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Ultra-low fertility with traditional contraceptives -a case study of Tehran city[1]

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Abstract

Despite stringent restrictions on modern contraceptives under Iran's pronatalist policy, the women of the capital city Tehran have displayed remarkable motivation to control their fertility by resorting to traditional contraceptives. This study examines the factors shaping their contraceptive behaviour. Data on 400 married women of Tehran aged 15-49 years, collected through structured questionnaires are analysed by using SPSS 24 employing both bivariate (χ^2- Test), and multivariate (Multiple Logistic Regression) statistics. Over 75% of the sampled women use some form of contraception. Among users, withdrawal is the most popular traditional contraceptive, while condom is the most popular modern contraceptive. Educational attainment is the key factor influencing contraceptive use. The cooperation of husbands has played a pivotal role, significantly impacting the practice of withdrawal ($p < 0.01$). Education is of paramount importance in guiding women's contraceptive choices. It is urgent disseminate accurate information regarding the correct use of traditional methods, particularly withdrawal. Understanding the nuances of the reproductive cycle is instrumental in averting unplanned pregnancies. These insights hold significant implications for policymakers and healthcare providers, offering essential guidance to support well-informed family planning decisions among the women of Tehran, and by extension, the broader society.

Keywords

Contraceptives, Modern, Tehran, Traditional, Withdrawal

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Introduction

Iran has experienced a remarkable reduction in fertility over the past few decades. Between 1986 and 2011, Iran's total fertility rate (TFR) plummeted from 6.6 to 1.8, marking a substantial change in the reproductive performance of Iranian women (Abbasi-Shavazi et. al. 2013; Statistical Center of Iran, 2016). Except for a temporary increase in the TFR to 2.01 in 2016, Iran's total fertility rate has continued to decline, reaching 1.71 in 2019 (Fathi, 2021). This decline has raised concerns among policymakers and politicians regarding the potential long-term implications of declining fertility, including population ageing and a shrinking of the working-age population. Consequently, there has been a re-emphasis on pro-natalist population policies reminiscent of those employed in the 1980s. In 2021, this renewed focus culminated in the enactment of the "Rejuvenation of the Population and Support of Family Law" (Islamic Parliament of Iran, 2021), a legislation designed to encourage higher fertility among married couples. Under this policy, the government provides incentives to promote childbirth, imposes restrictions on the distribution of free or subsidized modern contraceptives and sterilisation procedures, and allows oral contraceptives to be made available only through pharmacies with a doctor's prescription.

Despite these governmental measures the women of Iran, in particular those living in the capital city Tehran, who exhibit some of the lowest fertility rates in the country have strategically employed various methods to limit their family size. Even in the face of birth control program restrictions, these women have chosen to have fewer children than their initial desires (Hosseini et. al. 2021). Tehran has maintained a total fertility rate below replacement level for over two decades (Statistical Center of Iran, 2016; Aghajanian and Mehryar, 2007). Currently a Tehrani[6] woman has on average, 1.27 children born to her during her reproductive years (Fathi, 2021). Since a total fertility rate of 1.3 or less is defined as ultra-low fertility (Jones, 2019), the fertility of Tehrani women may be deemed to have dropped to ultra-low levels.

The desire of Tehrani women to limit future births is put into practice through one of the proximate determinants of fertility (Bongaarts et al 1990), consisting predominantly of withdrawal as a contraceptive. Most women use withdrawal, not because of any religious or cultural reason, but because its use cannot be controlled under the restrictions on modern contraceptives introduced by the government's pronatalist policies. The use of withdrawal is more popular among highly educated couples in advanced provinces such as Tehran (Abbasi-Shavazi et. al. 2004).

Aims and objectives

This paper analyses the factors influencing contraceptive use among a representative sample of married women in Tehran by examining the levels and patterns of contraceptive use based on method and socio-economic characteristics, identifying the determinants of using any contraceptive method, and exploring the specific factors influencing the preference for withdrawal as a contraceptive method among users.

[6] Women who live in Tehran.

Theoretical framework

The conceptual framework of this paper is based on two theories, namely (i) the Health Belief Model (HBM) and (ii) Social Cognitive Theory (SCT).

The Health belief Model (Champion and Skinner, 2008) posits that individuals are more likely to take preventive health-related actions if they believe that (i) they are susceptible to a health problem (perceived susceptibility), (ii) the health problem has serious consequences (perceived severity), (iii) taking a specific action would reduce their susceptibility to or severity of the health problem (perceived benefits), and (iv) the barriers to taking that action are outweighed by the benefits (perceived barriers).

The decision of Tehrani women to use contraceptives may also be viewed in the context of Social Cognitive Theory (SCT), developed by Albert Bandura (Bandura 1989; Phipps et.al., 2013). This theory emphasises the role of social influence and observational learning in shaping behaviour. According to SCT, individuals learn from observing others (modelling), evaluating the consequences of those behaviours, and making choices based on expected outcomes.

In this study, the Health Belief Model provides a framework for understanding individual perceptions of contraceptive use, including perceived susceptibility to unintended pregnancies, perceived severity of the consequences of unplanned pregnancies, perceived benefits of using contraceptives, and perceived barriers to contraceptive use. By exploring these dimensions, the study can identify factors that influence women's decisions to use or abstain from contraceptives. Additionally, the Social Cognitive Theory informs the study's exploration of social influences on contraceptive practices. By examining the role of social networks, community norms, and observational learning, the research can elucidate how social interactions and modelling contribute to the adoption and preference for specific contraceptive methods, including withdrawal.

Material and Methods

In this cross-sectional study, 400 married women of Tehran city aged 15-49 years were surveyed in 2015. This sample size allows estimations for small and large regions as well as comparison between subgroups broken down by age, educational attainment and other factors (Cochran 1977). The data collection involved the use of a validated questionnaire prepared by the first author with guidance from the second and third authors.

Tehran city, with a population of approximately 8.15 million in 2011, includes 1.57 million married women aged 15-49 years, and has an average household size of 3.3 (Statistical Center of Iran, 2011). The city comprises 22 municipal regions or districts, categorised into five development zones: (1) High, (2) Moderate to High, (3) Moderate, (4) Moderate to Low and (5) Low. One district was randomly selected from each zone, resulting in five primary sampling units (PSUs). The districts thus selected are Districts 3, 6, 8, 10, and 20. (In Tehran, the districts or zones are identified by numbers, not by names).

The units of analysis in this stidy are married women aged between 15 and 49 years. In order to select the sample of such women, a proportionate number of 400 households,

Table 1 Distribution of the sample of 400 women aged 15-49 years in each of the five selected districts. Tehran 2015.

Selected district	Total number. of married women aged 15-49 years	Proportion in each district	Sample size in each disrict allocated according to proportion
3	45,482	0.16437	66
6	30,985	0.11198	45
8	70,640	0.25530	102
10	59,617	0.21546	86
20	69,975	0.25289	101
Total	276,699	1.00	400

with at least one married woman aged between 15 and 49 years was chosen by simple random sampling from each of the five selected districts. The proportionate number in each selected district of the sample is calculated by multiplying the sample size (400) by the proportion in which the total number of married women aged 15-49 years in all the five selected districts taken together is distributed in each selected district. This is illustrated in Table 1.

If a selected household had more than one married woman aged 15-49 years, then one woman was chosen at random from among those women in that household and if a household had no married woman aged 15-49 years living there then the next randomly selected household was chosen. The sampling method employed in this study is a two-stage stratified random sampling, where Stage 1 consisted of selecting one district at random from each development zone described above, and Stage 2 involved randomly selecting the given number of households with at least one married woman aged 15-49 years from each selected zone. This two-stage approach is employed to ensure accuracy and representativeness, considering the varying population and socio-economic characteristics across te districts of Tehran city. According to Cochran (1977) this method is practical and efficient when a population is divided into sub-populations, as is the case in Tehran city.

This study focused exclusively on married women due to cultural and religious prohibitions against cohabitation and childbearing outside wedlock in Iran (Karim,1995; Dejong et.al., 2005; Razeghi, 2021). Consequently, it is also assumed that contraception is not practised outside marriage in Tehran.

Binary and multinomial logistic regression analysis have been employed in this study to examine the complex relationships between various socio-economic factors and contraceptive behaviour among the married women of Tehran. The statistical significance of any association between a predictor and the dependent variable is ascertained with a p-value <0.05. The analysis is done by using SPSS Version 24.0 (SPSS Inc., Chicago, Illinois, USA).

Results

Contraceptive use in Tehran city

In Tehran, the prevalence of contraceptive use among women of reproductive age at 2015 is high (76%). Among all the contraceptives used, withdrawal is the most widely practised method, with a prvalence of 31.7% among all women in the sample, and 40.4% among only contracepting

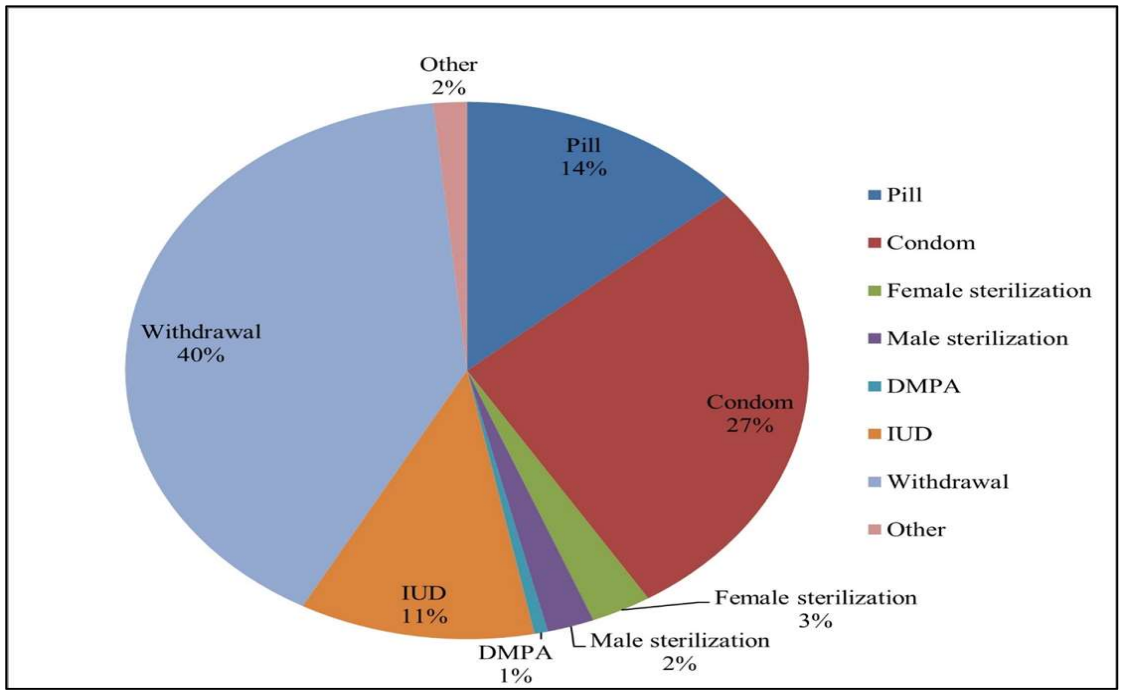

Figure 1 Contraceptive use by type among women aged 15-49 years using any contraceptive, Tehran city, 2015. Source: M. Hosseini (2012)

women. Condoms is the most prevalent modern contraceptive at 20.4% among all women in the sample and 27% among only contracepting women. Contraceptives such as oral pills and intrauterine devices (IUDs) rank as the second and third most popular modern methods respectively. Only a small percentage of women rely on sterilisation (both female and male) and DMPA injectable. The "Other" methods such as rhythm comprise only a small fraction 2% (see **Figure 1, and Tables 2, 3, 4 and 5**).

Figure 2 provides a comparative picture of contraceptive prevalence among Tehrani women for the years 2010 and 2015. The data for 2010 are sourced from the 2010 Iran Demographic and Health Survey (IDHS) (Iran Ministry of Health Education 2010), while those for 2015 are obtained from the fieldwork conducted by the first author. It is noteworthy that the use of male-initiated contraceptives, namely condom and withdrawal increased in Tehran between 2010 and 2015. As depicted in the figure, condom use increased from approximately 15% to 27%, while withdrawal use rose from 28.5% to 40% during the same period.

Figure 2 further illustrates a significant decline in the use of permanent contraceptive methods, including female and male sterilisation. At the same time, the prevalence of male-initiated methods (withdrawal and condoms) increased from 43% to 67% during the same period. Interestingly, the use of IUDs as a contraceptive method remained relatively stable, hovering at around 11% in both 2010 and 2015 (see **Figure 2**).

Figure 3 provides an insight into the dynamics of decision-making on family size (number of children), household finances, and health. This information pertains specifically to Tehran city, where the predominant family structure is nuclear,

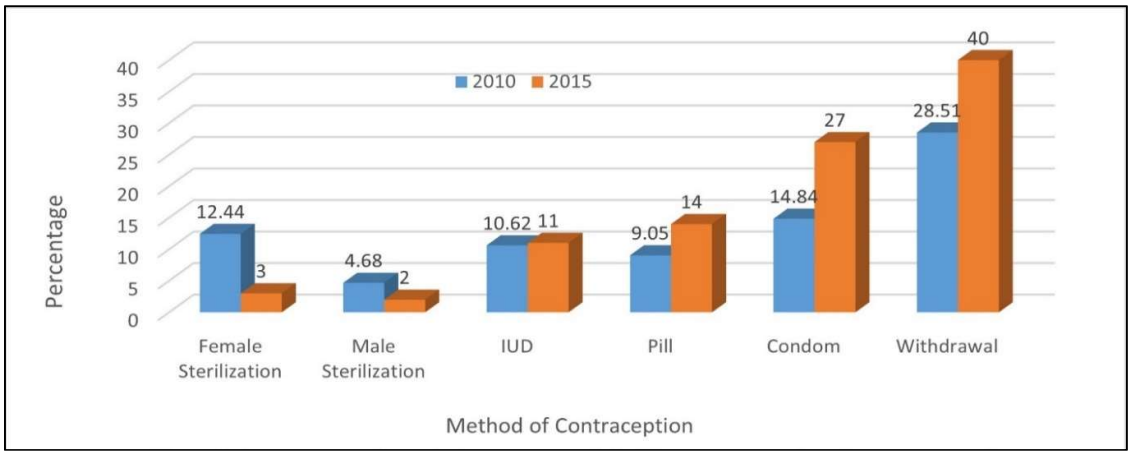

Figure 2 Percentage of married women aged 15-49 years currently using contraceptives by major methods. Tehran city, Iran 2010 and 2015. Source: M. Hosseini (2012); Iran Ministry of Health and medical Education (2010)

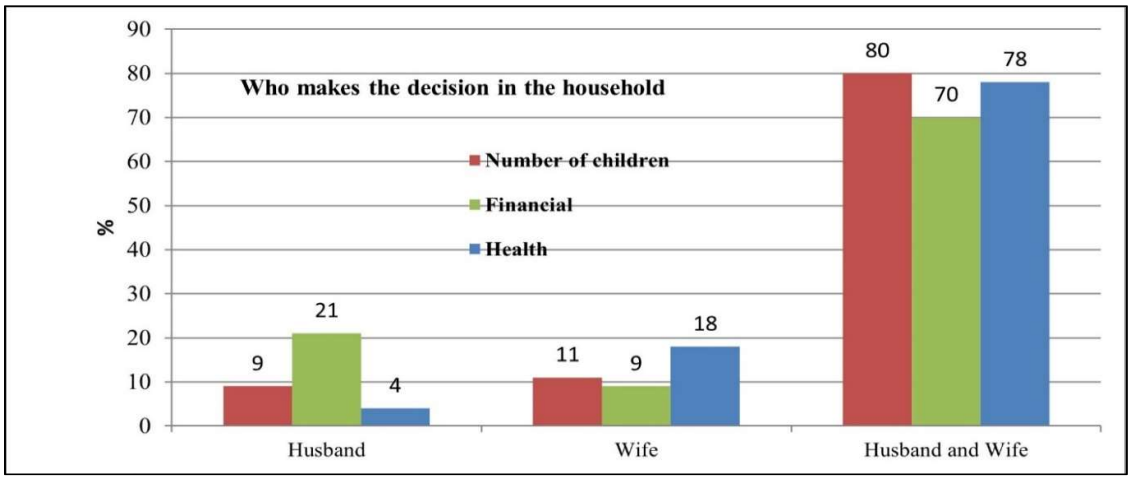

Figure 3 Percentage distribution of individuals who make family decisions about the number of children, household finances and health. Tehran 2015. Source: M. Hosseini (2012)

typically, without any active involvement of extended family members such as mothers-in-law or fathers-in-law in family-related decisions. It is worth mentioning that the trend of living in nuclear families is on the rise across the country, even in the most traditional cities (Saraee, 2006).

The information about decision-making on family size is particularly relevant to the analysis of contraceptive use in this paper. Within the context of very low fertility rates in Tehran, a substantial majority, ranging from 70% to 80% of decisions regarding family size are made jointly by the women and their husbands (see **Figure 3)**. This pattern reflects a high degree of women's empowerment within the households of Tehran city. Women in Tehran typically possess high levels of education, which equips them with the knowledge needed for the correct practice of traditional contraceptive methods. Education also empowers women to effectively negotiate with their husbands, particularly regarding traditional contraceptive methods which

have fewer associated side effects. These unique characteristics of Tehrani, and indeed Iranian women have set them apart from their counterparts in other predominantly Muslim countries like Pakistan, Egypt, and Jordan, where opposition from husbands has been identified as a risk factor for unmet needs in family planning (Casterline et.al., 2001; Mawajdeh, 2007; Kotb et.al., 2011).

Determinants of Contraceptive use in Iran and Tehran

Various demographic and socio-economic factors have consistently emerged as significant determinants of contraceptive use across different countries (Ntozi and Kabera, 1991; Dang, 1995; Mahmood and Ringheim, 1996; Joesoef et.al., 1988; Koc, 2000; Uuygur and Erkaya, 2001; Douthwaite and Ward, 2005; Kulczycki, 2008;). In the multicultural context of Iran, socio-demographic attributes such as 'age,' 'educational attainment,' 'number of living children,' and 'place of residence' are identified as key factors associated with contraceptive use (Malekafzali, 1992; Abbasi-Shavazi et.al., 2009; Hossein-Chavoshi and Abbasi-Shavazi, 2012; Razeghi Nasrabad and Alimondegari, 2019).

Table 2 shows the age distribution of women using different contraceptive methods in Tehran in 2015, revealing that a substantial majority (77.9%) of women across all age groups are actively using contraception.

The percentage of women currently using contraception appears to follow an inverted U-shaped pattern in relation to age. It increases from 70.8% in the 20-24 age group to 84.3% in the 25-29 age group before gradually declining to 65.8% in the 45-49 year age group. In spite of declining prevalence with age, nearly two-thirds of the women aged 45-49 years, who are near the end of their reproductive years are still using contraceptives.

In a general context, Table 3 reveals patterns of contraceptive methods and method-specific use that align with those seen in Table 2, reflecting a clear association between women's age and number of children, whether ever born or currently living. There is a substantial reliance on withdrawal and condom, especially on withdrawal with a prevalence of 43%, before the birth of a woman's first child.

Condom use peaks among women with one or two living children. As the number of living children increases to three or more, the prevalence of condom, pill, and withdrawal diminishes, while that of longer-acting contraceptive methods like IUD becomes more prevalent.

The information contained in Table 4 suggests some interesting associations between educational attainment and contraceptive use. While the overall contraceptive prevalence (any method) is positively associated with educational attainment, driven mainly by the high and positively associated prevalence of the use of condom and withdrawal, methods like IUD and Pill exhibit a negative association with educational attainment. This underscores the value of education in the uptake of short-acting methods like condom and traditional methods like withdrawal. The exception in this regard appears to be the short-acting method pill, the use of which shows a negative association with educational attainment. Sterilisation of both male and female is reportedly used by very small proportions of the survey respondents (less than 2% for each method) and does not appear to have a clear association with education.

Table 2 Percentage distribution of women aged 20-49 years using different methods of contraception by age, Tehran city, 2015.

Contraceptive use (% of women currently using a method)									
Age group	Any method	Sterilization		IUD	DMPA	Pill	Condom	Withdrawal	Number of women in each age group
		Female	Male						
20-24	70.8	0	0	7.1	0	17.7	10.6	35.4	20
25-29	84.3	1.4	0	7.0	0	9.9	28.1	37.9	60
30-34	84.0	1.1	0	4.1	0	11.4	30.1	37.3	81
35-39	79.0	0	1.3	11.4	1.3	10.2	19.1	35.7	63
40-44	71.9	2.7	0	13.3	0	2.7	21.3	31.9	55
45-49	65.7	3.0	14.9	14.9	3.0	3.0	12.0	14.9	23
Total Tehran	75.6	2.27	1.5	8.3	0.8	10.6	20.4	31.7	302

Note: The youngest age group, 15-19 years, represents only a small fraction (about 1%) of women using contraception and is therefore excluded from the table.
Source: M. Hosseini (2015).

Table 3 Percentage distribution of currently married women aged 20–49 years using different methods of contraception, by number of children living. Tehran city, 2015.

Percent of women using the given contraceptive									
Number of living children	**Any method**	**Sterilization**		**IUD**	**DMPA**	**Pill**	**Condom**	**Withdrawal**	**Number of women**
		Female	Male						
0	66.7	0.00	0.0	0.0	0.0	6.1	17.5	43.1	65
1	80.2	0.0	0.0	7.9	0.0	9.6	27.9	35.8	92
2	83.6	0.8	3.2	13.5	0.8	9.5	23.9	31.9	105
3+	78.2	7.8	3.9	17.6	2.0	9.8	15.6	21.5	40
Total of Tehran	75.6	2.27	1.5	8.3	0.8	10.6	20.4	31.7	302

Source: M. Hosseini (2015)

Table 4 Percentage distribution of currently married women aged 20–49 years using different methods of contraception by level of education, Tehran city, 2015.

Percent of women using the given Contraceptive									
Level of education	**Any Method**	**Sterilization**		**IUD**	**DMPA**	**Pill**	**Condom**	**Withdrawal**	**Number of women**
		Female	**Male**						
Less than diploma	0.694	0.012	0.012	0.132	0	0.144	0.251	0.144	60
Diploma	0.805	0.023	0.008	0.125	0.015	0.094	0.18	0.36	103
Bachelor degree and above	0.811	0.006	0.024	0.041	0	0.058	0.245	0.438	139
Total of Tehran	75.5	2.27	1.5	8.3	0.8	10.6	20.4	31.7	302

Source: M. Hosseini (2015)

In **Error! Reference source not found.**, the selected districts (3, 6, 8, 10, and 20) in Tehran city represent different levels of socio-economic development, ranging from high to low (Sadeghi, 2017). A Chi-square test conducted in this study (not presented here) suggests that there is no statistically significant association between contraceptive use and the districts where

women reside. This lack of significance implies that contraceptive use does not

Table 5 Percentage distribution of currently married women aged 20–49 years using different methods of contraception by level of education, Tehran city, 2015.

		Contraceptive use								
District of residence	Level of development	Any method	Sterilization		IUD	DM PA	Pill	Condom	Withdrawal	Number of women
			Female	Male						
3	High	71.9	0	1.6	8	0	3.2	9.6	49.5	45
6	Medium to high	75	2.1	0	14.6	0	14.6	12.5	31.3	36
8	Medium	80	3	5.1	6.2	0	4.1	46.2	15.4	78
10	Medium to low	72.2	1.2	0	8.7	2.5	16.2	14.9	28.7	58
20	Low	85.4	0	0	10.1	0	8	17.1	50.2	85
Total Tehran		75.5	2.27	1.5	8.3	0.8	10.6	20.4	31.7	302

Source: M. Hosseini (2015)

strongly correlate with socio-economic status of the region where the women live, as each of the selected districts exhibits high contraceptive use rates (as indicated in Table 4), with no substantial variation.

The findings reported in **Error! Reference source not found.** contradict expectations by showing that District 20, characterized by the lowest socio-economic development, has the highest prevalence of contraceptive use (85.4%), while District 3, with the highest level of development, has the lowest prevalence. This anomaly may be associated with other socio-economic factors. For instance, a review of the socio-demographic characteristics of surveyed women in Districts 3 and 20 (not presented here) reveals that due to later marriage ages in District 3, a significant portion of women aged 30-39 (43%) and 40-49 (23%) have not yet had children. This aligns with the report that 38% of District 3 residents mentioned that the intention to have a child is the reason for not using contraceptives. Conversely, in District 20, a substantial proportion (80%) of women aged 40-49 and 43% of those aged 30-39 already have at least two children. Consequently, residents aged 30-49 in District 20 are using contraceptives to prevent further childbearing. Meanwhile, contraceptive use among women aged 20-29 in this district is primarily associated with birth spacing.

Error! Reference source not found. also shows that withdrawal is the most practised method among women in Tehran across all selected districts, except for District 8. This trend mirrors the national situation. Surprisingly, there is no significant association between the percentage of women using withdrawal and their district of residence (**Error! Reference source not found.**).

In contrast to other districts where the withdrawal method is the most commonly used, in District 8 nearly one-half (46%) of contraceptive users chose condoms as their preferred method to prevent pregnancy.

Contraceptive user versus non-users, withdrawal versus modern use

It is stated earlier that factors such as women's age, the number of living children, their level of education, and their district of residence are key determinants of contraceptive use in Tehran. **Error! Reference source not found.** presents the results of a logistic regression analysis, divided into two parts: (i) factors influencing the use of any method of contraception and (ii) factors influencing the use of withdrawal among all contraceptive users. In the first model, the dependent variable is contraceptive use, categorized as "Yes" for use or "No" for non-use. In the second model, the dependent variable is withdrawal use (in contrast to a modern method), with "Yes" indicating withdrawal use and "No" indicating the use of modern methods.

The findings of the first logistic regression analysis, controlling for factors such as the number of children, level of education, and district of residence reveal that younger women are significantly more likely to use contraception compared to older women. Specifically, women aged 20-29 are 3.9 times more likely to use contraception, and women aged 30-39 are 2.4 times more likely to use contraception when compared to women in the 40-49 age group (**Error! Reference source not found.**).

A chi-square test (not displayed here) does not reveal any statistically significant relationship between age and the choice of contraceptive method (withdrawal versus modern). This absence of a relationship is further confirmed by the second logistic regression analysis (**Error! Reference source not found.**), which examines withdrawal users versus modern method users while controlling for other variables. This second logistic regression demonstrates that there is no significant association between women's age and their likelihood of using withdrawal. This is because withdrawal is equally prevalent across all age groups (**Error! Reference source not found.**). Table 3 indicates a significant relationship ($p=0.03$) between contraceptive use and the number of living children among the surveyed women in Tehran. However, after controlling for age, education, and district of residence, this relationship remains significant only among women with no children. In fact, women who have not yet had a child are 82% less likely to use any method of contraception compared to women with more than three children. Furthermore, the likelihood of using any contraceptive method does not significantly change after women have one, two, or three or more children (**Error! Reference source not found.**).

Despite the significant inverse relationship observed between withdrawal use and the number of living children in the initial analysis (Table 3), the findings of **Error! Reference source not found.**, after accounting for age, education, and district of residence indicate no significant association between the likelihood of withdrawal use (in contrast to modern method use) and the number of living children per se. This is because, although withdrawal use decreases with an increase in the number of living children, as shown in Table 3, there is no significant difference in the practice of withdrawal among women with different numbers of living children. In fact, due to higher autonomy and knowledge about family planning among women, withdrawal use is the most prevalent method of contraception, even among women with more than two children. This argument is elaborated upon below.

The data presented in Table 4 suggest a positive association between education and

contraceptive use. This is further supported by the findings in **Error! Reference source not found.**, which indicate that compared to women with only elementary school education, those with a High School/Diploma and Bachelor degree or higher are respectively two and three times more likely to use contraception. When it comes to the use of withdrawal as a contraceptive method, the results in **Error! Reference source not found.** reveal that compared to women with elementary education, those with High School and Bachelor degree education are respectively three and four and a half times more likely to use withdrawal. This suggests that education empowers women to exercise more autonomy, which in turn influences their reproductive choices.

After controlling for age, level of education, and the number of living children, the likelihood of using contraception does not significantly vary based on the level of development, as indicated by the districts of residence ranging from the highest level (District 3) to the lowest level (District 20). However, in the case of traditional contraceptive methods like withdrawal, the likelihood of use is significantly lower for women residing in districts with lower levels of development, except for women in the district with the lowest level of development, District 20.

It is previously mentioned that District 20, despite having the lowest level of development, has the highest prevalence of withdrawal use. However, after accounting for other socio-economic factors, the odds ratio for District 20 is not statistically significant, suggesting an inconclusive relationship for this district regarding the choice between withdrawal and modern contraceptives (**Error! Reference source not found.**).

The findings of this study show that, factors such as religious beliefs, lack of knowledge, cost, or accessibility did not deter contraceptive use. Instead, nearly half of the women stated their intention to have a child as the main reason for non-use.

Table 6. Odds ratios indicating the likelihood of current use of any form if contraception and using withdrawal versus modern contraception, according to socio-demographic factors. Women aged 15-49 years. Tehran city, 2015.

Variables in the equation		Any method use vs. no method-use		Withdrawal use vs. Modern use	
Number of women		N_1=293		N_2=126	
Age group (years)	20-29	**	3.87	n. s	1.56
	30-39	**	2.36	n. s	0.9
	40-49 (ref)				
Number of living children	0	**	0.18	n. s	1.69
	1	n. s	0.44	n. s	0.77
	2	n. s	0.86	n. s	0.96
	3+ (ref)				
Level of education	Elementary (ref)				
	High school and Diploma	**	2	***	2.87
	Bachelor's degree and above	**	3.04	***	4.53

District of residence (Highest to lowest level of development: 3 through 20)	3 (ref)				
	6	n. s	0.38	**	0.37
	8	n. s	0.40	***	0.14
	10	n. s	0.71	**	0.30
	20	n. s	0.44	n. s	1.18

*** Significant at level p<0.01; ** Significant at level 0.01<p<0.05; n.s. = Not Significant
Source: Computed by the authors.

Discussion

The discussion starts by referring to the conceptual framework of this study, based on the Health Behaviour Model (HBM) proposed by Champion and Skinner (2008) and Social Cognitive Theory (SCT) of proposed by Bandura (1989). In the context of contraceptive use in Tehran, the HBM may be interpreted to mean that women are more likely to use contraceptives if they perceive themselves as susceptible to unintended or unplanned pregnancies, understand the severity of the consequences of such pregnancies, believe in the benefits of contraceptive use in preventing such pregnancies and perceive fewer barriers, such as side effects, government restrictions imposed on modern contraceptives or social stigma associated with the use of contraceptives. With reference to contraceptive use in Tehran, the SCT may be interpreted to mean that women's decisions regarding contraception are influenced by observing the experiences of others, such as friends, family, or community members. Positive experiences and successful outcomes with contraceptive use observed in others can enhance self-efficacy, a key concept in SCT, which, in turn, increases the likelihood of adopting and maintaining contraceptive practices.

This research, conducted in 2015 in Tehran city, an area with one of the lowest fertility rates in the country (Total Fertility Rate = 1.27), shows that 78% of women were using contraception during the survey period. Notably, withdrawal emerged as the most common method (34%), while injectable DMPA and sterilization (both female and male) were the least preferred methods. Modern contraceptives like condoms were popular (22.5%), followed by pills (9%) and IUDs (9%). The findings illustrate a significant decline in the use of permanent contraceptive methods, including female and male sterilization, within Tehran city. This trend aligns with the observations made by Erfani and Yuksel-Kaptanoglu (2012), who showed that the reliance on long-acting contraceptives, specifically sterilization and IUDs, decreased from 34% in 2000 to 20% in 2014.

The findings reveal a clear correlation between women's age and the number of their children, whether ever born or currently living. There is a substantial reliance on withdrawal and condoms, on withdrawal with a prevalence of 43%, before the birth of a woman's first child, highlighting Iranian women's and couples' inclination to postpone the birth of their initial child, as observed in previous studies Abbasi-Shavazi et.al., 2009; Razeghi Nasrabad and Abbasi-Shavazi, 2019).

Logistic regression analysis reveals a positive link between educational level and the choice of withdrawal as a method of contraception. These findings are consistent with those of previous research by Abbasi-Shavazi et al. (2009) at the national level and Sadat-Hashemi et al. (2007) in Tehran city. Moreover, nnumerous studies have

demonstrated a noteworthy statistical correlation between the adoption of male-based contraceptive methods and level of education of both women and their spouses, especially within the Iranian context and particularly in Tehran (Erfani and Yuksel-Kaptanoglu 2012; Hosseini-Chavoshi et.al., 2007). This association may elucidate the notable prevalence of withdrawal and condom usage in the capital city, where a substantial proportion of individuals aged 25-49 hold university degrees. Educated women are more likely to be involved in their marital decisions and seek information about family planning and contraception to control their fertility (Abbasi-Shavazi and Khademzadeh, 2004; Abbasi-Shavozi et.al., 2019). Educated women may have more negotiating power within their marriages, and previous research has shown that women often choose withdrawal to avoid potential side effects associated with modern contraceptive methods (Ramenzanzadehet.al., 1995; Abbasi-Shavazi and Khademzadeh, 2004; Rahanama et.al., 2010; Razeghi Nasrabad et.al., 2019). It is important to note that the effectiveness of withdrawal, similar to condoms, depends on the cooperation and effectiveness of the male partner or husband. Although this survey did not collect information on husbands' education, it is a common practice in Iran for women to marry men with equal or higher educational attainment (Samani 2007; Karamouzian et. al., 2014). Therefore, it can be inferred that the husbands of the women surveyed in this study are also well educated and they cooperate with their wives to effectively use withdrawal or other male contraceptive methods.

Interestingly, this research indicates no significant variation in overall contraceptive use concerning the districts of residence and their implied levels of development. However, for traditional methods like withdrawal, women residing in less developed districts are less likely to opt for this method.

The study also highlights a growing trend of extended childbearing, especially among women aged 30-39 years, with 60% of them expressing their choice not to use contraceptives because they wanted to have another child. This trend has significantly contributed to the country's increasing total fertility rate, as indicated by the 2016 census data from Iran's Statistical Centre.

The finding of younger women being more likely to use contraception (Table 6) aligns with a similar finding by Abbasi-Shavazi et al. (36) that younger women have a higher likelihood of using any contraceptive method than older women who have already completed their reproductive goals. In the current phase of fertility transition in Iran, with fixed desires about the number of children, younger women are more inclined to use contraceptives. Furthermore, Razeghi Nasrabad et al. (2019) suggest that older women may use contraception less frequently due to infrequent sexual activity and lower fecundity.

The importance of the withdrawal method in controlling fertility is evident in this study. Santow (1995) considers that withdrawal, classically known as *coitus-interruptus* was essential to fertility reductions during the first demographic transition. The use of withdrawal requires the cooperation of husbands, signifying the importance of male involvement in fertility decisions. Unfortunately, due to limitations of time and budget, this study did not include interviews with the husbands of the women surveyed. Future studies exploring family planning dynamics in Tehran and Iran should address

this gap, emphasizing the crucial role of men in shaping fertility choices.

Future fertility in Tehran

Esmaeili and Abbasi-Shavazi (2024) examined the low fertility behaviour of Tehrani women in the face of simultaneous interactions among household, women and government policies and used a mullti-agent-based modelling to predict the future fertility of Tehran province to 2029 under pessimistic and optimistic economic scenarios. Under the pessimistic economic scenario Tehran's TFR would decline with a steep downward trend over from 1.4 children in 2019 to 1.06 in 2029, with childbearing peaking among women aged 25-29 years. Under the optimistic scenario and with the provision of family support policies by the government, Tehran's TFR would reach 1.10 in 2029, with the peak of childbearing concentrated on women aged 20-24 years. The optimistic scenario would soften the steep decline in fertility and see a shift in the timing of childbearing to younger ages.

Conclusion

In conclusion, this study sheds light on the prevalence and determinants of contraceptive use among women of reproductive age in Tehran city. The findings show a high prevalence of contraceptive use, with a notable preference for male-initiated methods such as withdrawal and condom. Shifts in contraceptive preference over time, particularly towards short-acting methods, suggest changing reproductive goals and preferences among the women of Tehran.

Moreover, the role of women's empowerment and educational attainment in contraceptive decision-making underscores the importance of comprehensive reproductive health education and access to family planning services. While socio-economic development of the district did not appear as a significant determinant of contraceptive use, the high prevalence of withdrawal use across different districts highlights a convergence toward a national level.

It is clear that addressing individual reproductive preferences and ensuring access to a range of contraceptive options tailored to diverse needs are essential steps towards promoting reproductive autonomy and meeting the contraceptive needs of women in Tehran. This underscores the importance of targeted interventions and comprehensive family planning programs that take into account the complex interplay of socio-demographic factors, educational attainment, and individual preferences.

Overall, this study contributes valuable insights into the dynamics of contraceptive use in Tehran city, providing a foundation for future research and informing the development of evidence-based policies and programs aimed at improving reproductive health outcomes in the region.

Declarations

Ethical approval

This research was conducted with due observance of research ethics involving human subjects.

It was approved in Australia by the Social and Behavioural Research Ethics Committee, Flinders

University, Australia. Project no. 6748 approved on 24 February 2015. Further, as per ethics committee guidelines the participants in this research were assured of their anonymity and the confidentiality of

the information they gave, and written consent was obtained from each participant.

Competing interests

No authors have competing interests.

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Availability of data and materials

Data cannot be shared publicly because of institutional restrictions. However, data are available from the Flinders University Institutional Data Access / Ethics Committee (contact Senior Research Support Officer at narmon.tulsi@flinders.edu.au) for researchers who meet the criteria for access to confidential data.

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