

# Use of hormonal contraceptives among immigrant and native women in Norway: data from the Norwegian Prescription Database

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**Objective** To examine the use of hormonal contraceptives among immigrant and native women in Norway.

**Design** Nationwide registry-based study based on merged data from the Norwegian Prescription Database, the Norwegian Population Registry, the Regular General Practitioner Database and the Medical Birth Registry.

**Setting** Norway.

**Sample** All women born abroad to two foreign-born parents (immigrants), or born in Norway to two Norwegian-born parents (natives) aged 16–45 years, who lived in Norway in 2008.

**Methods** Data on all collected supplies of hormonal contraceptives in 2008 were merged with demographic, socio-economic and immigration data, information on any delivery and women's general practitioners.

**Main outcome measures** User rates of hormonal contraception and predictors of contraceptive use.

**Results** A total of 893 073 women were included, of whom 130 080 were immigrants. More native women (38%) used hormonal contraceptives compared with all immigrant groups (15–24%). The odds ratios for any use of hormonal contraceptives for immigrants compared with Norwegian-born women were; Nordic countries 0.53, South and Central America 0.53, Western countries 0.39, Asia 0.30, Eastern Europe 0.29, Africa 0.29. Work, education, long stay in Norway and young age of immigration predicted the use of hormonal contraceptives among immigrants.

**Conclusions** The use of hormonal contraceptives varies between natives and immigrant groups. Further work is needed to ascertain whether these differences can be explained by higher desires for fertility, preferential use of non-hormonal contraceptives or other reasons identified through qualitative research.

**Keywords** Contraceptive agents, family planning, immigrant women, prescription database.

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## Introduction

Family planning is considered an essential human right by the United Nations Population Fund.<sup>1</sup> Hormonal contraception is an effective way of family planning<sup>1–3</sup> but its use differs greatly between women from different countries and cultures.<sup>1,4,5</sup> The increasing numbers of immigrants in Europe actualises the need for studying the use of contraception in these groups.

Immigrants, defined as persons born abroad to two foreign-born parents, constituted 12% of the population in

Norway by January 2013. Immigrants in Norway are a heterogeneous group originating from 220 different countries.<sup>6</sup> Although immigrant women may have different needs and traditions for use of hormonal contraceptives as compared with the native population, patterns may change over time with adaptation to their new country of residence. Studies on screening for cervix cancer suggest that differences in use of health care services between immigrants and natives become less pronounced with increasing length of stay in a new country.<sup>7</sup>

Induced abortions can be understood as unmet needs of contraception. Studies from the Nordic countries and the USA show that unintended pregnancy and induced abortion occur more commonly among minority women.<sup>4,8–10</sup>

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The use of contraceptives, and the level of knowledge about contraceptive methods, appears to be lower among immigrant than native women undergoing induced abortion.<sup>10–12</sup> A newly published study based on a health survey studying self-reported use of contraceptives found a lower use of contraceptives among immigrants than native women in France.<sup>13</sup> To our knowledge there are no prior studies that compare contraceptive use between different groups of immigrants and natives at the population level. Such knowledge is essential for gynaecologists, general practitioners (GPs), and other health professionals in order to provide adequate guidance regarding family planning.

The aim of this study was to analyse the use of hormonal contraceptives in various groups of immigrants and native women in Norway. In addition, we aimed to identify predictors for hormonal contraceptive use in these groups.

## Methods

### Data sources

This cross-sectional study is based on merged data from the Norwegian Prescription Database,<sup>14</sup> the Norwegian Population Registry,<sup>15</sup> the Regular General Practitioner Database,<sup>16</sup> and the Medical Birth Registry Norway.<sup>17</sup>

The Norwegian Prescription Database is a national health registry containing detailed information on all prescription drugs purchased by individual people at all pharmacies in Norway.<sup>18</sup> The data extracted for this study comprised all collected supplies on hormonal contraceptives, Anatomical Therapeutic Chemical (ATC) system code G02BA03 (intrauterine devices [IUDs]), G02BB01 (vaginal rings), G03A (oral, injections, patches, implants) and G03HB01 (oral) dispensed in 2008. Oral contraceptives, patches, rings and injections are usually prescribed in 90-day lots for at least a 12-month supply, while IUDs and implants usually last for several years. Hormonal contraception is strongly subsidised to 16–19-year-old women in Norway. We defined all women who collected one or more supplies of hormonal contraceptives during 2008 as contraceptive users, regardless numbers of drug supplies.

The Norwegian Population Registry comprises information on immigration, socio-economic status and demographics for all long-term residents in Norway.<sup>15</sup> The following variables were included in this study: (1) immigrant status: country of origin, length of stay in Norway, and immigrant category according to the definitions of Norwegian Population Registry;<sup>19,20</sup> (2) socio-economic variables: being in education and employment status; (3) other demographic variables: age and marital status. For married women, we also extracted information about their spouses' immigrant status.

The Regular GP Database contains information on the population assigned to each GP in Norway.<sup>16</sup> For the pur-

pose of this study we obtained information about the women's GP including GP age, gender, and immigrant status.

The Medical Birth Registry contains information on all births in Norway since 1967.<sup>17</sup> A single variable from the registry was extracted for this study; dichotomised information on whether a woman had given birth between 1 January 2008 and 30 June 2009 was used to identify those women who had been pregnant in 2008.

The variables selected from these four registries were linked, using the unique 11-digit personal identity number assigned to every citizen in Norway. The Norwegian Social Science Data Service was responsible for supplying the final anonymous data file to the researchers.

### Study population

The study population was restricted to women between 16 and 45 years old. Altogether, 959 512 women aged 16–45 years lived in Norway in 2008. Women born outside of Norway to two foreign-born parents were defined as immigrants, and those born in Norway to two Norwegian-born parents were defined as natives. All other women were excluded. The study population comprised 893 073 women, 762 993 natives and 130 080 immigrants, and was divided into the following seven groups based on country of origin: (1) Norway; (2) Nordic countries except Norway; (3) Eastern Europe; (4) Western Europe, North America, Australia and New Zealand; (5) Africa; (6) Asia including Turkey and Oceania except Australia and New Zealand; (7) South and Central America. Throughout this paper, the collective terms 'Western countries' will be used for group 4, and 'Asia' for group 6.

For the purpose of logistic regression analysis, we also divided the study population into three groups according to user rates of hormonal contraceptives: native women; aggregated immigrant group with relatively high use of contraceptives (women from Nordic countries, Western countries, and South and Central America); aggregated immigrant group with relatively low use of contraceptives (Africa, Asia, and Eastern Europe).

### Statistical analysis

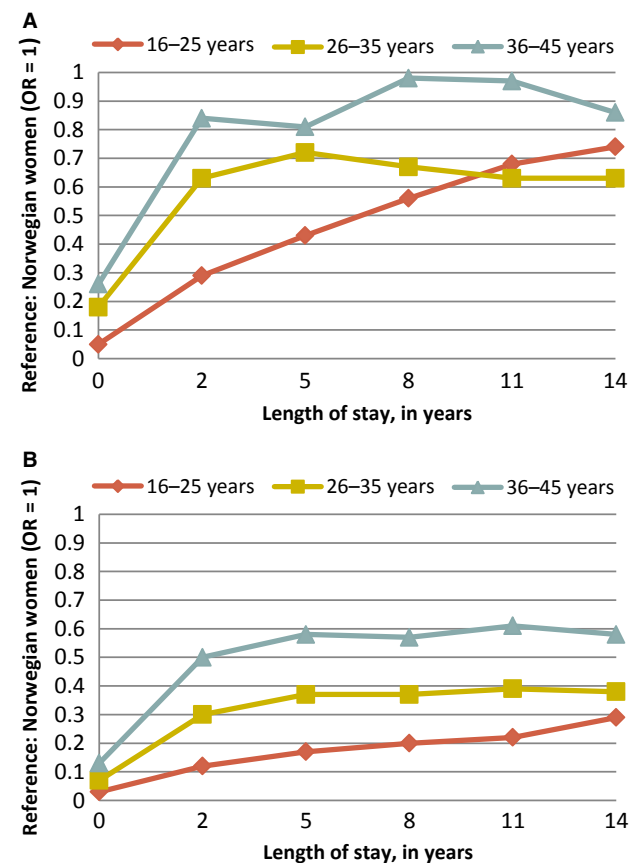
We conducted descriptive analyses on the use of oral and non-oral hormonal contraceptives stratified for three age groups (16–25, 26–35, 36–45 years). Non-oral formulations included intrauterine devices (IUDs), patches, vaginal rings, implants and injections. Binary logistic regression analysis was conducted, with use of some hormonal contraceptive as dependent variable and the following independent variables: each immigrant group according to area of origin, age, being in work and/or education, GP gender, and Norwegian versus immigrant GP. Because we found significant interactions ( $P < 0.001$ ) between area of origin and several inde-

pendent variables, we chose to present the results as crude ORs for the different world areas and adjusted ORs for three aggregated groups in complementing figures. Regression analyses were also conducted separately for the three aggregated groups including the independent variables being in work and/or education, length of stay in Norway, age on immigration, marital status, if women had given birth between 1 January 2008 and 30 June 2009, Norwegian versus immigrant GP and GP gender. Length of stay in Norway was dichotomised into over or under 5 years, based on user rates for contraceptives (Figure 1). Associations are shown as odds ratio (OR) with 95% confidence interval (CI).

Analysis was performed using IBM SPSS 19 (PASW Statistics for Windows; SPSS Inc, Chicago, IL, USA).

### Ethics

This study is part of the project 'Immigrants' health in Norway', which has been approved by the Regional Committee for Medical and Health Research Ethics and the Norwegian Data Inspectorate. The Norwegian Directorate of Health has given an exemption from the duty of confidentiality.



**Figure 1.** Association of contraceptive use with length of stay, for immigrant women from (A) Nordic countries, Western countries, South and Central America, and (B) Asia, Africa, Eastern Europe. Odds ratio (OR) for three age groups.

## Results

The study population comprised 893 073 women aged 16–45 years, 130 080 (14.6%) of whom were immigrants. Of the immigrant women, 38% were born in Asia, 25% in Eastern Europe, 12% in Africa, 11% in Nordic countries, 10% in Western countries, and 5% in South and Central America. Characteristics of the study population are shown in Table S1. Women's mean age varied between the groups from 31 to 33 years, mean age on immigration from 22 to 27 years, and mean length of stay in Norway from 6 to 9 years. Compared with Norwegian women, fewer immigrants were working and/or in education, had a Norwegian spouse, and had a Norwegian GP, and more immigrant women were married and had given birth. The proportion of immigrant women having a female GP varied from 37 to 47%, compared with 40% of the native women.

Table 1 shows user rates of hormonal contraceptives according to women's area of origin and age. Oral hormonal contraceptives were dispensed to four times as many women than were non-oral formulations. Relatively more native women (38%) were dispensed hormonal contraceptives than were all groups of immigrants; user rates among immigrants varied between 15 and 24%. Use of oral hormonal contraceptives decreased with increasing women's age. Differences in using oral and non-oral hormonal contraceptives between the native women and the immigrant groups were most prominent among women aged 16–25 years. Non-oral contraceptives comprised a larger share of overall use of contraceptives for women from Africa and Asia than for native women and all other immigrant groups. Hormonal IUDs were most commonly used by older women.

Figure 1 shows the association between length of stay in Norway and use of hormonal contraceptives for the two aggregated immigrant groups as compared with the Norwegian women (reference, OR = 1), by three age groups. The likelihood of using hormonal contraceptives increased during the first 5 years after immigration. The differences in use of contraceptives between immigrants and Norwegians were smallest in the oldest age group.

Table 2 shows the association of use of any hormonal contraceptive with women's world region of origin. Women from Africa, Asia and Eastern Europe were less likely to receive any hormonal contraceptive than were native women and all other groups of immigrants. Because of interactions, the adjusted ORs for the aggregated groups are shown in Figure 2.

Figure 2 shows the association of use of some hormonal contraceptive with age for two aggregated groups of immigrants; Figure 2A is restricted to women in work/education, Figure 2B to those not being working and/or in education. Results presented in both figures are adjusted for having a

**Table 1.** Use of hormonal contraceptives in Norway in 2008. Distribution by women's area of origin and age group

Age group (years)	Hormonal contraceptives	Norway	Nordic countries	Western countries*	Eastern Europe	Asia**	Africa	South and Central America
All women, <i>n</i>		762 993	14 137	12 550	32 298	50 120	15 088	5887
	Oral, %	31.6	19.6	15.9	11.8	11.7	11.1	19.7
	IUD and implants, %	2.8	2.3	1.5	1.2	1.7	1.6	1.8
	Other, %***	4.7	3.0	2.1	2.2	2.5	3.1	4.1
	Any, %	37.7	24.1	18.9	14.7	15.2	15.1	24.3
16–25, <i>n</i>		238 404	3144	2128	8329	11 264	4061	1104
	Oral, %	57.3	27.1	20.4	19.4	16.5	12.5	31.1
	IUD and implants, %	1.1	0.9	0.4	0.7	0.9	1	1.4
	Other, %	6.1	3.5	1.9	3.1	2.8	3.6	6.0
	Any, %	62.1	30.2	22.2	22.4	19.4	16.2	36.1
26–35, <i>n</i>		236 019	5573	5054	14 543	21 591	6517	2769
	Oral, %	32.1	24.7	20.7	12	12.9	13.2	22.1
	IUD and implants, %	3.4	2.1	1.6	1.2	2.1	1.9	1.9
	Other, %	5.4	3.9	2.8	2.2	2.9	3.7	4.6
	Any, %	39.2	29.8	24.3	14.9	16.9	18.0	27.3
36–45, <i>n</i>		288 570	5420	5368	9426	17 265	4510	2014
	Oral, %	10.0	10.1	9.6	4.9	7.1	6.8	10.2
	IUD and implants, %	3.8	3.3	1.7	1.5	1.8	1.6	1.9
	Other, %	3.0	1.9	1.5	1.5	1.9	1.9	2.4
	Any, %	16.2	14.7	12.5	7.5	10.4	9.8	13.9

The rows with different contraceptives do not add up to 'Any' because women may have used several types.

\*Western Europe, North America, Australia and New Zealand.

\*\*Asia including Turkey, Oceania except Australia and New Zealand.

\*\*\*Vaginal rings, injections and patches.

female GP and having a Norwegian GP. The impact of adjustment varied between immigrant groups, but the confidence interval only overlapped with native women among the oldest women in the aggregated group with highest use of contraceptives who were working/in education.

**Table 2.** Binary logistic regression. Crude OR and 95% confidence interval (CI) of use of hormonal contraceptives with women's world region of origin

World region of origin	Crude OR (95% CI)
Norway (reference)	1
Nordic countries	0.53 (0.51–0.55)
Western countries*	0.39 (0.37–0.40)
Eastern Europe	0.29 (0.28–0.29)
Asia**	0.30 (0.29–0.31)
Africa	0.29 (0.28–0.31)
South and Central America	0.53 (0.50–0.57)

\*Including Western Europe, North America, Australia and New Zealand.

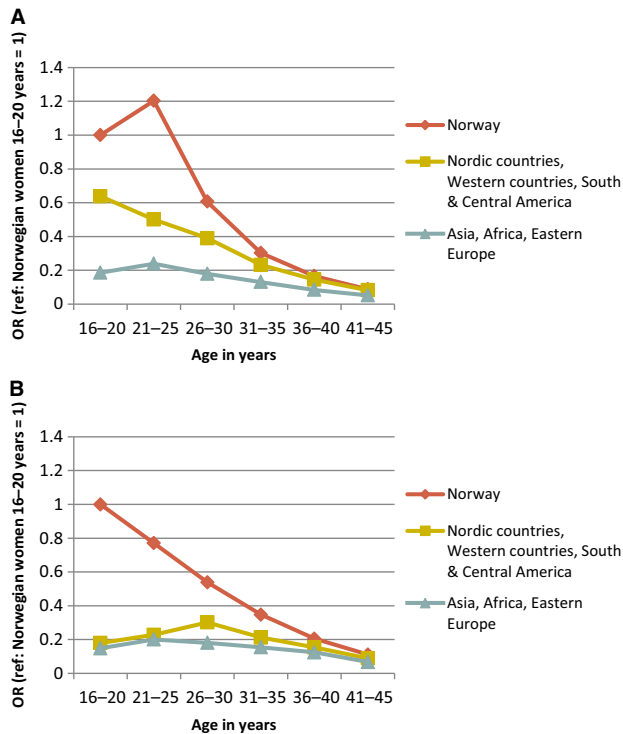
\*\*Asia including Turkey, Oceania except Australia and New Zealand.

Table 3 shows the adjusted association of using any hormonal contraceptive with women's characteristics, for native women and for two aggregated immigrant groups with relatively high and low use of hormonal contraceptives, respectively. In all three groups, being in work and/or education was a predictor of using oral contraceptives, with greatest impact on those immigrants with relatively high use of hormonal contraceptives. For immigrants, having lived in Norway for 5 years or more and a relatively young age of immigration, predicted use of hormonal contraceptives. In all groups, having a female GP increased the likelihood of using any contraceptive. Being married and giving birth were both associated with lower use of contraceptives in native women, but increased use in those immigrant groups with relatively low use. Adjusted data for immigrants according to each world area of origin are presented in Table S2.

## Discussion

### Main findings

Our results show that a smaller share of immigrants than native women in Norway used hormonal contraceptives.



**Figure 2.** Association of contraceptive use with age, for women (A) in work/education and (B) not in work/education. Odds ratio (OR) for three groups.

There was considerable variation between the immigrant groups, but all groups had lower user rates than natives. The use of hormonal contraceptives decreased with increasing age, and group differences were largest in the youngest age group 16–25 years. Being in work and/or education, longer length of stay, and young age on immigration to Norway, were predictors of using hormonal contraceptives for immigrants.

### Strengths and limitations

The national registries provided us a unique opportunity to link complete data on hormonal contraceptives purchased by a national female population with women's immigrant status. The linked data enabled us to study drug use according to immigrants' area of origin, adjusted for socio-economic and other variables. The nationwide study design eliminated selection and information bias.

However, some limitations should be considered. First, the Norwegian Prescription Database contains information on prescription drugs that were purchased, not on actual drug use. Thus, collected supplies served as surrogate marker for contraceptive use in the current study. This method does not account for compliance but is recognized in epidemiological studies.<sup>21</sup> Prior studies have revealed lower compliance among immigrants.<sup>12</sup> If this applies to the immigrants in our study, the differences we found should

be considered conservative estimates. Secondly, we lack information on other forms of contraception such as copper IUDs, sterilisation, vasectomy and condoms. Although this study showed that immigrant women used fewer hormonal contraceptives than natives did, many of them might be using 'effective' non-hormonal contraception methods. Copper IUDs are still used, though not registered in the Norwegian Prescription Database. However, based on figures from drug wholesalers, copper IUDs only constituted 27% of all IUDs sold in Norway in 2008,<sup>22</sup> and our findings are consistent with a recent study that included information on IUDs.<sup>13</sup> Thirdly, both IUDs and implants are typically used for several consecutive years and overall use is therefore underestimated in this study, but this underestimation would apply for both natives and immigrants. Lastly, our definition of a contraceptive user included all women who collected at least one supply of hormonal contraceptives during 2008, regardless of the number of drug supplies. The reason for this choice was that we considered purchase of contraceptives a surrogate marker for women knowing how to get access to contraceptives. Although this might overestimate the number of users, this would apply to all groups and hence not interfere with comparisons between groups.

### Interpretation

To the best of our knowledge, prior studies have not compared user rates of contraceptives between immigrant and native women at the population level, or among groups based on country of origin. One study in France compared self-reported user rates of contraceptives between immigrants and natives,<sup>13</sup> and several studies have compared user rates of contraceptives only among women undergoing induced abortion.<sup>10,12</sup> Our results showing lower contraceptive use among immigrants are consistent with the findings from these studies.<sup>10,12,13</sup> The association between higher socio-economic status and use of contraceptives in a general population is well established,<sup>1,4</sup> but the only study to date examining predictors of contraceptive use among immigrants found that the impact of socioeconomic status was different for immigrants and natives.<sup>13</sup> Our study confirms that being in work and/or education is an important predictor among all groups, especially in the aggregated immigrant group with high use of contraceptives. Adjusting for being in work and/or education, however, did not in itself explain the main differences between immigrants and natives.

Culture and religion influence sexuality and use of contraception in some immigrant groups.<sup>5</sup> Because the need for contraception may vary between women from different cultures, it is adequate to question the use of native women as the reference group. However, high prevalence rates of induced abortion among immigrants and ethnic minorities

**Table 3.** Association of use of hormonal contraceptives with women's characteristics, for Norwegian women and two immigrant groups. Odds ratio (OR) and 95% confidence interval

	Norway		Immigrants with high contraceptive use*		Immigrants with low contraceptive use**	
	Crude OR (95% CI)	Adjusted OR*** (95% CI)	Crude OR (95% CI)	Adjusted OR*** (95% CI)	Crude OR (95% CI)	Adjusted OR*** (95% CI)
<b>In work/education</b>	1.66 (1.64–1.69)	1.42 (1.40–1.45)	2.17 (2.01–2.34)	1.87 (1.72–2.04)	1.50 (1.45–1.57)	1.24 (1.19–1.29)
<b>Length of stay in Norway ≥5 years</b>	–	–	1.29 (1.22–1.36)	1.21 (1.11–1.31)	1.57 (1.51–1.63)	1.29 (1.23–1.36)
<b>Age at immigration (ref = 31–45 years)</b>						
0–15 years	–	–	4.55 (4.12–5.02)	1.22 (1.05–1.42)	3.73 (3.50–3.98)	1.38 (1.25–1.53)
16–30 years	–	–	2.07 (1.91–2.24)	1.07 (0.97–1.19)	1.95 (1.84–2.07)	1.23 (1.15–1.33)
<b>Female general practitioner</b>	1.08 (1.07–1.09)	1.12 (1.11–1.13)	1.12 (1.06–1.19)	1.15 (1.08–1.23)	1.20 (1.15–1.24)	1.16 (1.12–1.21)
<b>Norwegian general practitioner</b>	1.02 (1.01–1.03)	1.02 (1.01–1.04)	0.95 (0.89–1.01)	0.97 (0.91–1.04)	1.09 (1.05–1.13)	1.08 (1.04–1.12)
<b>Delivery between January 2008 and June 2009</b>	0.84 (0.83–0.86)	0.82 (0.80–0.83)	1.08 (1.00–1.16)	0.93 (0.85–1.01)	1.18 (1.13–1.24)	1.12 (1.06–1.18)
<b>Married</b>	0.30 (0.30–0.31)	0.66 (0.65–0.66)	0.67 (0.64–0.71)	0.91 (0.85–0.97)	0.82 (0.79–0.85)	1.13 (1.08–1.18)
<b>Age, years</b>	0.90 (0.90–0.90)	0.91 (0.91–0.91)	0.95 (0.94–0.95)	0.93 (0.92–0.93)	0.96 (0.96–0.96)	0.95 (0.95–0.96)

\*Immigrants from Nordic Countries and Western Countries, South and Central America.

\*\*Immigrants from Eastern Europe, Asia, and Africa.

\*\*\*Adjusted for all other independent variables in the model.

in Scandinavia and the USA,<sup>4,8–10</sup> and adaptation to their new country of residence regarding sexuality and the health care system,<sup>7</sup> suggest there are unmet needs in those groups with lower use of contraception.

All hormonal contraceptives dispensed in Norwegian pharmacies are included in our study. Some immigrant women, however, may have brought contraceptives with them upon immigration, and also purchased drugs when visiting their country of origin.<sup>23</sup> This may apply to some women from European countries and partly explain the increase in use of contraceptives during the first 5 years in Norway. However, not all women have the opportunity to travel to their country of origin, and use of hormonal contraceptives remains lowest among women from areas where contraceptives are less accessible than in Norway. As a proportion of overall hormonal contraception, non-oral methods were more widely used in the youngest immigrants from Asia, Africa, and South and Central America compared with Norwegian women and other immigrant groups. These differences are in accordance with patterns of use among ethnic minorities in the USA<sup>4</sup> and should be given further consideration as these groups might express cultural preferences that the prescriber should be aware of when giving advice on family planning.

We expected women who had delivered in 2008 or the first part of 2009 to have lower use of hormonal contraceptives in 2008. Although this was the case for Norwegians

and immigrants with high use of contraception, among immigrants with relatively low use of hormonal contraceptives, delivery was associated with higher use of contraceptives. Although the nature of this study does not allow for causal explanations, one possible theory is related to the organisation of the Norwegian health care system. In Norway there is a free control visit with the GP 6 weeks after delivery, and the need for contraception is one of the topics that should be discussed with the woman at that time. It is possible that immigrants that usually do not have contact with the health system may use this opportunity to get prescriptions for contraceptives.

Provider-related factors can influence the use of drugs. Immigrant women prefer to have an immigrant GP,<sup>24</sup> but it has not previously been studied whether this choice has an impact on use of contraceptives. In our study, having a Norwegian GP slightly increased the likelihood of using hormonal contraceptives among native women and among those immigrants with relatively low use of contraceptives, while having a female GP had a larger impact on all groups. This last finding is supported by a previous study.<sup>25</sup>

## Conclusion

This nationwide registry-based study confirms that fewer immigrant women use hormonal contraception compared

with native women, and these observations are consistent after adjustment for socio-economic and provider-related factors. However, our study was unable to ascertain whether these differences were related to factors such as desires for fertility or preferences for non-hormonal contraception in recently arrived and established immigrants. Furthermore, the extent to which immigrant contraceptive needs are met is unclear. Further work including qualitative research is necessary to examine the cultural, economic, healthcare system or provider-related reasons why immigrants use fewer hormonal contraceptives compared with native women. In addition, the association between choice of contraceptive method and culture or country of origin should be investigated. Finally, method switching and discontinuation should be targeted in longitudinal studies.

### Disclosure of interests

The authors declare that they have no conflict of interests.

### Contribution to authorship

GO performed the statistical analysis and prepared the manuscript. SR participated in the design and preparation of the manuscript. ED conceived and planned the study and supervised the analyses and writing of the manuscript. All authors read and approved the final manuscript.

### Details of ethics approval

This study is part of the project 'Immigrants' health in Norway', which has been approved by the Regional Committee for Medical and Health Research Ethics (ref. 2009/1747) in 2009 and the Norwegian Data Inspectorate (ref. 10/00069-6 IUR) in 2010. The Norwegian Directorate of Health (ref. 10/6022) has granted an exemption from the duty of confidentiality.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Table S1.** Characteristics of the study population by world region of origin.

**Table S2.** Association of use of hormonal contraceptives with women's characteristics, for Norwegian women and six immigrant groups. ■

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