



Using Non-Invasive Methods to Choose Gender; Sex Selection with Diet and Determination of Ovulation Time in Iran

Dariush Farhud^{1,2,3}, **Tahereh Mokhtaryan-Gilani*^{1,4}, *Tayebeh Mokhtarian Gilani*^{1,5}
*Nasrin Azimi*⁶, *Zahra Kiani*⁴

1. Dr. Farhud's Genetic Clinic, Tehran, Iran

2. School of Public Health, Tebran University of Medical Sciences, Tebran, Iran

3. Department of Basic Sciences Ethics Lifestyle, Academy of Medical Sciences, Tebran, Iran

4. Midwifery and Reproductive Health Research Center, Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tebran, Iran

5. Department of Psychology, Kharazmi University, Tebran, Iran

6. Department of Midwifery, Karaj Branch, Islamic Azad University, Karaj, Iran

*Corresponding Author: Email: tmokhtaryan@gmail.com

(Received 10 Apr 2021; accepted 15 Jul 2021)

Abstract

Background: Families, especially fathers, are continuously interested in selecting the child's sex in most societies. This study was conducted to Use non-invasive methods to choose gender in order that sex selection with diet and determination of ovulation time in Iran.

Methods: This study was a clinical experimental trial of convenient samples conducted as a retrospective study. Overall, 285 women were referred to Dr. Farhud's Genetic Clinic in 2013 and 2014 in Tehran, Iran. For two years (from June 2013 to Jun 2015), samples were followed-up. Participants used diet, the timing of ovulation, and considering lifestyle to have the sex selection.

Results: Overall, 88 women became pregnant in the first group among 179 participants in 2013, and talking to the participants showed that 82.95% achieved the wanted gender. Fifty-two women became pregnant among 106 participants in 2014 in the second group and 86.79%, achieved the wanted sex.

Conclusion: Diet and ovulation timing could be very efficient, and it is recommended that families Use safe procedures such as natural, and non-invasive methods to achieve the wanted sex for gender balance.

Keywords: Child sex; Wanted gender/sex; Diet; Time of ovulation

Introduction

It is common to select the child's sex and the tendency to have a son in many cultures. The requirement or benefit of physical strength, war, helping in agriculture tasks, continuing father's profession, caring for the elderly, inheriting property, continuing their family name and talent

can be the cultural basis to prefer the male child. The fate of gender selection affects the death of the daughter or newborn after birth directly, and also the preference of the child after birth will discriminate between boys and girls in terms of assigning the food, money, kindness, education,



Copyright © 2022 Farhud et al. Published by Tehran University of Medical Sciences.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International license.

(<https://creativecommons.org/licenses/by-nc/4.0/>). Non-commercial uses of the work are permitted, provided the original work is properly cited

and other sources of wealth and prosperity (1). Placing the baby in an unfavorable mental and physical condition Causes improper growth of the baby's physiological parameters (2,3).

Lack of proper nutrition in pregnant women can increase fetal growth and low birth weight (4). Since infant mortality in the first 72 h of birth is the highest (5). The risk of death of a newborn girl is threatened in societies where there is a gender preference. Moreover, neglecting micronutrients can cause a variety of diseases in girl children (6,7).

Unfortunately, ethnicity affects infant mortality (8). Therefore, the development of infants and children varies according to gender, birth weight, environmental factors, and living conditions (9).

Different methods for sex selecting

Sexual preference is frequent and striking in most parts of the world. The results of a country sampling are very different and inconsistent according to (age group, region, and researchers), such as Nepal and India listed in Table 1.

Table 1: Interest in male gender in countries throughout the world

<i>Author</i>	<i>Country</i>	<i>Year</i>	<i>Number of participants</i>	<i>Percentage of male gender preference</i>	
1	Srivastava et al (10)	India	2014	308 women aged 15 to 45 yr old	28.1
2	Kumar Nithin et al (11)	India	2015	132 women with a mean age of 27	55.7
3	Dhande et a (12)	India	2016	220 married women from village aged 15 to 49 yr old	95
4	Roy et al.(13)	India	2017	116 women aged 15 to 49 yr old	52.58
5	Zubair et al. (14)	Pakistan	2007	301 women aged 15 to 45 yr old	30.9
6	Atif et al. (15)	Pakistan	2016	385 women aged 15 to 45 yr old	24.3
7	Rai et al.(16)	Nepal	2014	100 women with a mean age of 31	64.3
8	Thapa et al.(17)	Nepal	2018	200 women aged 15 to 45 yr old	13
9	Inyang Etoh et al. (18)	Nigeria	2016	453 women with a mean age of 29	64.9
10	Al-Akour et al. (19)	Jordan	2012	335 women aged 15 to 45 yr old	14.9
11	Fejes et al. (20)	Hungary	2006	200 women aged 15 to 45 yr old	23.5
12	Edgar Dahl et al. (21)	America	2006	197 women aged 18 to 49 yr old	39
13	Ahmadi et al. (22)	Iran	2015	100 women aged 18 to 45 yr old	55

The initial sex ratio, i.e fertilized eggs with the male sex, is about twice that of the girl, but male fetuses are more vulnerable compared to the female fetus, which induces abortion in the first weeks of fertility. In other words, the sex ratio in aborted fetuses is about 80% male.

The adult sex ratio (ASR) is a demographic feature of the population (19). There are changes in sex ratio according to race, ethnicity, and maternal age. The sex ratio (number of boys by the girls) is 105 among whites and about 103 among African Americans (20). Differences in sex ratio are also observed in other countries of the world. In some

countries, a sex ratio of more than 107 has even been reported, while other countries have reported lower rates (21). It is remarkable that the sex ratio is very high, reported from 109 to 113 in some countries, such as China and India, which is an artificial sex ratio, due to human interventions (22).

Genetic factors are largely included in these sex ratio differences. Of course, humans can also affect the sex ratio. In some countries, human interventions intervene the biological process of sex ratio, including Taiwan,India, China, and South Korea (23). It is worth noting that

Earthquake (24), war (25), men's psychological stress (26), the effect of parent's age (27), seasons (28), determining the time of ovulation and diet (29) are factors that affect sex ratio.

Reasons for pre-pregnancy gender selection include “Medical reasons such as preventing the birth of children with sex-linked diseases”, “couples prefer a certain gender because they have one or more other children of the same sex”, “Gender preference is frequently preferred because of cultural, social, and economic reasons”, “as a result of policies that couples must adopt to limit reproduction to have a child”, “Prevent deliberate abortions after identifying the sex of the fetus!” and “Preventing the number of unwanted children to realize the wanted sex and so the family economy”.

There is a gap in many societies that are unaware of pre-pregnancy gender choices. when there is a prejudice against a particular gender in some societies. If it can not change gender preference, it can instead help people in those societies to achieve the desired gender. Therefore, this way can prevent unwanted gender harm to some extent. In addition, sex selection before pregnancy can prevent the transmission of sexually transmitted diseases.

This study was conducted to examine the relationship between child sex and time of ovulation and nutrition, before pregnancy and the superiority of the natural method over invasive method in Iran.

Methods

This study is a clinical experimental trial of convenient samples conducted in a retrospective study. This study was conducted on 285 eligible women aged 25 to 44 yr, at pre-pregnancy, in which sex selecting was studied in Farhud's Genetic Clinic in Tehran Iran. For two years (from Jun 2013 to Jun 2015) .Consequently, collecting retrospective data from parents' reports were used.

Three months before trying to pregnancy, the women were monitored for nutrition and ovulation. Using a combination of high sodium and potassium foods will increase the likelihood of having a male child, and foods with high calcium and magnesium will increase to form a female fetus. Accordingly, the composition of food in the pre-pregnancy period, particularly in women, can change that group's sex ratio (29,30). Male sperm carrying a chromosome (Y) is smaller than the female sperm carrying a chromosome (X) and hence, has a faster speed; accordingly, sexual intercourse should be done in proportion to the time of ovulation (31,32).

Intercourse in the days before ovulation was recommended to have a daughter (a female child), and attempting to conceive on the day of ovulation was recommended to have a son (a male child).

Inclusion criteria: Women aged 25 to 44 yr old referred to the clinic were interested in using sex selection instructions.

Exclusion criteria: 1- Illiterate women who could not follow orders 2- Men who had problems with spermogram disorder 3- Women who had high blood pressure 4- Women who had thyroid problems 5- Women who had neurological problems. 6- Women with secondary infertility.

Demographic information (based on education, age, employment, type of delivery, etc.) was homogeneous in both groups of participants. Men with a normal spermogram test were included in the study. Men with abnormal spermograms (hypospermia) were treated with medicine and recommendations to have a healthy lifestyle.

Results

Participants studied in a group of 179 people in 2013 and a group of 106 people in 2014. Overall, 88 women became pregnant in 2013 among 179 participants in the first group, and 53 women became pregnant in 2014 in the second group among 106 participants (Table 2).

Table 2: Percentage of success in achieving the wanted sex in 179 participants (2013) and 106 participants (2014)

<i>Number of children born</i>	<i>Wanted sex</i>	<i>Unwanted sex</i>	<i>Success percentage</i>
88	73	15	82.95
53	46	7	86.79

Discussion

The sample used in this study is a kind of clinical trial, without control, and was selected from the convenient samples referred to Dr. Farhud's Genetic Clinic. Overall, 285 individuals participated in the study from Jun 2013 to Jun 2015. Adjusting the time of sexual intercourse according to the time of ovulation and observing the pre-pregnancy diet in couples were specified to be effective on the sex ratio in this research.

A success rate between 70% and 90% was observed in a number of studies similar to these studies that were conducted based on selecting the child's sex in different populations (27,29,31-34) According to the current study, 82.95% and 86.79% can success the wanted sex selection using the diet method and ovulation time.

The human population has long considered gender as the first and most important differentiating factor among individuals, and today such an attitude dominates some communities. Many studies may consider child sex selection as a kind of gender discrimination. Unfortunately, in societies where gender preference exists, girls are at risk from infancy to adulthood. Both physically and mentally, girls' health is at risk (1). As in societies that have a gender preference, when a woman becomes pregnant and everyone around her is waiting to hear the news of the boy's pregnancy. When the fetus becomes a girl, the woman may be ignored. The pregnant mother may also be physically and mentally stressed (35). Placing the baby in an unfavorable mental and physical condition Causes improper growth of the baby's physiological parameters(2-4,35,36).

The secondary sex ratio of fetuses who are born is usually determined at 106 male fetuses to 100 female fetuses, and in summary, is estimated 106

(37). Naturally, according to the sex ratio in society, the likelihood of having a son or a daughter is about 50/50 without using gender selection methods.

A study has reported a considerable reduction in the number of male births since 1950 in Denmark, Sweden, the Netherlands, the United States, Germany, Norway, and Finland (33). Improper conditions increase the likelihood of giving birth to a girl. An earthquake in a Japanese city in 1995 decreased the secondary sex ratio (24).

Other study reported that has been conducted during World War II on Austrian and German populations specified that the likelihood of having a female child was higher than a male child at that time (25). Psychological stress caused by severe and difficult events in life is possible to change the sex ratio by influencing the loss of sperm by transferring the y chromosome (26). A significant relationship between child's sex and parents' smoking and will increase the girl's birth (38).

Fertilization season is a potential factor that can affect the sex ratio (28). Months of birth and sex ratio were different, and pregnant mothers were more expected to have girls in the summer and winter compared to the spring. Pregnancy season may affect the child's birth (39).

Noorlander reported that Y sperm has a small head and moves at a higher speed compared to X sperm. The difference in sperm size is caused by the difference in their DNA content that male sperms have less DNA content compared to female sperms. Male sperm (y) is less resistant to environmental changes and is more vulnerable than larger sperm (X) (30,40). When the male body is influenced by environmental stressors, such as heat and chemicals, x sperms indicate more resistance compared to y sperms (41). Men's environmental contact with chemicals such as lead will disrupt the physical structure and reduce

sperm motility and fertility in men (42). Air pollution influences sperm motility and reduces sperm motility, especially y chromosome-carrying sperms (43). Many environmental pollutants decrease sperm number and motility and increase the conditions to give birth to female children (41).

Diet methods and determining the time of ovulation increase the success rate from 50% to even 90% (27,29,31,33,34). Couples those interested to gender selection are more in improving gender balance and the prevention of sex-linked diseases in Iran, and consequently, they act to select the child sex, and gender preference may infrequently be observed in some ethnicities (22). Families can likely achieve their wanted gender using these methods in a perfectly safe, natural, non-invasive, and economically reasonable way.

Conclusion

It is significantly effective to apply diet and ovulation timing in this study. Families use safe, natural, and non-invasive methods to achieve the wanted sex to have a gender balance. This study's methods are more economical compared to the invasive and laboratory methods and ensure avoiding serious risks and hormonal complications in invasive methods (IVF and PGD). Thus sex selection is appropriate so that people in certain communities can determine the sex of their baby before pregnancy and strive to obtain it. In this way, it may prevent the birth of babies who are not of the desired gender of the parents.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Acknowledgements

Thanks to the participants referred to Dr. Farhud Genetics Clinic to participate in this study.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Pande RP, Astone NM (2007). Explaining son preference in rural India: the independent role of structural versus individual factors. *Popul Res Policy Rev*, 26(1):1–29.
2. Kazemian L, Sabaghian M, Tavakolian A, et al (2020). Effect of the Holy Quran on the Physiological Responses in Premature Infants: A Review. *Int J Pediatr*, 8(5):11219–25.
3. Shahidi B, Khajenoori F, Najarzadegan MR, et al (2019). A Systematic Review of the Effectiveness of Aromatherapy Massage on Sleep in Children and Infants. *Int J Pediatr*, 8(5):11233–41.
4. Bahrami HR, Mosa Farkhani E, Beygi B, Gholian-Aval M, Taghipour A, Hoseini SJ (2020). Risk Factors of Low Birth Weight Infants: A Population-Based Cross-Sectional Study. *Int J Pediatr*, 8(1):10807–15.
5. Ouedraogo P, Zagre N, Zohoncon TM, Ouattara A, Bissyande V, Simpore J (2020). Risk Factors for Neonatal Mortality at St Camille Hospital in Ouagadougou, Burkina Faso. *Int J Pediatr*, 8(2):10817–25.
6. Salehi F, Zangouei A, Zia Z, et al (2020). Investigating Vitamin D Serum Levels in Children with Congenital Heart Disease Compared with the Healthy Control Group. *Int J Pediatr*, 8(3):11077–85.
7. Zia Z, Hashemi Z, Moghtaderi M, Honar N, Saki F (2020). The effect of Maternal Vitamin D Deficiency on Increased Risk for Hyperbilirubinemia in Term Newborns. *Int J Pediatr*, 8(4):11141–7.
8. Valadbeigi T, Dara N, Tabatabaee H, et al (2020). Maternal Risk Factors of Neonatal Mortality in Iran: A Case-Control Study. *Int J Pediatr*, 8(2):10865–74.
9. Zhonggui X, Yan J, Shi S (2020). Epidemiological Distributions and Critical Contributions to the Growth Rate for Infants and Young Children

- in Hubei Province of China during 2017 to 2018: A Review. *Int J Pediatr*, 8(2):10837–44.
10. Srivastava A, Singh J, Singh O, Singh V, Singh N (2014). Gender Preference, Attitude and Awareness of Young eligible couples towards Prenatal Sex Determination in Lucknow District. *Natl J Community Med*, 5(1):148–52.
 11. Kumar N, Kanchan T, Bhaskaran U, et al (2015). Gender preferences among antenatal women: a cross-sectional study from coastal South India. *Afr Health Sci*, 15(2):560–67.
 12. Dhande V, RD G, Shingare A, Dimple V (2016). Gender preference among reproductive age group women in rural area. *Int J Community Med Public Heal*, 3(7):1862–5.
 13. Roy A, Biswas R (2017). A Study on Gender Preference and Awareness Regarding Prenatal Sex Determination among Antenatal Women in a Rural Area of Darjeeling District, West Bengal, India. *J Clin Diagnostic Res*, 11(2):115–119.
 14. Zubair F, Dahl E, Sher Shah S, Ahmed M, Brosig B (2007). Gender preferences and demand for preconception sex selection: a survey among pregnant women in Pakistan. *Hum Reprod*, 22(2):605–9.
 15. Atif K, Ullah MZ, Afsheen A, Naqvi SAH, Raja ZA, Niazi SA (2016). Son Preference in Pakistan; A Myth or Reality. *Pak J Med Sci*, 32(4):994.
 16. Rai P, Paudel IS, Ghimire A, Pokharel PK, Rijal R, Niraula SR (2014). Effect of gender preference on fertility: cross-sectional study among women of Tharu community from rural area of eastern region of Nepal. *Reprod Health*, 11(1):15.
 17. Thapa M, Bajracharya J (2018). Gender Preference in Current Pregnancy among Primigravidae. *Nepal J Obstet Gynaecol*, 12(1):36–9.
 18. Inyang-Etoh EC, Ekanem AM (2016). Child-Sex Preference and Factors That Influenced Such Choices among Women in an Obstetric Population in Nigeria. *OALib*, 03(10):1–10.
 19. Al-Akour N, Khassawneh M, Zayed F, Khader Y (2012). Characteristics of women visiting an infertility clinic and their interest in preimplantation sex selection in the north of Jordan. *Eur J Obstet Gynecol Reprod Biol*, 165(2):271–4.
 20. Fejes I, Szöllosi J, Závaczki Z, Koloszar S, Pál A (2006). A boy or a girl? A Hungarian survey regarding gender selection. *Acta Obstet Gynecol Scand*, 85(8):993–6.
 21. Dahl E, Gupta RS, Beutel M, et al (2006). Preconception sex selection demand and preferences in the United States. *Fertil Steril*, 85(2):468–73.
 22. Ahmadi SF, Shirzad M, Kamali K, Ranjbar F, Behjati-Ardakani Z, Akhondi MM (2015). Attitudes about sex selection and sex preference in Iranian couples referred for sex selection technology. *J Reprod Infertil*, 16(1):36–42.
 23. Jacobsen R, Møller H, Mouritsen A (1999). Natural variation in the human sex ratio. *Hum Reprod*, 14(12):3120–5.
 24. Fukuda M, Fukuda K, Shimizu T, Yomura W, Shimizu S (1996). Kobe earthquake and reduced sperm motility. *Hum Reprod*, 11(6):1244–6.
 25. Graffelman J, Hoekstra RF (2000). A statistical analysis of the effect of warfare on the human secondary sex ratio. *Hum Biol*, 433–45.
 26. Hansen D, Møller H, Olsen J (1999). Severe periconceptional life events and the sex ratio in offspring: follow up study based on five national registers. *BMJ*, 319(7209):548–9.
 27. Farhoud D (1985). *Choosing the sex of the child" Do you want boy or girl"*. tehran: Sina Publications, Iran, pp:111.
 28. Catalano R, Bruckner T, Anderson E, Gould JB (2005). Fetal death sex ratios: a test of the economic stress hypothesis. *Int J Epidemiol*, 34(4):944–8.
 29. Mokhtarian-Gilani T (2006). *Boy or girl sex selection and diet. 1st ed. Tebran*. Naslenowandish Publishing, Iran, pp: 39.
 30. Noorlander AM, Geraedts JPM, Melissen JBM (2010). Female gender pre-selection by maternal diet in combination with timing of sexual intercourse - A prospective study. *Reprod Biomed Online*, 21(6):794–802.
 31. Shettles L, Rorvik D (2006). *How to choose the sex of your baby: The method best supported by scientific evidence*. Harmony, America, pp:229.
 32. Rorvik DM, Shettles LB (1970). *Your babys sex: now you can choose*. Dodd. Mead, America, pp:126.
 33. Davis DL, Gottlieb MB, Stampnitzky JR (1998). Reduced ratio of male to female births in several industrial countries: a sentinel health indicator? *JAMA*, 279(13):1018–23.
 34. Sereshti M, Mirmiran P, Ejtahed H-S (2014). The role of maternal diet on fetal sex selection: A Review. *Iranian Journal of Endocrinology and Metabolism*, 16(1): 57–67.

35. Arasteh A, Kharaghani R, Zenoozian S, Moloodi R, Jafari E (2020). Effectiveness of Midwifery Counseling on Adaptation to Pregnancy, Maternal-Fetal Attachment, and Quality of Life in Unplanned Pregnant Women: A Randomized Controlled Trial. *Int J Pediatr*;8(6):11435–48.
36. Whittaker A (2015). Media debates and ‘ethical publicity’ on social sex selection through pre-implantation genetic diagnosis (PGD) technology in Australia. *Cult Health Sex*, 17(8):962–76.
37. Cunningham FG, Ikeno KJ, Bloom SL, Hauth JC, Gilstrap LC, Wenstrom KD (2005). *Williams Obstetrics*. McGraw Hill, New York, pp:112–116 .
38. Shahi A, Kamjoo A, Dabiri F, PormehrYabandeh A, Khademi Z, Hosseinin S (2021). The relationship between paternal smoking and sex ratio of children born in public maternity hospitals in Bandar Abbas (Iran). *Hormozgan Medical Journal*, 18(6):454-9
39. Xu T, Lin D, Liang H, et al (2014). The Association between Season of Pregnancy and Birth-Sex among Chinese. *Int J Environ Res Public Health*, 11(12):8166–74.
40. Goodall H, Roberts AM (1976). Differences in motility of human X-and Y-bearing spermatozoa. *Reproduction*, 48(2):433–6.
41. James W (2008). Evidence that mammalian sex ratios at birth are partially controlled by parental hormone levels around the time of conception. *Endocrinology*, 198:3–13.
42. Yartireh H, Hosein Hashemian A (2013). The effect of lead on number and sex type of children in men occupationally exposed to lead. *Iran J Obstet Gynecol Infertil*, 16(69):9–15.
43. Fathi Najafi F, Roudsari Lotfinezhad R, Namvar F, et al (2015). Air pollution and quality of sperm: A Meta-Analysis. *Iran Red Crescent Med J*, 17(4) e26930.