 2018. This reduces the possibility of an individual being dispensed a COC while overseas and therefore not being identified as a COC user in the data despite being a user.

The findings must also be considered in light of several limitations. When COC are dispensed in-clinic, information on who the medication was dispensed to is not captured in the Pharmaceutical Collection. Non-subsidised dispensations, including formulations such as drospirenone-containing COC, are also not captured, nor are hospital dispensations of COC. These limitations are likely to have resulted in an underestimation of the true prevalence of COC users, and further research is needed to quantify this. The nature of using administrative data means that assumptions or inferences about causality cannot be made. The Pharmaceutical Collection in the IDI is an administrative data set, thus the data were not collected to answer the specific research question of who is using COC in Aotearoa/NZ. Although it was assumed that individuals would only fill a script for COC if they were intending to use them, some may not have used the COC dispensed. Levonorgestrel-containing intrauterine contraceptives became PHARMAC subsidised in late 2019, with insertion costs covered for some groups, including Māori and Pacific women, although device removal costs remain unsubsidised. This has likely resulted in some substitution away from COC use; however, the extent to which this has occurred requires further research.[41] COC have benefits beyond their contraceptive effects. They can be used to regulate or prevent menstrual bleeding and can be used in addition to other hormonal contraceptive methods such as the contraceptive implant or intrauterine contraceptives.[42,43] Anti-androgenic COC formulations can also be used to manage acne, hirsutism and other symptoms of polycystic ovarian syndrome.[21] The data used in this study do not include reason for COC use, nor do they enable accurate analysis of concurrent use of COC with other contraceptives due to the number of the latter being dispensed in-clinic only.

A large number of individuals use COC in Aotearoa/NZ. Socioeconomic, ethnic and geographic disparities in utilisation of COC remain after accounting for other sociodemographic and geographic differences, which has implications for equitable access to acceptable contraceptives for large numbers of COC users and women across Aotearoa/NZ. Further research is needed into the topic of contraception acquisition in Aotearoa/NZ and whether shared decision-making between patients and clinicians is occurring appropriately.

DISCLAIMER

These results are not official statistics. They have been created for research purposes from the IDI, which is carefully managed by Stats NZ. More information on the IDI is available at https://www.stats.govt.nz/integrated-data/.

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