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Fertility Desire of Women and Related Factors: Karabuk and N'Djamena Samples

Kadınların Doğurganlık Tercihi ve İlişkili Faktörler: Karabük ve N'Djamena Örnekleri

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Abstract: Objective: Fertility desire is one of the important factors influencing population growth and women's fertility-related health outcomes. This study aimed to assess women's fertility desire and factors associated with excess fertility desire in two populations with different socio-demographic and cultural characteristics. Methods: A hospital-based cross-sectional study was conducted at a tertiary hospital in Karabuk and a health center in N'Djamena. The sample size was calculated as 611 women (311 for Karabuk, 300 for N'Djamena). The study's dependent variable is the desire to have children, which was determined by asking women about their ideal number of children. Independent variables included women's sociodemographic and reproductive characteristics, and some perceptions about women's status. The chi-square test was used to compare the sociodemographic and reproductive characteristics of women. Crude and adjusted odds ratios (ORs) and corresponding 95% confidence intervals were calculated via binary logistic regression analysis to explore the relationship between dependent and independent variables. Results: A total of 615 women were reached. The average ideal number of children for women was 2.7 in Karabuk and 5.6 in N'Djamena. In the whole study group multivariable logistic regression analysis, unofficial marriages (OR = 12.1), the belief that a woman's fertility is determined by her husband or God (OR = 2.5), lower education level (primary school and below) (OR = 2.4) and the husband's increasing ideal number of children (OR = 2.3) were associated with women's excess fertility desire. Conclusion: The findings of the study reveal significant differences between the fertility patterns and preferences of women in the two populations and the influence of social structure on women's fertility behaviors. Policies aimed at empowering women and eliminating gender inequalities should be pursued to protect them from the adverse effects of excess fertility.
Keywords: Fertility, Social factors, Women's health.

Öz: Amaç: Doğurganlık tercihi, nüfus artışını ve kadınların doğurganlık ile ilişkili sağlık sonuçlarını etkileyen önemli faktörlerden biridir. Bu çalışmanın amacı, farklı sosyodemografik ve kültürel özelliklere sahip iki toplumda kadınların doğurganlık tercihlerini ve aşırı doğurganlık tercihi ile ilişkili faktörleri değerlendirmektir. Gereç ve Yöntem: Hastane tabanlı kesitsel bir çalışma, Karabük'te bulunan bir üçüncü basamak hastanede ve N'Djamena'daki bir sağlık merkezinde yürütüldü. Örnek büyüklüğü 611 kadın olarak hesaplandı (Karabük için 311, N'Djamena için 300). Çalışmanın bağımlı değişkeni, çocuk sahibi olma isteğidir ve kadınların ideal çocuk sayısı sorularak belirlenmiştir. Bağımsız değişkenler kadınların sosyodemografik ve doğurganlık özelliklerini ve kadının statüsü ile bazı görüşlerini içerdi. Kadınların sosyodemografik ve doğurganlık özelliklerini karşılaştırmak için ki-kare testi kullanıldı. Bağımlı ve bağımsız değişkenler arasındaki ilişkiyi açıklamak için ikili lojistik regresyon analizi aracılığı ile kaba ve standardize olasılık oranları (OO) ve %95 güven aralıkları hesaplandı. Bulgular: Çalışmada toplam 615 kadına ulaşıldı. Kadınların ortalama ideal çocuk sayısı Karabük'te 2,7, N'Djamena'da 5,6 idi. Tüm çalışma grubunun çok değişkenli lojistik regresyon analizinde, resmi olmayan evlilikler (OO = 12,1), bir kadının doğurganlığının kocası veya tanrı tarafından belirlendiği inancı (OO = 2,5), düşük öğrenim düzeyi (ilkokul ve altı) (OO = 2,4) ve kocanın ideal çocuk sayısının yüksek olması (OO = 2,3) kadınların aşırı doğurganlık tercihi ile ilişkili idi. Sonuç: Çalışmanın bulguları, iki toplumdaki kadınların doğurganlık örüntüsü ve tercihleri arasında önemli farklılıkları ve toplumsal yapının kadınların doğurganlık davranışı

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üzerindeki etkisini ortaya koymaktadır. Kadınları aşırı doğurganlığın olumsuz etkilerinden korumak için kadınları güçlendirmeyi ve toplumsal cinsiyet eşitsizliklerini ortadan kaldırmayı amaçlayan politikalar izlenmelidir.
Anahtar Kelimeler: Fertilite, Sosyal faktörler, Kadın sağlığı.

Introduction

Fertility, which is one of the components of population growth and age structure changes in society in terms of demography, is a primary interest of public health as the main determinant of women's reproductive health. High fertility rates increase the risk of maternal and child morbidity and mortality, as well as restrict human capital investment, slow economic growth, and exacerbate environmental challenges (Casterline, 2010). Fertility desire refers to an individual's desire to have children and personal motivation to reproduce in the future (Matovu et al., 2017). The desire for children is an important determinant of the fertility rate and contraceptive use in a population. When the number of children a person has reaches or exceeds their desired number, they are motivated to take action to prevent further pregnancies (Casterline, 2010).

The global fertility rate in total declined from 3.2 live births per woman in 1990 to 2.5 in 2019 (United Nations, 2020). According to classical demographic transition theory, the decline in fertility is the direct result of the decrease in demand for live births. The reason for this declining demand is structural socioeconomic transformations in populations that reduce the benefits of raising children and increase costs (Bongaarts, 2008). In this approach, which reflects the characteristics of the demographic transition process in developed western countries, couples consciously decide on the number of children they will have. Biological and socioeconomic determinants, as well as cultural factors, have a significant impact on the fertility preferences of women in developing countries (Zare et al., 2019; Wei et al., 2018; Zhang and Li, 2017; Atake and Gnakou Ali, 2019; Akinyemi and Odimegwu, 2021). The value ascribed to having children by couples is influenced by the norms of their social environment. Cultural and religious values that promote larger families, such as the continuation of the family lineage, the view of children as a source of protection for the elderly, and the social status that motherhood confers on women, can exert a significant effect on individuals' fertility preferences in traditional societies (Akinyemi and Odimegwu, 2021; Ibisomi, 2008). Although fertility and mortality rates have declined greatly in many developing countries since the 1960s, there are regions where these rates are still very high, especially in sub-Saharan African countries (Muhoza et al., 2014).

The Republic of Chad and Turkey are two countries with great differences in terms of socioeconomic level and the population's health status. Chad is one of the countries with the highest fertility rate in the world. The total fertility rate was reported as 6.3 per woman in 1960, 7.3 per woman in 1993, and 6.3 per woman in 2021 (World Bank, n.d.). The percentage of women using modern contraceptive methods in Chad was reported as 4.8% in 2014-2015 (INSEED, MSP and ICF International, 2016) and 17.5% in 2019 (United Nations-a, n.d.). While the total fertility rate in Turkey was 6.4 per woman in 1960, it decreased to 1.9 in 2021 (World Bank, n.d.). The transition to an anti-natalist policy in 1965 was an important turning point in the decline of fertility rates in Turkey. The anti-natalist policy was further strengthened in 1983 by the legalization of surgical contraception and curettage up to the tenth week of gestation (The population Planning Law, 1983). Meanwhile, due to the social and economic transformations that the country had undergone, women's status had also changed, which affected fertility behavior. Nevertheless, in Turkey, patriarchal norms and practices continue to exert a profound influence on social life. Widespread gender inequalities, which have a detrimental impact on women's reproductive health, remain a significant concern (Okten, 2009; Simsek, 2011). Currently, about half (49%) of married women in Turkey use modern contraceptive methods (Hacettepe University Institute of Population Studies, 2019).

This study aimed to determine women's fertility desires and related factors in the samples of Karabuk from Turkey and N'Djamena from the Republic of Chad. The study contributes to the understanding of the dynamics affecting women's fertility preferences in two countries with different socioeconomic and cultural characteristics.

Methods

Study Design and Settings

The hospital-based cross-sectional study was conducted in the two health institutions in Karabuk, Turkey, and in N'Djamena, Chad Republic, in 2020. The population of Karabuk, located in the Western Black Sea Region of Turkey, was 243614 in 2020 (TURKSTAT, 2021). N'Djamena, the capital of the Republic of Chad, had a population of about 1.3 million in 2016 (United Nations-b, n.d.).

Target Population and Sample Size of the Study

The target populations of the study were women who have given birth in 2018 at Karabuk Research and Training Hospital and N'Djamena King Faisal Health Center (N = 1625 and 1359, respectively). The sample size was calculated as 611 women (311 for Karabuk, 300 for N'Djamena) with a proportion of 50% for excess fertility desire, a margin error of 5% and 95%

of confidence interval (CI) values using OpenEpi software.

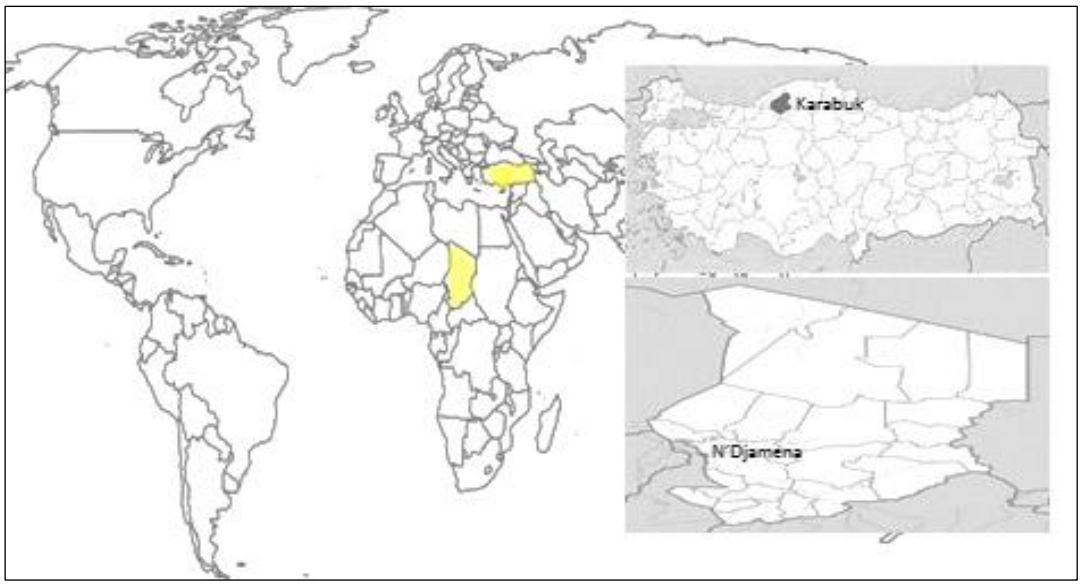

Figure 1. Study Places

Dependent and Independent Variables

The dependent variable of the study is women's fertility desire and was determined by asking the ideal number of children. The ideal number of children was identified by asking the following question: “If you could go back to the days when you had no children and have the exact number of children you desired, how many children would you like to have in your lifetime?” (Hacettepe University Institute of Population Studies, 2019). The dependent variable was classified into two categories. If the ideal number of children was 1-3, it was categorized as lower fertility desire, and if it was 4 or more, it was considered excess fertility desire. However, since there were only 4 women (1.3%) in the N'Djamena sample who wanted to have 1-3 children, lower fertility desire for N'Djamena was classified as 1-4 as the ideal number of children. Independent variables included women's sociodemographic and reproductive characteristics, and some perceptions about women’s status in society in which they lived.

Data Collection Method and Tool

The data was collected through face-to-face interviews with the women through a questionnaire. The questionnaire included questions about women's sociodemographic characteristics (age, place of residence, marriage type, woman's and husband's educational level, woman's and husband's working status, number of household members, and household monthly income level), reproductive characteristics (age at first marriage and pregnancy, total number of pregnancies, number of deliveries, number of abortions, number of stillbirths, and

number of living children; experiences of infant death; and information on the last pregnancy), woman's and husband's ideal number of children, and some perceptions about women's status (Do you think women are valued in your society? How do you define your most important role in your family? Who decides how many children you will have?). The questionnaire was in Turkish in Karabuk and in Arabic in N'Djamena. The pilot test of the questionnaire was in Karabuk with seven women who were not part of the study group.

Data Analysis

The chi-square test was used to compare the sociodemographic and reproductive characteristics of the women in the Karabuk and N'Djamena samples. Both univariate and multivariable logistic regression analyses were used to evaluate factors affecting fertility desire for the samples of Karabuk and N'Djamena separately and for the whole study group. The variables with a value of $p < 0.20$ in the univariate logistic regression analysis were included in the multivariable logistic regression model (the results of the univariate logistic regression analysis are presented in Appendix 1). Statistical significance was accepted at $p < 0.05$ in the chi-square test and multivariable logistic regression analyses. All analyzes were performed using the Statistical Package for the Social Sciences v20.

Ethical approval

Ethical approval was obtained from the ethical committee of Karabuk University (Date: 11.11.2019, No: 7/21) prior to data collection. Research permission was obtained from both health institutions**.** In addition, verbal consent was obtained from the women for their voluntary participation.

Results

A total of 615 women, 315 from Karabuk and 300 from N'Djamena, were reached. Table 1 compares sociodemographic characteristics and some perceptions about women's status in their society in the Karabuk and N'Djamena samples. There was no difference between the two samples in terms of age, place of residence, education level, or employment status ($p > 0.05$). Almost all of marriages (98.7%) were official in Karabuk, while they were unofficial (customary or religious marriages) (96.7%) in N'Djamena (only Catholic women were officially married). A total of 28.3% of marriages are polygamous in N'Djamena. In Karabuk, 41.3% of households had a monthly income of less than $400, compared to 55.0% of households in N'Djamena. The majority of N'Djamena women (71.0%) resided in crowded families (≥5 members of households). The percentage of marriages based on family decisions in Karabuk was 25.1%, while in N'Djamena it was 67.3%. In Karabuk, 61.0% of couples decided together

how many children they have, but in N'djamena, 64.0% of women left the decision up to God (Table 1).

Table 1: Sociodemographic Characteristics of Women and Some Perceptions About Women's Status in Their Society in Karabuk and N'Djamena Samples

	Karabuk	**N'djemena**	**Total**	
Variable	**n (%)***	**n (%)***	**n (%)***	**p****
Age group				
< 20	18 (5.7)	19 (6.3)	37 (6.0)	0.903
20-34	195 (61.9)	188 (62.7)	383 (62.3)	
≥ 3 5	102 (32.4)	93 (31.0)	195 (31.7)	
Place of residence				
City center	211 (67.0)	222 (74.0)	433 (70.4)	0.057
District/village	104 (33.0)	78 (26.0)	182 (29.6)	
Type of marriage				
Official marriage	311 (98.7)	7 (2.3)	318 (51.7)	**<0.001**
Unofficial marriage	5 (1.3)	292 (97.7)	297 (48.3)	
Polygamous marriage				
No	315 (100.0)	215 (71.7)	530 (86.2)	
Yes	-	85 (28.3)	85 (13.8)	na
Education level				
No formal education	17 (5.4)	29 (9.7)	46 (7.5)	0.136
Primary school	75 (23.8)	85 (28.3)	160 (26.0)	
Secondary School	67 (21.3)	52 (17.3)	119 (19.3)	
High school and above	156 (49.5)	134 (44.7)	290 (45.2)	
Husband's education level				
No formal education	5 (1.6)	10 (3.3)	15 (2.4)	0.324
Primary school	50 (15.9)	39 (13.0)	89 (14.5)	
Secondary School	55 (17.5)	63 (21.0)	118 (19.2)	
High school and above	205 (65.0)	188 (62.7)	393 (63.9)	
Working status				
Yes	43 (13.7)	55 (18.3)	98 (15.9)	0.113
No	272 (86.3)	245 (81.7)	517 (84.1)	
Husband's working status				
Yes	260 (82.54)	252 (84.0)	512 (83.3)	0.058
No	24 (7.62)	32 (10.7)	56 (9.1)	
Retired	31 (9.84)	16 (5.3)	47 (7.6)	
Monthly household income (USD)***				
≤399	130 (41.3)	165 (55.0)	295 (48.0)	**0.003**
400-799	136 (43.2)	101 (33.7)	237 (38.5)	
≥800	49 (15.6)	34 (11.3)	83 (13.5)	
Number of household members				
1-4	181 (57.5)	87 (29.0)	268 (43.6)	**<0.001**
≥5	134 (42.5)	213 (71.0)	347 (56.4)	
Do you think women are valued in your society?				
Yes	252 (80.0)	285 (95.0)	537 (87.3)	**<0.001**
No	63 (20.0)	15 (5.0)	78 (12.7)	
Who decided your marriage?				
Myself	236 (74.9)	98 (32.7)	334 (54.3)	**<0.001**
Family	79 (25.1)	202 (67.3)	281 (45.7)	
How do you define your most important role in your family?				
Domestic chores	37 (11.8)	48 (16.0)	85 (13.8)	**0.009**
Childcare	213 (67.6)	216 (72.0)	429 (69.8)	
Contribution to family income	65 (20.6)	36 (12.0)	101 (16.4)	
Who decides how many children you will have?				
Only me/ Jointly	249 (79.0)	41 (13.7)	290 (47.2)	**<0.001**
My husband	66 (21.0)	67 (22.3)	133 (21.6)	
God	-	192 (64.0)	192 (31.2)	
Total	**315 (100.0)**	**300 (100.0)**	**615 (100.0)**	

**Column percentage **Chi-square test ***Calculated according to the exchange rate dated 11.01.2020 of the Central Bank of the Republic of Turkey*

Table 2 shows reproductive characteristics of women. N'Djamena women had higher levels of early marriages, pregnancies, abortions, stillbirths, infant deaths, and problems with their last pregnancies compared to Karabuk women ($p < 0.05$). Approximately two-thirds (61.0%) of the last deliveries in Karabuk were by caesarean section, while this level was only 4.7% in N'Djamena ($p < 0.001$) (Table 2).

Table 2: Reproductive Characteristics of Women in the Karabuk and N'Djamena Samples

Variable	Karabuk n (%)*	N'djamena n (%)*	Total n (%)*	p**
First marriage age				
< 18	73 (23.2)	165 (55.0)	238 (38.7)	**<0.001**
18-24	162 (51.4)	131 (43.7)	293 (47.6)	
≥ 25	80 (25.4)	4 (1.3)	84 (13.7)	
First pregnancy age				
< 18	8 (2.5)	49 (16.3)	57 (9.3)	**<0.001**
18-24	193 (61.3)	235 (78.3)	428 (69.6)	
≥ 25	114 (36.2)	16 (5.3)	130 (21.1)	
Total number of pregnancies				
1-3	252 (80.0)	173 (57.7)	425 (69.1)	**<0.001**
≥ 4	63 (20.0)	127 (42.3)	190 (30.9)	
Total number of deliveries				
1-3	271 (86.0)	194 (64.7)	465 (75.6)	**<0.001**
≥ 4	44 (14.0)	106 (35.3)	150 (24.4)	
Abortion (at least one)				
Yes	51 (16.2)	98 (32.7)	149 (24.2)	**<0.001**
No	264 (83.8)	202 (67.3)	466 (75.8)	
Stillbirth (at least one)				
Yes	5 (1.6)	14 (4.7)	19 (3.1)	**0.027**
No	310 (98.4)	286 (95.3)	596 (96.9	
Infant death (aged 0-12 months, at least one)				
Yes	5 (1.6)	34 (11.3)	39 (6.3)	**<0.001**
No	310 (98.4)	266 (88.7)	576 (93.7)	
Number of living children				
1-3	279 (88.6)	199 (66.3)	478 (77.7)	**<0.001**
≥ 4	36 (11.4)	101 (33.7)	137 (22.3)	
Disease/complication during last pregnancy				
Yes	30 (9.5)[#]	137 (45.7)†	167 (27.2)	**<0.001**
No	285 (90.5)	163 (54.3)	448 (72.8)	
Mode of the last delivery				
Vaginal	123 (39.0)	286 (95.3)	409 (66.5)	**<0.001**
Cesarean	192 (61.0)	14 (4.7)	206 (33.5)	
Total	**315 (100.0)**	**300 (100.0)**	**615 (100.0)**	

**Column percentage **Chi-Square Test #Urinary tract infection (n= 10), gestational diabetes (n= 8), anemia (n= 5), hypertensive disorder (n= 5), vaginal infection (n= 2). †Malaria (n= 54), hypertensive disorder (n= 41), anemia (n= 38), gestational diabetes (n= 4).*

Figure 2 shows the ideal number of children for women and their husbands. Women's average ideal number of children was 2.7 (minimum 1, maximum 6) in Karabuk and 5.6

(minimum 1, maximum 10) in N'Djamena. In Karabuk, 26.0% of women desired four or more children, compared to 98.7% in N'djamena. According to women's statements, spouses' average ideal number of children was 2.9 (minimum 1, maximum 7) in Karabuk and 7.9 (minimum 1, maximum 14) in N'Djamena. While the percentage of spouses who wanted to have four or more children was 26.0% in Karabuk, this level was 99.0% in N'Djamena (Figure 2).

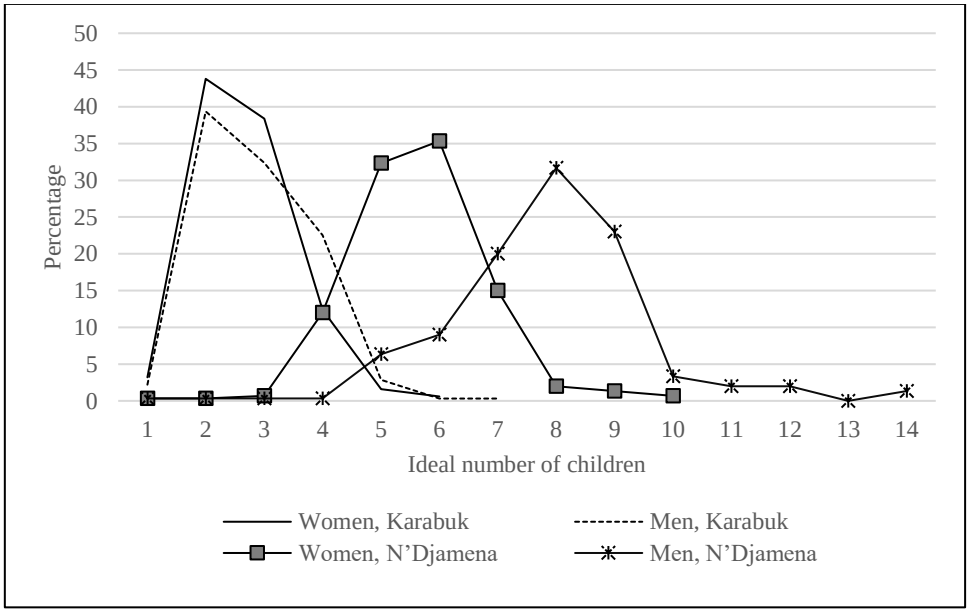

Figure 2. The Ideal Number of Children for Women and Their Husbands in the Karabuk and N'Djamena Samples

The percentage of women whose desired fertility is more than, equal to, or less than their current living children was 14.0%, 31.7%, and 54.3% in Karabuk and 6.7%, 8.3%, and 85.0% in N'Djamena, respectively (Table 3).

Table 3: Women's Ability to Have the Desired Number of Children in The Karabuk and N'Djamena Samples

	Karabuk		**N'Djanema**		**Total**	
Number of living children minus the ideal number of children	**n**	**%**	**n**	**%**	**n**	**%**
Less*	171	54.3	255	85.0	**426**	**69.3**
Equal**	100	31.7	25	8.3	**125**	**20.3**
More***	44	14.0	20	6.7	**64**	**10.4**
Total	**315**	**100.0**	**300**	**100.0**	**615**	**100.0**

(number of living children minus the ideal number of children) < 0 **(number of living children minus ideal number of children) = 0 *(number of living children minus ideal number of children) > 0*

Table 4 shows the results of a multivariable logistic regression analysis of women's fertility desire and independent variables for each sample and the whole study group. The odds of women's excess fertility desire (ideal number of children ≥ 4) increased with low educational level (OR = 2.5) and their husband's increasing ideal number of children (OR = 2.3) in the Karabuk sample. In the N'Djamena sample, women's desire for excess fertility (ideal number of children ≥ 5) was associated with living in a district or village (OR = 4.4) and their husband's increasing ideal number of children (OR = 1.5). According to the whole study group analysis, the odds of women's excess fertility desire (ideal number of children ≥ 4) increased with unofficial marriages (OR = 12.1), the belief that a woman's fertility is determined solely by her husband or God (OR = 2.5), low educational level (OR = 2.4) and husband's increasing ideal number of children (OR = 2.3) (Table 4).

Discussion

This study analyzed women's fertility desires and factors associated with excess fertility desire in two populations with different sociodemographic and cultural characteristics. The study's findings reveal striking differences in women's fertility behaviors and preferences between the two samples. Women in the N'Djamena sample tend to have excess fertility compared to the Karabuk sample, and their ideal number of children is considerably higher than in the Karabuk sample. These substantial variations in women's fertility patterns and tendencies may reflect how the patriarchal and traditional societal structures have shaped women's reproductive behavior. There are considerable differences between the two communities in favor of the Karabuk sample in terms of fertility-related experiences such as child marriages, adolescent pregnancies, abortions, stillbirths, infant deaths, and pregnancy complications. These findings also provide insight into the extent of gender inequalities in the two populations.

Fertility desire is an important determinant of the fertility rate and subsequent high population growth in a population. Cleland et al. (2020) reported that women who wanted to stop giving birth had lower fertility levels compared to those who wanted to continue (Cleland et al., 2020). In this study, the average ideal number of children of women was 2.7 in Karabuk and 5.6 in N'Djamena. The 2018 Turkey Demographic and Health Survey indicates that the average ideal number of children for married women aged 15-49 is 3.0 (Hacettepe University Institute of Population Studies, 2019), which similar with the study's findings. On the other hand, the average ideal number of children in the N'Djamena sample is considerably lower than nationwide.

Table 4: Multivariable Logistic Regression Analysis of Women's Fertility Desire and Independent Variables for Each Sample and the Whole Study Group

	Karabuk#		**N'Djamena##**		**The whole study group#**	
Variable	**OR**	**%95 CI**	**OR**	**%95 CI**	**OR**	**%95 CI**
Age	1.1	0.9-1.2	1.0	0.9-1.1	*	
Place of residence						
City center (ref)	*		1.0		*	
District/village			**4.4**	**1.4-13.6**		
Education level					.	
Primary school and below	**2.5**	**1.0-6.0**	*		**2.4**	**1.1-5.4**
Secondary school and above (ref)	1.0				1.0	-
Husband's education level						
Primary school and below	0.6	0.2-1.8	*		*****	
Secondary school and above (ref)	1.0					
Type of marriage						
Official marriage (ref)			1.0		1.0	
Unofficial marriage	*		3.0	0.6-14.6	**12.1**	**3.1-27.0**
Household monthly income	*		*		1.0	0.9-1.0
Husband's number of wives	na		0.9	0.5-1.8	0.9	0.7-1.3
Number of households	0.8	0.5-1.2	1.0	0.8-1.2	0.9	0.7-1.3
First marriage age					1.0	0.8-1.1
Husband's ideal number of children	**2.3**	**1.5-3.6**	**1.5**	**1.2-1.9**	**2.3**	**1.7-3.1**
First gestational age	1.0	0.9-1.1	*		1.0	0.9-1.2
Abortion (at least one)						
Yes	1.2	0.3-5.2	*		1.2	0.3-4.7
No	1.0				1.0	
Number of living children	0.7	0.3-1.9	0.7	0.4-1.4	0.7	0.3-1.5
Mode of last delivery						
Vaginal	1.0	0.5-2.3	1.3	0.3-5.4	0.7	0.3-1.4
Cesarean delivery	1.0		1.0		1.0	
Disease/complication during the last pregnancy						
Yes (ref)	*		*		1.0	
No					0.7	0.3-2.2
Do you think women are valued in your society?						
Yes					0.8	0.3-2.1
No (ref)	*		*		1.0	
Who decided your marriage?						
Myself (ref)	1.0		1.0		1.0	
Family	1.1	0.5-2.8	2.1	0.9-4.5	2.0	0.9-4.2
How would you describe the most important role in your family?						
Domestic chores and childcare	*		*		0.4	0.2-1.0
Contribution to family income (ref)					1.0	
Who decides how many children you will have?						
Only me/Jointly (ref)	1.0		*		1.0	
My husband/God	2.2	0.9-5.2			**2.5[f]**	**1.1-5.4**
Nagelkerke R Square		**0.368**		**0.222**		**0.836**

*ref: reference category * p≥0.20 in bivariate logistic regression analysis #Code 0= an ideal number of children 1-3 (reference category), code 1= an ideal number of children ≥4 (excess fertility) ## Code 0= an ideal number of children 1-4 (reference category), code 1= an ideal number of children ≥5 (excess fertility)*

The Chad Demographic and Health Survey indicates that the average ideal number of children is 8.2 for women and 11.4 for men (INSEED, MSP & ICF International, 2016). These differences may be attributed to the fact that the study was conducted on women who delivered in hospitals. While almost all births (99%) take place in hospitals in Turkey (Hacettepe University Institute of Population Studies, 2019), only 22% of births occur in health institutions in Chad (INSEED, MSP and ICF International, 2016). In N'Djamena, women who do not apply to the health institutions for childbirth, particularly those residing in impoverished and rural areas, may have distinct fertility preferences.

Our study indicates that 14.0% of women in Karabuk and 6.7% of women in N'Djamena have more children than their ideals. This difference can be attributed on the high number of children targeted by women in N'Djamena. Since women's fertility will continue in both samples, the number of women who cannot achieve their ideal fertility at the end of their reproductive age may increase. Upadhyay and Karasek (2012), in their study involving four Sub-Saharan African countries, reported that 12-28% of women aged 35 and over had more children than their ideals (Upadhyay and Karasek, 2012). In both samples, efforts to the empowerment of women along with improving family planning services can result in improvements in many areas, including women's ability to control their fertility.

In the whole study group analysis, unofficial marriages increased the excess fertility desire by 12.1 times. Unofficial marriages cause a disadvantage in terms of using the legal rights arising from marriage and benefiting from public services, as well as allowing for child marriages. Ozdemir et al. (2019) found that only religious marriages increased the frequency of unmet family planning needs by 4.96 times in Karabuk (Ozdemir et al., 2019). Although official marriage has been compulsory since 1926 in Turkey, it was reported that the percentage of only religious marriages was 5.8% in 2003 (Civelek and Koç, n.d.). On the other hand, customary or religious marriages and polygamous marriages are common in Chad. We found no relationship between polygamous marriages and excess fertility desire in the N'Djamena sample. Odisina et al. (2020) stated that in the northern part of Nigeria, where a high fertility trend is observed, the desire for excess fertility, especially among men, may be related to the Islamic religion, which encourages polygamy, early marriages, and fertility (Odisina et al., 2020). Comprehensive community-based studies can lead to a better understanding of the dynamics that influence fertility in monogamous and polygamous marriages in Chad.

Education provides professional development, stable income, better access to information and health services, and a better lifestyle for women, enabling them to control fertility and

reproductive decisions. In addition, education delays the marriage age and increases competence in childcare and contraceptive use (Götmark and Andersson, 2020). This study showed that the excess fertility desire of women with low education levels was 2.5 times higher in the Karabuk sample, and 2.4 times higher in the whole study group analysis. The strong relationship between women's education and fertility has also been shown in studies (Wei et al. 2018; Upadhyay and Karasek, 2012; Kebede et al. 2022). Since education interacts with socioeconomic, cultural and demographic factors, increasing access to formal education can improve in many areas.

The husbands' ideal number of children was found to be 2.9 in Karabuk and 7.9 in N'Djamena according to the women's statements. Couples had an almost consistent ideal number of children in Karabuk, while men desired more children compared to women in N'Djamena. The husband's increasing number of ideal children increased women's excess fertility desire by 2.3 times in Karabuk, 1.5 times in N'Djamena, and 2.3 times in the whole study group. The fact that men are the main decision-makers, including fertility behaviors, in traditional societies, can be attributed to the excess fertility tendency of women in Chad, which has a more traditional social structure than Turkish society. Patriarchal attitudes that have their roots in oppressive systems support male superiority and power. Both men and women can display patriarchal gender roles, reinforcing dominant ideologies of masculinity and femininity (McKinley et al., 2021). Many couples, especially men, do not use contraceptive methods because of the desire for more children, which is often related to religious and cultural beliefs. Upadhyay and Karasek (2012) reported that women whose husbands want more children are less likely to achieve their reproductive goals (Upadhyay and Karasek, 2012). As demonstrated in this study, various studies consistently show that men generally desire a higher number of children than women (Odisina et al., 2020; Gebresealassie, 2008) These findings highlight the importance of investigating the couple's perspective to understand reproductive decisions and behaviors and the need to design reproductive health programs to engage men.

The ability to make decisions about having children and the timing of pregnancy is crucial for women to choose the life they want to lead. In Karabuk, 61.0% of women reported that they would make a joint decision with their spouse regarding the number of children they would have. This decision was largely left to God (64.0%) or husbands (22.3%) in N'Djamena. In the Karabuk sample, no women attributed their fertility decisions to God. The N'Djamena sample showed that religious-based fatalism is a powerful factor influencing women's fertility choices. Religious women's attitudes towards femininity and motherhood status are directly related to

their thoughts on fertility, contraception, and reproductive health. In traditional and religious societies, women are often esteemed for their ability to give birth to children, as motherhood is considered a blessing.

In the study, excess fertility desire is 4.4 times higher among women living in districts and villages in N'Djamena. This finding supports the high fertility level in rural areas in Chad compared to urban areas (6.8 vs 5.4) (INSEED, MSP and ICF International, 2016). The excess fertility desire further increases the need for maternal and child health services in rural areas, where the coverage is very low (Kim and Kim, 2019; Marquis et al., 2022). The difference between rural and urban fertility rates in Turkey is gradually decreasing. According to the 2018 Turkey Demographic and Health Survey, the total fertility rate is 2.8 in rural areas and 2.2 in urban areas (Hacettepe University Institute of Population Studies, 2019).

Limitations

This study has some limitations. First, cause-and-effect relationships were assessed at the same point in time, depending on the cross-sectional design of the study. The second is that since the data are based on women's self-reports, there is a possibility of recall and social acceptability bias. Another limitation is that the study was conducted among women who gave birth in the health institutions. Therefore, the results of the study can only be generalized to women who give birth in hospitals, not to the general population. It may be useful to conduct population-based studies to better understand the factors associated with women's fertility preferences and to produce data that can be generalized to the population. Despite these limitations, our study reveals striking differences between women's fertility preferences and behaviors in two different societies and the factors associated with excess fertility desire.

Conclusion

The study shows that the average ideal number of children for women was 2.7 in Karabuk and 5.6 in N’Djamena. Factors associated with women's excess fertility desire were the low levels of education and the husband's increasing number of ideal children in Karabuk. In N'Djamena, these factors were living outside the city centre and the husband's increasing number of ideal children, while in the entire study group they were unofficial marriages, low levels of education, the husband's increasing number of ideal children and the belief that a woman's fertility is determined solely by her husband or God were the factors in the whole study group. The study indicates that men's fertility preferences significantly influence women's decisions. Therefore, there is a need to conduct studies on the factors affecting men's fertility desires and to design family planning programs that will enable their participation. Government

initiatives should support the fight against socioeconomic and gender inequality. Action plans should be developed that aim to empower women in terms of basic components of women's empowerment, such as education, employment, and participation in family decision-making processes.

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