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## Use of universally offered family planning services - a cohort study in the city of Vantaa, Helsinki metropolitan area, Finland

Saloranta, Tuire

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7 **Use of universally offered family planning services – a cohort study in the**  
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9 **City of Vantaa, Helsinki Metropolitan area, Finland** ~~Use of universally~~  
10 ~~offered, public free-of-charge family planning services—A population-~~  
11 ~~based cohort study in Finland~~  
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## 20 **ABSTRACT**

### 21 **Aims**

22  
23 Knowledge on women reached by public family planning services is scarce. The  
24 means to provide these services pivotal for women's health and empowerment varies  
25 globally. In Finland, family planning services are offered free-of-charge, but often  
26 separately for different age groups. The city of Vantaa offers these services for all  
27 female residents without age limits. City of Vantaa, Finland, offers free-of-charge  
28 family planning services for all female residents without age or income limits. The  
29 aim of this study was to describe the characteristics of women using ~~such~~ public  
30 family planning services.  
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### 45 **Methods**

46 We assessed the sociodemographic and reproductive characteristics of women aged  
47 15–44 both using (n=11,790) and not using (n=42,931) these services in 2013–2014.  
48 We obtained adjusted odds ratios (adjORs) and 95% confidence intervals (95%CI) for  
49 service use by multivariate logistic regression.  
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### 57 **Results**

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3 Women under 35 years of age had higher odds of service use compared to those over  
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5 35 (adjORs ranging from 2.79 [95%CI 2.54–3.07] for 15–19-year-olds to 1.81 [95%CI  
6  
7 1.69–1.95] for 30–34-year-olds). Women speaking a foreign native language used  
8  
9 services less when aged under 30 and more when aged 35–44 compared to women  
10  
11 speaking the national languages. Women with history of delivery, induced abortion or  
12  
13 STI, or ~~those~~ with lower socioeconomic or educational status were more likely to use  
14  
15 the services.  
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### 23 **Conclusions**

24  
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26 Young women were more likely to use free-of-charge family planning services. In  
27  
28 contrast, young women speaking a foreign native language were underrepresented  
29  
30 among service users. It is important to recognise and actively reach underrepresented  
31  
32 groups, such as young women with foreign background to optimise equal access to  
33  
34 family planning services.  
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### 47 **KEYWORDS:**

48  
49 Family planning, contraception, service provision  
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56 **WORD COUNT:** [30172728](#)  
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## BACKGROUND

As family planning reduces maternal mortality, unintended pregnancies, and enables women to work and be educated, equal access to family planning services is essential for both women's health and empowerment.[1, 2] [Family planning services are important in combating unintended pregnancies, spacing births, allowing for individual control of family sizes and in providing accurate information on sexual and reproductive health issues.](#) [Effective contraception has had profound public health benefits in reducing maternal and infant mortality worldwide.](#)[1]

However, worldwide women with different income levels often have unequal access to [family planning](#) these services, as commonly, the service provision is divided according to different income or age groups, and the quality of the services and variety of methods offered differs by providers and funding sources.[1, 3–6] More equal service provision could reduce disparities in sexual health, as women with no contraceptive service visits have markedly higher odds of being non-users of contraception.[7]

Providing all women access to comprehensive family planning services could improve the use of most effective contraceptive methods. By offering all women the same possibility to control their fecundity this might also reduce sexual health disparities and enable universal reproductive autonomy.[8] Still, even if services are provided equally for all women, not all women are reached with the services, which can create gaps in sexual health across different groups of women. For example, non-native and migrant women have lower rates of sexual health service use in the USA. [9]

In Finland, all citizens are entitled to publicly funded health services, including contraceptive services (but not contraceptives) free of charge since 1975.[10] Private service providers offer services alongside the public system, but only a third of all family planning visits occur

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3 in the private sector with considerable variation between different communities.[11, 12]

4  
5 Finland has a very low induced abortion rate compared worldwide [13, 14], but still  
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8 disparities in sexual health in different socioeconomic and educational groups continue to  
9  
10 exist, with the highest educational group experiencing the least amount of abortions. [15]

11  
12  
13 The city of Vantaa, the fourth most populated city (population 228,166 in 2019) in Finland,  
14  
15 provides contraceptive services at family planning clinics offering comprehensive  
16  
17  
18 contraceptive services for all women of reproductive age. The services are frequently used  
19  
20 with 25% of women aged 15-25 years attending the clinics annually. [16]

21  
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23 The family planning clinics of Vantaa, together with Finnish national registers, provided us  
24  
25 with a unique opportunity to assess the use of universal contraceptive services in a female  
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28 population according to demographic and reproductive characteristics. More detailed  
29  
30 information on the users and non-users of such comprehensive family planning  
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32 services could be used to create, optimise, and modify family planning services to better  
33  
34 reach the women in need of them.

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37 In the present study, we assessed sociodemographic and reproductive characteristics  
38  
39 associated with use and non-use of the universally offered [publicmunicipal](#), free-of-charge  
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41 family planning services of the city of Vantaa during 2013–2014.  
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## 48 **METHODS**

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51 This cross-sectional regional cohort study included all 15-44-year-old female residents  
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53 (n=54,721) of the city of Vantaa in 2013 as identified from the city's Central Population  
54  
55 Register. Based on patient records of the city's primary care family planning clinics, we  
56  
57 identified women who used the services between January 2013 and December 2014. To  
58  
59 assess sociodemographic and reproductive characteristics, we derived and combined the data  
60



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3 from the Finnish national and health care registers using a personal identification number  
4 assigned to every resident in Finland since the 1960s.  
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7  
8 The family planning clinics in the city of Vantaa provide comprehensive services  
9 including contraceptive counselling, a wide mix of hormonal contraceptives, long-  
10 acting reversible contraceptive (LARC) methods, emergency contraception, screening  
11 and treatment for vaginal and sexually transmitted infections (STI), counselling on  
12 sexuality related questions, and abortion referrals and post-abortion follow-up. The  
13 public health nurses and midwives are responsible for contraceptive counselling and  
14 follow-up, whereas general practitioners provide consultation, prescriptions, and  
15 insertions of LARC methods.  
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27 Since 2013, every woman has been entitled to her first LARC method free of charge.  
28 During 2013–2014, women aged under 20 years received a nine-month supply of birth  
29 control pills or contraceptive vaginal rings at no cost. All women receive a three-  
30 month supply of pills or rings when starting or switching contraception. Information  
31 on the contraceptive services are provided in Finnish, Swedish, and English on the  
32 City's website. Interpreter services are provided if needed.  
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42 During the 2013–2014 study period, women using hormonal contraception were  
43 invited for follow-up annually or within 18 months, and to contact the clinics if they  
44 had problems concerning their method or wished to switch their method. Women  
45 using LARCs were invited to visit for follow-up within a year of initiation in 2013,  
46 and since 2014 were instructed to contact the clinics only in case of problems or if  
47 they wished to have the device removed.  
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56 The Central Population Register of Vantaa provided the number of women in Vantaa, data on  
57 date of birth, marital status, and native language. Marital status was defined as married or  
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3 unmarried, cohabitations are not registered in Finland. There is no information on ethnicity or  
4 race recorded in the Finnish registers. Instead, Population Registers record self-reported  
5 information on native language, which we used as a proxy of ethnic variation and divided the  
6 study population into native (Finnish or Swedish) speakers and others. Statistics Finland  
7 provided data on educational and socioeconomic status. Educational status was defined  
8 according to International Standard Classification of Education and divided into five groups  
9 (Table 1). Only educational attainments above basic education are statistically recorded in  
10 Finland. Socioeconomic status was divided according to Statistics Finland's standards into  
11 five groups (Table 1).  
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24 The Finnish Institute of Health and Welfare registers data on births, induced abortions,  
25 sterilisations, STIs, outpatient visits, and hospital-care episodes and care episodes in primary  
26 health care. The International Statistical Classification of Diseases and Related Health  
27 Problems, 10<sup>th</sup> Revision diagnoses are registered at visits in primary and specialised care, and  
28 on hospital care episodes. The registers are comprehensive, validated, and of high  
29 quality.[17–19]  
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39 We obtained data on prior sterilisations, births, induced abortions, STIs, diagnoses of mental  
40 health disorders in adulthood (F10-69 and F99, excluding nicotine dependence, F17), and  
41 gynaecological morbidities (N80, endometriosis; N92 Excessive, frequent and irregular  
42 menstruation; N93 Other abnormal uterine and vaginal bleeding; N94 Pain and other  
43 conditions associated with female genital organs and menstrual cycle) in both specialised and  
44 primary care from the registers maintained by The Finnish Institute of Health and Welfare.  
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52 The number of women with diagnosis of endometriosis (n=325) or other abnormal uterine  
53 and vaginal bleeding (n=153) was low and thus these diagnoses were omitted from the  
54 analyses. We included all births and induced abortions available in the registers since 1987.  
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60 We analysed parity, history of induced abortions and STIs as two-level variables — history

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3 or no history. We included the above-mentioned diagnoses within the previous two years to  
4 assess associations of gynaecological and psychiatric morbidities with use of family planning  
5 services, and history of STIs as it indicates sexual activity.  
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## 10 **Statistical analyses**

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13 We studied the association between the use of contraceptive services, and  
14 sociodemographic and reproductive characteristics by applying univariate and multivariable  
15 logistic regression models. We evaluated the variation in the probability of using the services  
16 with age by fitting a restricted cubic spline (Supporting Information Figure S1), based on  
17 which age was divided into five groups: 15–19, 20–24, 25–29, 30–34 and 35–44 years. As  
18 previous literature is lacking on factors associated with use of universal, [public](#)  
19 [municipal](#) contraceptive services, we selected variables to the descriptive  
20 multivariable model, if those were significantly ( $P<0.05$ ) associated with service use  
21 in univariate analysis and remained significant when added to multivariable model.  
22 From the final model, we calculated odds ratios (ORs) with 95% confidence intervals  
23 (CIs).  
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40 To have more detailed information on the associations of age with service use, we  
41 explored the interactions of age with the other variables, and then continued to  
42 analyses stratified by age groups.  
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47 All analyses were conducted using statistical software R 3.6.3.[20]  
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## 52 **Ethical approval**

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56 [Approvals were obtained from the register-keeping organizations of all registers used in this](#)  
57 [study: The Finnish Institute of Health and Welfare \(THL/572/5.05.00/2016\), Statistics](#)  
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3 [Finland \(TK-53-611-17\) and the City of Vantaa \(VD/9786/13.00.00/2015\).](#) ~~We received~~  
4 ~~approval from the ethics committee of the Hospital District of Helsinki and Uusimaa~~  
5 ~~(304/13/03/03/2015).~~ ~~The register-keeping organizations approved the use of their health-~~  
6 ~~register data in this study.~~  
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## 16 RESULTS

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19 [In the city of Vantaa, during 2013-2014 altogether 11,790 women aged 15–44 years used the](#)  
20 [family planning services.](#) ~~Altogether 11,790 women aged 15–44 years used the family~~  
21 ~~planning services in years 2013 and 2014,~~ whereas 42,931 women did not (Figure 1). The  
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characteristics of the women using and not using the services are presented in Table 1. [The](#)  
[service users were younger than the non-service users.](#) The probability to use the  
services was highest in women aged 23 years (Supporting Information Figure S1).

[The service users were less often married, non-native speakers or parous, but more](#)  
[often had history of abortion or had had a delivery or an STI within the previous two](#)  
[years compared to non-service users.](#)

In univariate analyses (Supporting Information Table S1), all the sociodemographic and  
reproductive characteristics studied showed a ~~statistically~~ significant association with  
the odds of service use and were studied further with multivariable analysis. All these  
candidate variables remained ~~statistically~~ significant in the multivariable analysis and  
were included in the final multivariable model (Supporting Information Table S1).

Service use was positively associated with young age, being non-sterilised and history  
of delivery, induced abortion; STI; excessive, frequent, and irregular menstruation  
(N92); or pain and other conditions associated with female genital organs and

1  
2  
3 menstrual cycle (N94). [In contrast, high socioeconomic and educational status were](#)  
4 [associated with less use of services.](#)  
5  
6

7  
8 As age had significant interactions with many of the variables (Supporting Information  
9 Table S1), we performed multivariable analyses stratified by age groups (Table 2,  
10 Supporting Information Table S2). In the age-stratified logistic regression model (Table  
11 2, Figure 2), the OR of service use varied with age for marital status, history of  
12 delivery, native language, socioeconomic status, and education. [Among teenagers being](#)  
13 [non-married, or having history of delivery, induced abortion, STI or history of pain and other](#)  
14 [conditions associated with female genital organs and menstrual cycle \(N94\), were positively](#)  
15 [associated with service use. However, speaking a non-native language was negatively](#)  
16 [associated with service use.](#) For women speaking another native language than  
17 Finnish/Swedish, those aged under 30 were less likely to use the services, but those  
18 aged 30–34 years were equally as likely, and those aged 35–44 years more likely than  
19 women speaking Finnish/Swedish.  
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## DISCUSSION

In the city of Vantaa, we found that women aged 25 years or younger were more likely to use the municipal free-of-charge contraceptive services. Young women, especially those younger than 25 were more likely to use the public free-of-charge contraceptive services. Moreover, women who had delivered, or had a history of induced abortion or STI, also had increased odds of using the services. In contrast, women with a foreign native language aged under 30 used the services less. Women with high socioeconomic status or high educational level tended to use the services less compared to women with lower education or socioeconomic status. In contrast, low socioeconomic status was associated with lower odds of service use among women younger than 25. Having received diagnoses of excessive or irregular menstruation or menstrual pain, and mental health disorder diagnosis among women aged over 34, was associated with higher odds of service use.

The high proportion of young women in service users is in line with previous studies from the US and UK.[4, 21–23] Young age, parity, and history of induced abortion and STI are all linked to sexual activity and/or fertility. Young, and especially teenage women are unlikely to have pregnancy intentions.[24, 25]

As previous studies on users of family planning services are based on data on aggregated level, knowledge on parity, previous abortions, and history of STIs on use of family planning services is scarce. In the UK, nulliparous women had a higher prevalence of service use compared to parous women, a contradicting finding compared to our data.[21] These differences could be due to differences in legislations and/or service provision. In Finland, all women are invited to post-delivery follow-up visit, and are required to have such a check-up in order to receive maternity allowances. Recommendations, national guidelines, and legislation require that contraception is discussed during these visits.[26] Thus, the higher

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3 odds of service use seen for parous women is likely to reflect both higher fertility awareness  
4 and thus higher need for the services compared to nulliparous women. Interestingly, in a  
5 recent study from Finland, parous women were less likely to use hormonal contraception, but  
6 in our study were more likely to use the contraceptive services.[27] This likely represents  
7 high use of LARC methods in parous women. In fact, parous women were more likely to  
8 choose LARC methods compared to nulliparous women at the family planning clinics of  
9 Vantaa. [28]

10  
11 Similarly, women with history of induced abortion were most likely aware of the services and  
12 had higher odds of service use across all age groups. Surprisingly, the recent Finnish study  
13 found that women with history of induced abortion had lower rates of hormonal contraceptive  
14 use. [27] But again, especially young women with a history of induced abortion were more  
15 likely to choose LARC methods, which can explain the discrepancy in the studies. [28]

16  
17 Young women speaking a foreign native language were less likely to use the services  
18 compared to native-speaking women. This is in line with previous studies reporting that  
19 immigrants commonly use health services less or at most similarly as native populations.[9]  
20 In the US, migrant women use sex-related health services as a whole at lower rates compared  
21 to native women.[29] In Finland, non-native women are a diverse group that can have  
22 different needs and family planning strategies compared to native women. The non-use of  
23 services by young women with a foreign native language may in some ethnic groups be  
24 linked to perception of sexual activity not being permissible for unmarried young women or  
25 to pregnancy intentions at a younger age. In contrast, higher use of services among older non-  
26 native women may be explained by having needs for spacing births and/or having learned of  
27 the public services through maternity care received previously.

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3 Women of all age groups with lower educational level had increased odds of public  
4 contraceptive service use compared to women with the highest education. This finding could  
5 reflect higher need of services and/or less likely use of other contraceptive service options,  
6 namely private health care among women with lower educational level. A UK study similarly  
7 found that women with the highest education level had the lowest overall prevalence of  
8 contraceptive service use.[21] There are recent observations in Finland that fecundity is  
9 declining in all other, but not in the highest educational levels, which could infer differences  
10 in family planning strategies and subsequently needs for using family planning services.[30]  
11  
12 Age modified the association of socioeconomic status with service use. Women older than 30  
13 that were unemployed, or students had higher odds of service use compared to same aged  
14 women that were upper-level employees. This is likely to be due to upper-level employees  
15 having more access to private health care. Young female students had lower odds of service  
16 use which is likely to represent use of student health care.

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19 Compared to the whole of Finland, the sociodemographic characteristics of city of  
20 Vantaa are rather similar. However, there is a larger proportion of fertile aged women  
21 (i.e. 15–44-year olds [21% vs. 18% in 2013]), of non-native speakers (13.4% vs.  
22 5.3%) and a smaller proportion of unemployed (10% vs. 12% in 2013-2014), but  
23 similar proportion of students (7% vs. 8%).[14]

24  
25  
26 The use of public Finnish family planning services is socially more equally distributed  
27 compared to US settings, where the majority of users in public family planning clinics are of  
28 low income.[4, 23] The rate of induced abortion in Finland (8.1 per 1000 women aged 15-49  
29 years) and in Vantaa (8.8) - and presumably also the rate of unintended pregnancy - are low  
30 compared to most of the world (39/1000), including Europe and North-America (17/1000).~~It~~



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3 ~~Finland, the rate of induced abortions, and thus presumably the rate of unintended~~  
4 ~~pregnancies is low compared to most international settings, including US and UK).~~[13, 14]  
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7  
8 In US studies, women of low socioeconomic or education status use contraceptives at lower  
9 rates and experience higher rates of unintended pregnancies than women of higher  
10 socioeconomic status or education, although these disparities and rates of unintended  
11 pregnancies have declined.[7, 31, 32]  
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17 Women with excessive or painful menstruation are likely to have higher needs for family  
18 planning services as hormonal contraceptives are often used as the first line therapy to  
19 manage these symptoms. Having diagnoses of gynaecological ailments or mental health  
20 disorders are also markers of the use of public services, which are thus familiar and likely be  
21 used more. Women with recent or current mental health disorders may also have increased  
22 need for contraception.  
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35 The strengths of our study include complete coverage of all women in Vantaa and of all the  
36 users of the contraceptive services during 2013–2014, as well as use of the comprehensive  
37 and validated Finnish register data. The international generalisability of our results is limited  
38 as the Finnish health care system differs from many health care systems worldwide. The City  
39 of Vantaa also offers family planning services differently compared to Finland nationally, as  
40 in many municipalities specialized family planning services are offered only for young  
41 women. Generalisability of our results is limited as the Finnish health care system differs  
42 from many health care systems worldwide. Still, our results on age, marital status, and  
43 nativity are quite similar to interview-based National Survey of Family Growth data on use of  
44 contraceptive services overall in the US.[4] However, the native language in the registers is  
45 self-reported, and women can have differing preferences on which language to report as a  
46 native language. Also, women cohabiting with a man were not registered as married, as  
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3 cohabitation is not registered in Finland. As satisfied LARC users do not visit the clinics for  
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5 regular check-ups despite being within the reach of the services, these women may be  
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7 missing from the service users. Use of LARC methods increased in Vantaa after initiation of  
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9 an ongoing program offering all women their first LARC method free of charge in 2013.[16]  
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12 The program may also have influenced the user profile of the family planning services.  
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15 [Future research is needed on user satisfaction on family planning services to facilitate their](#)  
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17 [further development to better reach the women in need of them](#)  
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20 In conclusion, it is important to acknowledge the higher needs of young women and the  
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22 differences in needs of underrepresented groups, especially non-native women, to  
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24 optimize access to and use of family planning services.  
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## COMPETING INTERESTS

Author TS has received payments for lectures from Novartis and Bayer. Author OH serves occasionally on advisory boards for Bayer AG, Gedeon Richter, HRA-Pharma, Sandoz A/S and Vifor Pharma, and has designed and lectured at educational events of these companies. The remaining authors report no conflict of interest.

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## Tables:

**Table 1. Characteristics of 15–44-year-old women according their use of the family planning services of the city of Vantaa, Finland, during 2013–2014.**

| Characteristic                          | All<br>(n=54,721)<br>n (%) | Service-users<br>(n=11,790)<br>n (%) | Non-<br>service-<br>users<br>(n=42,931)<br>n (%) | <i>P</i> -value <sup>b</sup> |
|---|----------------------------|--------------------------------------|--|------------------------------|
| <b>Age <sup>a</sup>, years</b>          | 28.8 (22.1,<br>36.2)       | 26.5 (21.2,<br>33.1)                 | 29.6 (22.5,<br>37.0)                             | <0.001                       |
| <b>Age categories, years</b>            |                            |                                      |  | <0.001                       |
| 15–19                                   | 9,125 (17)                 | 2,163 (18)                           | 6,962 (16)                                       |                              |
| 20–24                                   | 10,803 (20)                | 2,992 (25)                           | 7,811 (18)                                       |                              |
| 25–29                                   | 9,815 (18)                 | 2,334 (20)                           | 7,481 (17)                                       |                              |
| 30–34                                   | 9,259 (17)                 | 2,055 (17)                           | 7,204 (17)                                       |                              |
| 35–44                                   | 15,719 (29)                | 2,246 (19)                           | 13,473 (31)                                      |                              |
| <b>Married</b>                          | 19,771 (36)                | 3,483 (30)                           | 16,288 (38)                                      | <0.001                       |
| <b>History of delivery</b>              |                            |                                      |  | <0.001                       |
| No                                      | 34,803 (64)                | 6,884 (58)                           | 27,919 (65)                                      |                              |
| Within the previous<br>two years        | 5,848 (11)                 | 2,151 (18)                           | 3,697 (9)  |                              |
| More than two years<br>prior            | 14,070 (26)                | 2,755 (23)                           | 11,315 (26)                                      |                              |
| <b>Number of deliveries</b>             |                            |                                      |  | <0.001                       |
| 0                                       | 34,803 (64)                | 6,884 (58)                           | 27,919 (65)                                      |                              |
| 1                                       | 7,451 (14)                 | 1,861 (16)                           | 5,590 (13)                                       |                              |
| 2                                       | 8,472 (15)                 | 2,093 (18)                           | 6,379 (15)                                       |                              |
| 3 or more                               | 3,995 (7)                  | 952 (8)                              | 3,043 (7)  |                              |
| <b>Age at first birth, years</b>        |                            |                                      |  | <0.001                       |
| 14–19                                   | 1,640 (3)                  | 525 (4)                              | 1,115 (3)  |                              |
| 20–24                                   | 5,937 (11)                 | 1,677 (14)                           | 4,260 (10)                                       |                              |
| 25–29                                   | 7,171 (13)                 | 1,649 (14)                           | 5,522 (13)                                       |                              |
| 30 or more                              | 5,170 (9)                  | 1,055 (9)                            | 4,115 (10)                                       |                              |
| <b>Sterilised</b>                       | 978 (2)                    | 123 (1)                              | 855 (2)  | <0.001                       |
| <b>History of induced<br/>abortions</b> |                            |                                      |  | <0.001                       |
| No                                      | 47,010 (86)                | 9,701 (82)                           | 37,309 (87)                                      |                              |



|  |             |             |             |        |
|--|-------------|-------------|-------------|--------|
| Within the previous two years                                  | 1,356 (2)   | 478 (4)     | 878 (2)     |        |
| More than two years prior                                      | 6,355 (12)  | 1,611 (14)  | 4,744 (11)  |        |
| <b>Number of prior abortions</b>                               |             |             |             | <0.001 |
| 0  | 47,010 (86) | 9,701 (82)  | 37,309 (87) |        |
| 1  | 5,629 (10)  | 1,504 (13)  | 4,125 (10)  |        |
| 2  | 1,435 (3)   | 409 (3)     | 1,026 (2)   |        |
| 3 or more  | 647 (1)     | 176 (1)     | 471 (1)     |        |
| <b>Native language</b>   |             |             |             | <0.001 |
| Finnish or Swedish   | 43,283 (79) | 10,014 (85) | 33,269 (77) |        |
| Other  | 11,438 (21) | 1,776 (15)  | 9,662 (23)  |        |
| <b>Socioeconomic status<sup>c</sup></b>                        |             |             |             | <0.001 |
| Upper-level employees <sup>d</sup>                             | 6,493 (12)  | 1,001 (8)   | 5,492 (13)  |        |
| Lower-level employees or manual workers <sup>e</sup>           | 28,438 (52) | 6,796 (58)  | 21,642 (50) |        |
| Students   | 8,778 (16)  | 2,000 (17)  | 6,778 (16)  |        |
| Long-term unemployed   | 3,782 (7)   | 912 (8)     | 2,870 (7)   |        |
| Entrepreneurs, pensioners, and others not elsewhere classified | 4,631 (8)   | 1,018 (9)   | 3,613 (8)   |        |
| Unknown  | 2,599 (5)   | 63 (1)      | 2,536 (6)   |        |
| <b>Education level</b>   |             |             |             | <0.001 |
| Doctoral, master, or equivalent level                          | 5,093 (9)   | 705 (6)     | 4,388 (10)  |        |
| Bachelor or equivalent level                                   | 9,074 (17)  | 1,770 (15)  | 7,304 (17)  |        |
| Short-cycle tertiary education                                 | 2,642 (5)   | 302 (3)     | 2,340 (5)   |        |
| Upper secondary education                                      | 20,774 (38) | 5,280 (45)  | 15,494 (36) |        |
| Unknown <sup>f</sup>   | 17,138 (31) | 3,733 (32)  | 13,405 (31) |        |
| <b>History of sexually transmitted infections<sup>g</sup></b>  |             |             |             | <0.001 |
| No   | 49,298 (90) | 9,977 (85)  | 39,321 (92) |        |
| Yes  | 5,423 (10)  | 1,813 (15)  | 3,610 (8)   |        |
| <b>History of endometriosis (N80)<sup>h</sup></b>              | 325 (1)     | 36 (0)      | 289 (1)     | <0.001 |

|   |            |            |            |        |
|---|------------|------------|------------|--------|
| <b>History of excessive, frequent, and irregular menstruation (N92)<sup>h</sup></b>                                     | 940 (2)    | 254 (2)    | 686 (2)    | <0.001 |
| <b>History of other abnormal uterine and vaginal bleeding (N93)<sup>h</sup></b>   | 153 (0)    | 53 (0)     | 100 (0)    | <0.001 |
| <b>History of pain and other conditions associated with female genital organs and menstrual cycle (N94)<sup>h</sup></b> | 506 (1)    | 166 (1)    | 340 (1)    | <0.001 |
| <b>History of mental health disorder diagnoses in adulthood (F10–69,99)<sup>h,i</sup></b>                               | 5,860 (11) | 1,610 (14) | 4,250 (10) | <0.001 |

<sup>a</sup> Median (IQR, interquartile range)

<sup>b</sup> T-test for continuous variables,  $\chi^2$ -test for categorical variables

<sup>c</sup> Socioeconomic status of the youngest age group could also be derived from their family's socioeconomic status.

<sup>d</sup> Administrative, managerial, professional, and related occupations

<sup>e</sup> Administrative and clerical occupations or manual workers

<sup>f</sup> Comprises women with only basic education, as well as without education in Finland, and those not graduating elementary school

<sup>g</sup> Chlamydia, gonorrhoea, or syphilis

<sup>h</sup> Diagnosed within two previous years in primary or specialised care

<sup>i</sup> Excluding nicotine dependence (F17)

**Table 2. Adjusted Odds Ratios (AORs) for factors associated with using the family planning services of city of Vantaa, Finland, during 2013–2014 stratified in age groups.**

| Characteristic                     | 15–19 years<br>AOR <sup>a</sup> (95% CI) | 20–24 years<br>AOR <sup>a</sup> (95% CI) | 25–29 years<br>AOR <sup>a</sup> (95% CI) | 30–34 years<br>AOR <sup>a</sup> (95% CI) | 35–44 years<br>AOR <sup>a</sup> (95% CI) |
|------------------------------------|--|--|--|--|--|
| <b>Marital status</b>              |  |  |  |  |  |
| Married                            | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Not married                        | 3.51 (2.44–5.06)                         | 1.82 (1.60–2.07)                         | 1.38 (1.24–1.53)                         | 1.15 (1.04–1.29)                         | 1.04 (0.94–1.14)                         |
| <b>History of delivery</b>         |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.67 (1.05–2.66)                         | 2.01 (1.74–2.32)                         | 2.44 (2.20–2.72)                         | 2.51 (2.24–2.81)                         | 2.50 (2.21–2.83)                         |
| <b>Sterilised</b>                  |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.00 (0.08–11.86)                        | 0.41 (0.04–4.08)                         | 0.56 (0.26–1.20)                         | 0.68 (0.45–1.02)                         | 0.50 (0.40–0.64)                         |
| <b>History of induced abortion</b> |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.47 (1.11–1.96)                         | 1.35 (1.18–1.55)                         | 1.07 (0.94–1.22)                         | 1.24 (1.09–1.41)                         | 1.15 (1.03–1.28)                         |
| <b>Native language</b>             |  |  |  |  |  |
| Finnish or Swedish                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Other                              | 0.48 (0.39–0.57)                         | 0.54 (0.47–0.63)                         | 0.79 (0.69–0.91)                         | 1.04 (0.90–1.21)                         | 1.23 (1.08–1.40)                         |

| <b>Socioeconomic status</b>   |                  |                   |                   |                  |                  |                  |
|---|------------------|-------------------|-------------------|------------------|------------------|------------------|
| Upper-level employees   |                  |                   | Ref.              | Ref.             | Ref.             |                  |
| Lower-level employees or manual workers   |                  | Ref. <sup>b</sup> | Ref. <sup>b</sup> | 1.11 (0.92–1.34) | 1.30 (1.10–1.53) | 1.29 (1.11–1.48) |
| Students  | 0.49 (0.43–0.55) | 0.75 (0.67–0.85)  | 1.20 (0.94–1.52)  | 1.20 (0.92–1.58) | 1.46 (1.10–1.94) |                  |
| Long-term unemployed  | 0.72 (0.55–0.93) | 0.91 (0.75–1.10)  | 1.19 (0.93–1.52)  | 1.32 (1.04–1.66) | 1.46 (1.19–1.79) |                  |
| Entrepreneurs, pensioners, and others not elsewhere classified                      | 0.76 (0.61–0.95) | 0.79 (0.67–0.93)  | 0.95 (0.75–1.21)  | 1.04 (0.83–1.30) | 1.15 (0.94–1.41) |                  |
| Unknown   | 0.04 (0.01–0.11) | 0.08 (0.05–0.14)  | 0.20 (0.12–0.33)  | 0.19 (0.11–0.36) | 0.33 (0.18–0.60) |                  |
| <b>Education level</b>  |                  |                   |                   |                  |                  |                  |
| Doctoral, master, or equivalent level   |                  |                   | Ref.              | Ref.             | Ref.             |                  |
| Bachelor or equivalent level  |                  | Ref. <sup>c</sup> | Ref. <sup>c</sup> | 1.41 (1.13–1.76) | 1.12 (0.94–1.33) | 1.26 (1.06–1.49) |
| Short-cycle tertiary education  |                  |                   |                   | 1.98 (1.08–3.64) | 0.65 (0.38–1.13) | 0.73 (0.60–0.88) |
| Upper secondary education   |                  |                   |                   | 1.82 (1.46–2.26) | 1.20 (1.00–1.44) | 1.18 (1.00–1.40) |
| Unknown <sup>d</sup>  | 1.86 (1.63–2.13) | 1.16 (1.03–1.31)  | 1.67 (1.31–2.12)  | 1.30 (1.06–1.61) | 1.11 (0.92–1.34) |                  |
| <b>History of sexually transmitted infection<sup>e</sup></b>                        |                  |                   |                   |                  |                  |                  |
| No  |                  | Ref.              | Ref.              | Ref.             | Ref.             | Ref.             |
| Yes   |                  | 1.70 (1.33–2.19)  | 1.66 (1.46–1.88)  | 1.32 (1.17–1.51) | 1.30 (1.13–1.49) | 1.60 (1.36–1.89) |
| <b>History of excessive, frequent, and irregular menstruation (N92)<sup>f</sup></b> |                  |                   |                   |                  |                  |                  |
|   | 1.12 (0.74–1.69) | 1.37 (0.97–1.94)  | 1.17 (0.80–1.69)  | 1.04 (0.71–1.53) | 1.27 (0.98–1.65) |                  |

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**History of pain and other conditions associated with female genital organs and menstrual cycle (N94)<sup>f</sup>**

1.86 (1.32-2.61)      1.38 (0.96-2.00)      1.20 (0.74-1.94)      1.15 (0.64-2.10)      1.48 (0.85-2.57)

**History of mental health disorder diagnoses in adulthood (F10-69,99)<sup>f,g</sup>**

1.15 (0.99-1.34)      1.08 (0.94-1.23)      0.97 (0.83-1.14)      1.04 (0.88-1.23)      1.47 (1.28-1.70)

<sup>a</sup> Acquired with logistic regression.

<sup>b</sup> The two categories combined due to small numbers among women younger than 25 years.

<sup>c</sup> The four categories were combined due to small numbers among women younger than 25 years.

<sup>d</sup> Comprises women with only basic education, as well as without education in Finland, and those not graduating elementary school

<sup>e</sup> Chlamydia, gonorrhoea, or syphilis

<sup>f</sup> Diagnosed within two previous years in primary or specialised care

<sup>g</sup> Excluding nicotine dependence (F17)

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3 **Figure legends:**  
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6 Figure 1. Flow chart of the formation of study cohorts.  
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9 Figure 2. Forrest plot of adjusted odds ratios (ORs) with 95% confidence intervals (CIs) of  
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11 characteristics associated with using the family planning services of the city of Vantaa,  
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13 Finland, during 2013–2014 according to age-stratified multivariate model.  
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7 **Use of universally offered family planning services – a cohort study in the**  
8  
9 **City of Vantaa, Helsinki Metropolitan area, Finland**  
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## ABSTRACT

### Aims

Knowledge on women reached by public family planning services is scarce. The means to provide these services pivotal for women's health and empowerment varies globally. In Finland, family planning services are offered free-of-charge, but often separately for different age groups. The city of Vantaa offers these services for all female residents without age limits. The aim of this study was to describe the characteristics of women using public family planning services.

### Methods

We assessed the sociodemographic and reproductive characteristics of women aged 15–44 both using (n=11,790) and not using (n=42,931) these services in 2013–2014. We obtained adjusted odds ratios (adjORs) and 95% confidence intervals (95%CI) for service use by multivariate logistic regression.

### Results

Women under 35 years of age had higher odds of service use compared to those over 35 (adjORs ranging from 2.79 [95%CI 2.54–3.07] for 15–19-year-olds to 1.81 [95%CI 1.69–1.95] for 30–34-year-olds). Women speaking a foreign native language used services less when aged under 30 and more when aged 35–44 compared to women speaking the national languages. Women with history of delivery, induced abortion or STI, or with lower socioeconomic or educational status were more likely to use the services.



## Conclusions

Young women were more likely to use free-of-charge family planning services. In contrast, young women speaking a foreign native language were underrepresented among service users. It is important to recognise and actively reach underrepresented groups, such as young women with foreign background to optimise equal access to family planning services.

## KEYWORDS:

Family planning, contraception, service provision

**WORD COUNT: 3017**

## BACKGROUND

As family planning reduces maternal mortality, unintended pregnancies, and enables women to work and be educated, equal access to family planning services is essential for both women's health and empowerment.[1, 2] Family planning services are important in combating unintended pregnancies, spacing births, allowing for individual control of family sizes and in providing accurate information on sexual and reproductive health issues.

Effective contraception has had profound public health benefits in reducing maternal and infant mortality worldwide.[1]

However, worldwide women with different income levels often have unequal access to family planning services, as commonly, the service provision is divided according to different income or age groups, and the quality of the services and variety of methods offered differs by providers and funding sources.[1, 3–6] More equal service provision could reduce disparities in sexual health, as women with no contraceptive service visits have markedly higher odds of being non-users of contraception.[7]

Providing all women access to comprehensive family planning services could improve the use of most effective contraceptive methods. By offering all women the same possibility to control their fecundity this might also reduce sexual health disparities and enable universal reproductive autonomy.[8] Still, even if services are provided equally for all women, not all women are reached with the services, which can create gaps in sexual health across different groups of women. For example, non-native and migrant women have lower rates of sexual health service use in the USA. [9]

In Finland, all citizens are entitled to publicly funded health services, including contraceptive services (but not contraceptives) free of charge since 1975.[10] Private service providers offer services alongside the public system, but only a third of all family planning visits occur

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3 in the private sector with considerable variation between different communities.[11, 12]  
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5 Finland has a very low induced abortion rate compared worldwide [13, 14], but still  
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7 disparities in sexual health in different socioeconomic and educational groups continue to  
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9 exist, with the highest educational group experiencing the least amount of abortions. [15]  
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13 The city of Vantaa, the fourth most populated city (population 228,166 in 2019) in Finland,  
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15 provides contraceptive services at family planning clinics offering comprehensive  
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17 contraceptive services for all women of reproductive age. The services are frequently used  
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19 with 25% of women aged 15-25 years attending the clinics annually. [16]  
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23 The family planning clinics of Vantaa, together with Finnish national registers, provided us  
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25 with a unique opportunity to assess the use of universal contraceptive services in a female  
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27 population according to demographic and reproductive characteristics. More detailed  
28  
29 information on the users and non-users of such comprehensive family planning  
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31 services could be used to create, optimise, and modify family planning services to better  
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33 reach the women in need of them.  
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37 In the present study, we assessed sociodemographic and reproductive characteristics  
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39 associated with use and non-use of the universally offered municipal, free-of-charge family  
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41 planning services of the city of Vantaa during 2013–2014.  
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## 48 **METHODS**

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50 This cross-sectional regional cohort study included all 15-44-year-old female residents  
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52 (n=54,721) of the city of Vantaa in 2013 as identified from the city's Central Population  
53  
54 Register. Based on patient records of the city's primary care family planning clinics, we  
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56 identified women who used the services between January 2013 and December 2014. To  
57  
58 assess sociodemographic and reproductive characteristics, we derived and combined the data  
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3 from the Finnish national and health care registers using a personal identification number  
4 assigned to every resident in Finland since the 1960s.  
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8 The family planning clinics in the city of Vantaa provide comprehensive services  
9 including contraceptive counselling, a wide mix of hormonal contraceptives, long-  
10 acting reversible contraceptive (LARC) methods, emergency contraception, screening  
11 and treatment for vaginal and sexually transmitted infections (STI), counselling on  
12 sexuality related questions, and abortion referrals and post-abortion follow-up. The  
13 public health nurses and midwives are responsible for contraceptive counselling and  
14 follow-up, whereas general practitioners provide consultation, prescriptions, and  
15 insertions of LARC methods.  
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27 Since 2013, every woman has been entitled to her first LARC method free of charge.  
28 During 2013–2014, women aged under 20 years received a nine-month supply of birth  
29 control pills or contraceptive vaginal rings at no cost. All women receive a three-  
30 month supply of pills or rings when starting or switching contraception. Information  
31 on the contraceptive services are provided in Finnish, Swedish, and English on the  
32 City's website. Interpreter services are provided if needed.  
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42 During the 2013–2014 study period, women using hormonal contraception were  
43 invited for follow-up annually or within 18 months, and to contact the clinics if they  
44 had problems concerning their method or wished to switch their method. Women  
45 using LARCs were invited to visit for follow-up within a year of initiation in 2013,  
46 and since 2014 were instructed to contact the clinics only in case of problems or if  
47 they wished to have the device removed.  
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56 The Central Population Register of Vantaa provided the number of women in Vantaa, data on  
57 date of birth, marital status, and native language. Marital status was defined as married or  
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3 unmarried, cohabitations are not registered in Finland. There is no information on ethnicity or  
4 race recorded in the Finnish registers. Instead, Population Registers record self-reported  
5 information on native language, which we used as a proxy of ethnic variation and divided the  
6 study population into native (Finnish or Swedish) speakers and others. Statistics Finland  
7 provided data on educational and socioeconomic status. Educational status was defined  
8 according to International Standard Classification of Education and divided into five groups  
9 (Table 1). Only educational attainments above basic education are statistically recorded in  
10 Finland. Socioeconomic status was divided according to Statistics Finland's standards into  
11 five groups (Table 1).

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The Finnish Institute of Health and Welfare registers data on births, induced abortions,  
sterilisations, STIs, outpatient visits, and hospital-care episodes and care episodes in primary  
health care. The International Statistical Classification of Diseases and Related Health  
Problems, 10<sup>th</sup> Revision diagnoses are registered at visits in primary and specialised care, and  
on hospital care episodes. The registers are comprehensive, validated, and of high  
quality.[17–19]

We obtained data on prior sterilisations, births, induced abortions, STIs, diagnoses of mental  
health disorders in adulthood (F10-69 and F99, excluding nicotine dependence, F17), and  
gynaecological morbidities (N80, endometriosis; N92 Excessive, frequent and irregular  
menstruation; N93 Other abnormal uterine and vaginal bleeding; N94 Pain and other  
conditions associated with female genital organs and menstrual cycle) in both specialised and  
primary care from the registers maintained by The Finnish Institute of Health and Welfare.  
The number of women with diagnosis of endometriosis (n=325) or other abnormal uterine  
and vaginal bleeding (n=153) was low and thus these diagnoses were omitted from the  
analyses. We included all births and induced abortions available in the registers since 1987.  
We analysed parity, history of induced abortions and STIs as two-level variables — history

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3 or no history. We included the above-mentioned diagnoses within the previous two years to  
4 assess associations of gynaecological and psychiatric morbidities with use of family planning  
5 services, and history of STIs as it indicates sexual activity.  
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## 10 **Statistical analyses**

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13 We studied the association between the use of contraceptive services, and  
14 sociodemographic and reproductive characteristics by applying univariate and multivariable  
15 logistic regression models. We evaluated the variation in the probability of using the services  
16 with age by fitting a restricted cubic spline (Supporting Information Figure S1), based on  
17 which age was divided into five groups: 15–19, 20–24, 25–29, 30–34 and 35–44 years. As  
18 previous literature is lacking on factors associated with use of universal, municipal  
19 contraceptive services, we selected variables to the descriptive multivariable model, if  
20 those were significantly ( $P < 0.05$ ) associated with service use in univariate analysis  
21 and remained significant when added to multivariable model. From the final model,  
22 we calculated odds ratios (ORs) with 95% confidence intervals (CIs).  
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37 To have more detailed information on the associations of age with service use, we  
38 explored the interactions of age with the other variables, and then continued to  
39 analyses stratified by age groups.  
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45 All analyses were conducted using statistical software R 3.6.3.[20]  
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## 50 **Ethical approval**

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53 Approvals were obtained from the register-keeping organizations of all registers used in this  
54 study: The Finnish Institute of Health and Welfare (THL/572/5.05.00/2016), Statistics  
55 Finland (TK-53-611-17) and the City of Vantaa (VD/9786/13.00.00/2015).  
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## RESULTS

In the city of Vantaa, during 2013-2014 altogether 11,790 women aged 15–44 years used the family planning services, whereas 42,931 women did not (Figure 1). The characteristics of the women using and not using the services are presented in Table 1. The service users were younger than the non-service users. The probability to use the services was highest in women aged 23 years (Supporting Information Figure S1).

The service users were less often married, non-native speakers or parous, but more often had history of abortion or had had a delivery or an STI within the previous two years compared to non-service users. In univariate analyses (Supporting Information Table S1), all the sociodemographic and reproductive characteristics studied showed a significant association with the odds of service use and were studied further with multivariable analysis. All these candidate variables remained significant in the multivariable analysis and were included in the final multivariable model (Supporting Information Table S1). Service use was positively associated with young age, being non-sterilised and history of delivery, induced abortion; STI; excessive, frequent, and irregular menstruation (N92); or pain and other conditions associated with female genital organs and menstrual cycle (N94). In contrast, high socioeconomic and educational status were associated with less use of services.

As age had significant interactions with many of the variables (Supporting Information Table S1), we performed multivariable analyses stratified by age groups (Table 2, Supporting Information Table S2). In the age-stratified logistic regression model (Table 2, Figure 2), the OR of service use varied with age for marital status, history of delivery, native language, socioeconomic status, and education. Among teenagers being non-married, or having history of delivery, induced abortion, STI or history of pain and other

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3 conditions associated with female genital organs and menstrual cycle (N94), were positively  
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5 associated with service use. However, speaking a non-native language was negatively  
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7 associated with service use. For women speaking another native language than  
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9 Finnish/Swedish, those aged under 30 were less likely to use the services, but those  
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11 aged 30–34 years were equally as likely, and those aged 35–44 years more likely than  
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15 women speaking Finnish/Swedish.  
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## DISCUSSION

In the city of Vantaa, we found that women aged 25 years or younger were more likely to use the municipal free-of-charge contraceptive services. Moreover, women who had delivered, or had a history of induced abortion or STI, also had increased odds of using the services. In contrast, women with a foreign native language aged under 30 used the services less. Women with high socioeconomic status or high educational level tended to use the services less compared to women with lower education or socioeconomic status. In contrast, low socioeconomic status was associated with lower odds of service use among women younger than 25. Having received diagnoses of excessive or irregular menstruation or menstrual pain, and mental health disorder diagnosis among women aged over 34, was associated with higher odds of service use.

The high proportion of young women in service users is in line with previous studies from the US and UK.[4, 21–23] Young age, parity, and history of induced abortion and STI are all linked to sexual activity and/or fertility. Young, and especially teenage women are unlikely to have pregnancy intentions.[24, 25]

As previous studies on users of family planning services are based on data on aggregated level, knowledge on parity, previous abortions, and history of STIs on use of family planning services is scarce. In the UK, nulliparous women had a higher prevalence of service use compared to parous women, a contradicting finding compared to our data.[21] These differences could be due to differences in legislations and/or service provision. In Finland, all women are invited to post-delivery follow-up visit, and are required to have such a check-up in order to receive maternity allowances. Recommendations, national guidelines, and legislation require that contraception is discussed during these visits.[26] Thus, the higher odds of service use seen for parous women is likely to reflect both higher fertility awareness

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3 and thus higher need for the services compared to nulliparous women. Interestingly, in a  
4 recent study from Finland, parous women were less likely to use hormonal contraception, but  
5 in our study were more likely to use the contraceptive services.[27] This likely represents  
6 high use of LARC methods in parous women. In fact, parous women were more likely to  
7 choose LARC methods compared to nulliparous women at the family planning clinics of  
8 Vantaa. [28]  
9

10  
11 Similarly, women with history of induced abortion were most likely aware of the services and  
12 had higher odds of service use across all age groups. Surprisingly, the recent Finnish study  
13 found that women with history of induced abortion had lower rates of hormonal contraceptive  
14 use. [27] But again, especially young women with a history of induced abortion were more  
15 likely to choose LARC methods, which can explain the discrepancy in the studies. [28]  
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18 Young women speaking a foreign native language were less likely to use the services  
19 compared to native-speaking women. This is in line with previous studies reporting that  
20 immigrants commonly use health services less or at most similarly as native populations.[9]  
21 In the US, migrant women use sex-related health services as a whole at lower rates compared  
22 to native women.[29] In Finland, non-native women are a diverse group that can have  
23 different needs and family planning strategies compared to native women. The non-use of  
24 services by young women with a foreign native language may in some ethnic groups be  
25 linked to perception of sexual activity not being permissible for unmarried young women or  
26 to pregnancy intentions at a younger age. In contrast, higher use of services among older non-  
27 native women may be explained by having needs for spacing births and/or having learned of  
28 the public services through maternity care received previously.  
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31 Women of all age groups with lower educational level had increased odds of public  
32 contraceptive service use compared to women with the highest education. This finding could  
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3 reflect higher need of services and/or less likely use of other contraceptive service options,  
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5 namely private health care among women with lower educational level. A UK study similarly  
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7 found that women with the highest education level had the lowest overall prevalence of  
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9 contraceptive service use.[21] There are recent observations in Finland that fecundity is  
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11 declining in all other, but not in the highest educational levels, which could infer differences  
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13 in family planning strategies and subsequently needs for using family planning services.[30]  
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16 Age modified the association of socioeconomic status with service use. Women older than 30  
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18 that were unemployed, or students had higher odds of service use compared to same aged  
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20 women that were upper-level employees. This is likely to be due to upper-level employees  
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22 having more access to private health care. Young female students had lower odds of service  
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24 use which is likely to represent use of student health care.  
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30 Compared to the whole of Finland, the sociodemographic characteristics of city of  
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32 Vantaa are rather similar. However, there is a larger proportion of fertile aged women  
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34 (i.e. 15–44-year olds [21% vs. 18% in 2013]), of non-native speakers (13.4% vs.  
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36 5.3%) and a smaller proportion of unemployed (10% vs. 12% in 2013-2014), but  
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38 similar proportion of students (7% vs. 8%).[14]  
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45 The use of public Finnish family planning services is socially more equally distributed  
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47 compared to US settings, where the majority of users in public family planning clinics are of  
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49 low income.[4, 23] The rate of induced abortion in Finland (8.1 per 1000 women aged 15-49  
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51 years) and in Vantaa (8.8) - and presumably also the rate of unintended pregnancy - are low  
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53 compared to most of the world (39/1000), including Europe and North-America  
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55 (17/1000).[13, 14] In US studies, women of low socioeconomic or education status use  
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57 contraceptives at lower rates and experience higher rates of unintended pregnancies than  
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3 women of higher socioeconomic status or education, although these disparities and rates of  
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5 unintended pregnancies have declined.[7, 31, 32]  
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8 Women with excessive or painful menstruation are likely to have higher needs for family  
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10 planning services as hormonal contraceptives are often used as the first line therapy to  
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12 manage these symptoms. Having diagnoses of gynaecological ailments or mental health  
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14 disorders are also markers of the use of public services, which are thus familiar and likely be  
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16 used more. Women with recent or current mental health disorders may also have increased  
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18 need for contraception.  
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23 The strengths of our study include complete coverage of all women in Vantaa and of all the  
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25 users of the contraceptive services during 2013–2014, as well as use of the comprehensive  
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27 and validated Finnish register data. The international generalisability of our results is limited  
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29 as the Finnish health care system differs from many health care systems worldwide. The City  
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31 of Vantaa also offers family planning services differently compared to Finland nationally, as  
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33 in many municipalities specialized family planning services are offered only for young  
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35 women. Still, our results on age, marital status, and nativity are quite similar to interview-  
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37 based National Survey of Family Growth data on use of contraceptive services overall in the  
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39 US.[4] However, the native language in the registers is self-reported, and women can have  
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41 differing preferences on which language to report as a native language. Also, women  
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43 cohabiting with a man were not registered as married, as cohabitation is not registered in  
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45 Finland. As satisfied LARC users do not visit the clinics for regular check-ups despite being  
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47 within the reach of the services, these women may be missing from the service users. Use of  
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49 LARC methods increased in Vantaa after initiation of an ongoing program offering all  
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51 women their first LARC method free of charge in 2013.[16] The program may also have  
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53 influenced the user profile of the family planning services. Future research is needed on user  
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3 satisfaction on family planning services to facilitate their further development to better reach  
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5 the women in need of them  
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8 In conclusion, it is important to acknowledge the higher needs of young women and the  
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10 differences in needs of underrepresented groups, especially non-native women, to  
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12 optimize access to and use of family planning services.  
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## COMPETING INTERESTS

Author TS has received payments for lectures from Novartis and Bayer. Author OH serves occasionally on advisory boards for Bayer AG, Gedeon Richter, HRA-Pharma, Sandoz A/S and Vifor Pharma, and has designed and lectured at educational events of these companies. The remaining authors report no conflict of interest.

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## Tables:

**Table 1. Characteristics of 15–44-year-old women according their use of the family planning services of the city of Vantaa, Finland, during 2013–2014.**

| Characteristic                          | All<br>(n=54,721)<br>n (%) | Service-users<br>(n=11,790)<br>n (%) | Non-<br>service-<br>users<br>(n=42,931)<br>n (%) | <i>P</i> -value <sup>b</sup> |
|---|----------------------------|--------------------------------------|--|------------------------------|
| <b>Age <sup>a</sup>, years</b>          | 28.8 (22.1,<br>36.2)       | 26.5 (21.2,<br>33.1)                 | 29.6 (22.5,<br>37.0)                             | <0.001                       |
| <b>Age categories, years</b>            |                            |                                      |  | <0.001                       |
| 15–19                                   | 9,125 (17)                 | 2,163 (18)                           | 6,962 (16)                                       |                              |
| 20–24                                   | 10,803 (20)                | 2,992 (25)                           | 7,811 (18)                                       |                              |
| 25–29                                   | 9,815 (18)                 | 2,334 (20)                           | 7,481 (17)                                       |                              |
| 30–34                                   | 9,259 (17)                 | 2,055 (17)                           | 7,204 (17)                                       |                              |
| 35–44                                   | 15,719 (29)                | 2,246 (19)                           | 13,473 (31)                                      |                              |
| <b>Married</b>                          | 19,771 (36)                | 3,483 (30)                           | 16,288 (38)                                      | <0.001                       |
| <b>History of delivery</b>              |                            |                                      |  | <0.001                       |
| No                                      | 34,803 (64)                | 6,884 (58)                           | 27,919 (65)                                      |                              |
| Within the previous<br>two years        | 5,848 (11)                 | 2,151 (18)                           | 3,697 (9)  |                              |
| More than two years<br>prior            | 14,070 (26)                | 2,755 (23)                           | 11,315 (26)                                      |                              |
| <b>Number of deliveries</b>             |                            |                                      |  | <0.001                       |
| 0                                       | 34,803 (64)                | 6,884 (58)                           | 27,919 (65)                                      |                              |
| 1                                       | 7,451 (14)                 | 1,861 (16)                           | 5,590 (13)                                       |                              |
| 2                                       | 8,472 (15)                 | 2,093 (18)                           | 6,379 (15)                                       |                              |
| 3 or more                               | 3,995 (7)                  | 952 (8)                              | 3,043 (7)  |                              |
| <b>Age at first birth, years</b>        |                            |                                      |  | <0.001                       |
| 14–19                                   | 1,640 (3)                  | 525 (4)                              | 1,115 (3)  |                              |
| 20–24                                   | 5,937 (11)                 | 1,677 (14)                           | 4,260 (10)                                       |                              |
| 25–29                                   | 7,171 (13)                 | 1,649 (14)                           | 5,522 (13)                                       |                              |
| 30 or more                              | 5,170 (9)                  | 1,055 (9)                            | 4,115 (10)                                       |                              |
| <b>Sterilised</b>                       | 978 (2)                    | 123 (1)                              | 855 (2)  | <0.001                       |
| <b>History of induced<br/>abortions</b> |                            |                                      |  | <0.001                       |
| No                                      | 47,010 (86)                | 9,701 (82)                           | 37,309 (87)                                      |                              |

|  |             |             |             |        |
|--|-------------|-------------|-------------|--------|
| Within the previous two years                                  | 1,356 (2)   | 478 (4)     | 878 (2)     |        |
| More than two years prior                                      | 6,355 (12)  | 1,611 (14)  | 4,744 (11)  |        |
| <b>Number of prior abortions</b>                               |             |             |             | <0.001 |
| 0  | 47,010 (86) | 9,701 (82)  | 37,309 (87) |        |
| 1  | 5,629 (10)  | 1,504 (13)  | 4,125 (10)  |        |
| 2  | 1,435 (3)   | 409 (3)     | 1,026 (2)   |        |
| 3 or more  | 647 (1)     | 176 (1)     | 471 (1)     |        |
| <b>Native language</b>   |             |             |             | <0.001 |
| Finnish or Swedish   | 43,283 (79) | 10,014 (85) | 33,269 (77) |        |
| Other  | 11,438 (21) | 1,776 (15)  | 9,662 (23)  |        |
| <b>Socioeconomic status<sup>c</sup></b>                        |             |             |             | <0.001 |
| Upper-level employees <sup>d</sup>                             | 6,493 (12)  | 1,001 (8)   | 5,492 (13)  |        |
| Lower-level employees or manual workers <sup>e</sup>           | 28,438 (52) | 6,796 (58)  | 21,642 (50) |        |
| Students   | 8,778 (16)  | 2,000 (17)  | 6,778 (16)  |        |
| Long-term unemployed   | 3,782 (7)   | 912 (8)     | 2,870 (7)   |        |
| Entrepreneurs, pensioners, and others not elsewhere classified | 4,631 (8)   | 1,018 (9)   | 3,613 (8)   |        |
| Unknown  | 2,599 (5)   | 63 (1)      | 2,536 (6)   |        |
| <b>Education level</b>   |             |             |             | <0.001 |
| Doctoral, master, or equivalent level                          | 5,093 (9)   | 705 (6)     | 4,388 (10)  |        |
| Bachelor or equivalent level                                   | 9,074 (17)  | 1,770 (15)  | 7,304 (17)  |        |
| Short-cycle tertiary education                                 | 2,642 (5)   | 302 (3)     | 2,340 (5)   |        |
| Upper secondary education                                      | 20,774 (38) | 5,280 (45)  | 15,494 (36) |        |
| Unknown <sup>f</sup>   | 17,138 (31) | 3,733 (32)  | 13,405 (31) |        |
| <b>History of sexually transmitted infections<sup>g</sup></b>  |             |             |             | <0.001 |
| No   | 49,298 (90) | 9,977 (85)  | 39,321 (92) |        |
| Yes  | 5,423 (10)  | 1,813 (15)  | 3,610 (8)   |        |
| <b>History of endometriosis (N80)<sup>h</sup></b>              | 325 (1)     | 36 (0)      | 289 (1)     | <0.001 |

|   |            |            |            |        |
|---|------------|------------|------------|--------|
| <b>History of excessive, frequent, and irregular menstruation (N92)<sup>h</sup></b>                                     | 940 (2)    | 254 (2)    | 686 (2)    | <0.001 |
| <b>History of other abnormal uterine and vaginal bleeding (N93)<sup>h</sup></b>   | 153 (0)    | 53 (0)     | 100 (0)    | <0.001 |
| <b>History of pain and other conditions associated with female genital organs and menstrual cycle (N94)<sup>h</sup></b> | 506 (1)    | 166 (1)    | 340 (1)    | <0.001 |
| <b>History of mental health disorder diagnoses in adulthood (F10–69,99)<sup>h,i</sup></b>                               | 5,860 (11) | 1,610 (14) | 4,250 (10) | <0.001 |

<sup>a</sup> Median (IQR, interquartile range)

<sup>b</sup> T-test for continuous variables,  $\chi^2$ -test for categorical variables

<sup>c</sup> Socioeconomic status of the youngest age group could also be derived from their family's socioeconomic status.

<sup>d</sup> Administrative, managerial, professional, and related occupations

<sup>e</sup> Administrative and clerical occupations or manual workers

<sup>f</sup> Comprises women with only basic education, as well as without education in Finland, and those not graduating elementary school

<sup>g</sup> Chlamydia, gonorrhoea, or syphilis

<sup>h</sup> Diagnosed within two previous years in primary or specialised care

<sup>i</sup> Excluding nicotine dependence (F17)

**Table 2. Adjusted Odds Ratios (AORs) for factors associated with using the family planning services of city of Vantaa, Finland, during 2013–2014 stratified in age groups.**

| Characteristic                     | 15–19 years<br>AOR <sup>a</sup> (95% CI) | 20–24 years<br>AOR <sup>a</sup> (95% CI) | 25–29 years<br>AOR <sup>a</sup> (95% CI) | 30–34 years<br>AOR <sup>a</sup> (95% CI) | 35–44 years<br>AOR <sup>a</sup> (95% CI) |
|------------------------------------|--|--|--|--|--|
| <b>Marital status</b>              |  |  |  |  |  |
| Married                            | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Not married                        | 3.51 (2.44–5.06)                         | 1.82 (1.60–2.07)                         | 1.38 (1.24–1.53)                         | 1.15 (1.04–1.29)                         | 1.04 (0.94–1.14)                         |
| <b>History of delivery</b>         |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.67 (1.05–2.66)                         | 2.01 (1.74–2.32)                         | 2.44 (2.20–2.72)                         | 2.51 (2.24–2.81)                         | 2.50 (2.21–2.83)                         |
| <b>Sterilised</b>                  |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.00 (0.08–11.86)                        | 0.41 (0.04–4.08)                         | 0.56 (0.26–1.20)                         | 0.68 (0.45–1.02)                         | 0.50 (0.40–0.64)                         |
| <b>History of induced abortion</b> |  |  |  |  |  |
| No                                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Yes                                | 1.47 (1.11–1.96)                         | 1.35 (1.18–1.55)                         | 1.07 (0.94–1.22)                         | 1.24 (1.09–1.41)                         | 1.15 (1.03–1.28)                         |
| <b>Native language</b>             |  |  |  |  |  |
| Finnish or Swedish                 | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     | Ref.                                     |
| Other                              | 0.48 (0.39–0.57)                         | 0.54 (0.47–0.63)                         | 0.79 (0.69–0.91)                         | 1.04 (0.90–1.21)                         | 1.23 (1.08–1.40)                         |

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**Socioeconomic status**

|  |                  |                   |                   |                  |                  |                  |
|--|------------------|-------------------|-------------------|------------------|------------------|------------------|
| Upper-level employees  |                  |                   | Ref.              | Ref.             | Ref.             |                  |
| Lower-level employees or manual workers                        |                  | Ref. <sup>b</sup> | Ref. <sup>b</sup> | 1.11 (0.92–1.34) | 1.30 (1.10–1.53) | 1.29 (1.11–1.48) |
| Students   | 0.49 (0.43–0.55) | 0.75 (0.67–0.85)  | 1.20 (0.94–1.52)  | 1.20 (0.92–1.58) | 1.46 (1.10–1.94) |                  |
| Long-term unemployed   | 0.72 (0.55–0.93) | 0.91 (0.75–1.10)  | 1.19 (0.93–1.52)  | 1.32 (1.04–1.66) | 1.46 (1.19–1.79) |                  |
| Entrepreneurs, pensioners, and others not elsewhere classified | 0.76 (0.61–0.95) | 0.79 (0.67–0.93)  | 0.95 (0.75–1.21)  | 1.04 (0.83–1.30) | 1.15 (0.94–1.41) |                  |
| Unknown  | 0.04 (0.01–0.11) | 0.08 (0.05–0.14)  | 0.20 (0.12–0.33)  | 0.19 (0.11–0.36) | 0.33 (0.18–0.60) |                  |

**Education level**

|                                       |                  |                   |                   |                  |                  |                  |
|---------------------------------------|------------------|-------------------|-------------------|------------------|------------------|------------------|
| Doctoral, master, or equivalent level |                  |                   | Ref.              | Ref.             | Ref.             |                  |
| Bachelor or equivalent level          |                  | Ref. <sup>c</sup> | Ref. <sup>c</sup> | 1.41 (1.13–1.76) | 1.12 (0.94–1.33) | 1.26 (1.06–1.49) |
| Short-cycle tertiary education        |                  |                   |                   | 1.98 (1.08–3.64) | 0.65 (0.38–1.13) | 0.73 (0.60–0.88) |
| Upper secondary education             |                  |                   |                   | 1.82 (1.46–2.26) | 1.20 (1.00–1.44) | 1.18 (1.00–1.40) |
| Unknown <sup>d</sup>                  | 1.86 (1.63–2.13) | 1.16 (1.03–1.31)  | 1.67 (1.31–2.12)  | 1.30 (1.06–1.61) | 1.11 (0.92–1.34) |                  |

**History of sexually transmitted infection<sup>e</sup>**

|     |                  |                  |                  |                  |                  |
|-----|------------------|------------------|------------------|------------------|------------------|
| No  | Ref.             | Ref.             | Ref.             | Ref.             | Ref.             |
| Yes | 1.70 (1.33–2.19) | 1.66 (1.46–1.88) | 1.32 (1.17–1.51) | 1.30 (1.13–1.49) | 1.60 (1.36–1.89) |

**History of excessive, frequent, and irregular menstruation (N92)<sup>f</sup>**

|                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|
| 1.12 (0.74–1.69) | 1.37 (0.97–1.94) | 1.17 (0.80–1.69) | 1.04 (0.71–1.53) | 1.27 (0.98–1.65) |
|------------------|------------------|------------------|------------------|------------------|

|   |                  |                  |                  |                  |                  |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>History of pain and other conditions associated with female genital organs and menstrual cycle (N94)<sup>f</sup></b> | 1.86 (1.32–2.61) | 1.38 (0.96–2.00) | 1.20 (0.74–1.94) | 1.15 (0.64–2.10) | 1.48 (0.85–2.57) |
| <b>History of mental health disorder diagnoses in adulthood (F10–69,99)<sup>f,g</sup></b>                               | 1.15 (0.99–1.34) | 1.08 (0.94–1.23) | 0.97 (0.83–1.14) | 1.04 (0.88–1.23) | 1.47 (1.28–1.70) |

<sup>a</sup> Acquired with logistic regression.

<sup>b</sup> The two categories combined due to small numbers among women younger than 25 years.

<sup>c</sup> The four categories were combined due to small numbers among women younger than 25 years.

<sup>d</sup> Comprises women with only basic education, as well as without education in Finland, and those not graduating elementary school

<sup>e</sup> Chlamydia, gonorrhoea, or syphilis

<sup>f</sup> Diagnosed within two previous years in primary or specialised care

<sup>g</sup> Excluding nicotine dependence (F17)

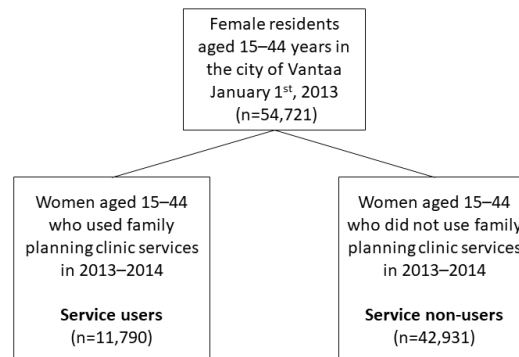


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3 **Figure legends:**  
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6 Figure 1. Flow chart of the formation of study cohorts.  
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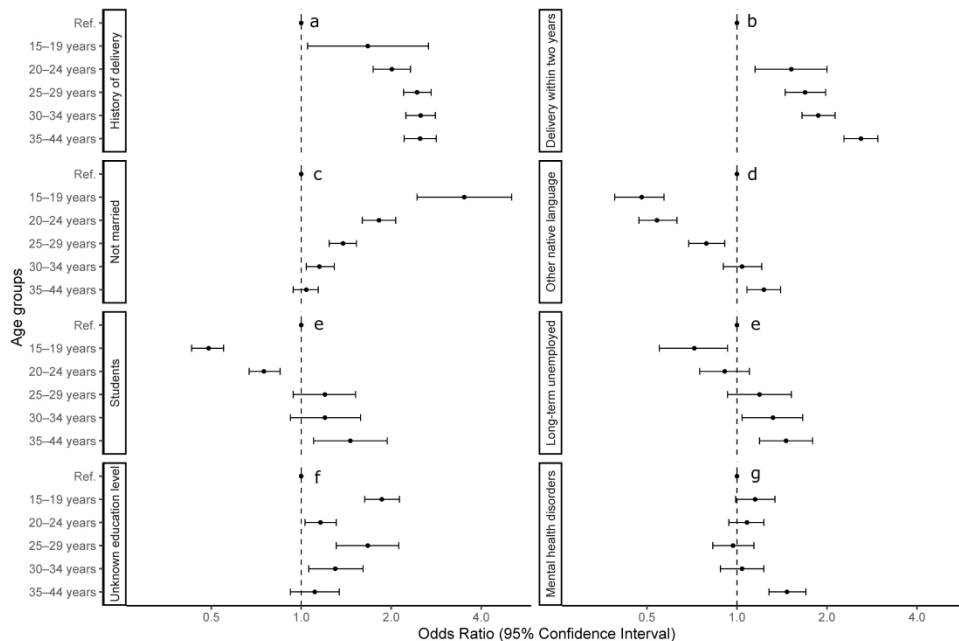
8  
9 Figure 2. Forrest plot of adjusted odds ratios (ORs) with 95% confidence intervals (CIs) of  
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11 characteristics associated with using the family planning services of the city of Vantaa,  
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13 Finland, during 2013–2014 according to age-stratified multivariate model.  
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For Peer Review Only



25 Figure 1. Flow chart of the formation of study cohorts.

26 338x190mm (96 x 96 DPI)



a No history of delivery  
 b Delivery more than two years prior  
 c Married  
 d Native language Finnish/Swedish  
 e 15-24 years: Upper- or lower-level employees or manual workers; 25-44 years: Upper-level employees  
 f 15-24 years: Educational attainments above basic education; 25-44 years: Doctoral, master, or equivalent level education  
 g No history of mental health disorders (F10-F69, F99) in adulthood

Figure 2. Forrest plot of adjusted odds ratios (ORs) with 95% confidence intervals (CIs) of characteristics associated with using the family planning services of the city of Vantaa, Finland, during 2013-2014 according to age-stratified multivariate model.

294x241mm (600 x 600 DPI)