



Relationship between Desirable Fetus Gender and Type of Consumed Diet: A Cross-sectional Study

**Afaf Abdulrahman Yaslam^{a#}, Hoda Jehad Abousada^{b*},
Rubuah Mohammed Ayyashi^c, Rawan Abdulkarim Agala^c,
Halah Abdulrahman Hafiz^{d≡}, Hanan Misfer Alzahrani^{e‡},
Najwan Hassan Abduljabar^{e‡}, Lujain Khaled Alhazmi^{e‡},
Mohammed Saaduddin Sahibzada^{e‡}, Alaa Omar Abusarir^{e‡},
Atheer Nasser Alhrany^{e^o}, Raibal Adnan Sabbahi^{e^o}, Wejdan Ali Alshehri^{e^o},
Ghada Meshall Almahyawi^{e^o} and Nour Ahmed Naaman^{e^o}**

^a OBGYN, Obstetrics and Gynecology Department, King Abdullah Medical Complex, Jeddah, Saudi Arabia.

^b OBGYN, KAMC, KSA.

^c OBGYN Residents, MOH, KSA.

^d Clinical Nutrition, UQU, Makkah, KSA.

^e MOH, KSA.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: The fetus's development can be influenced by the mother's nutrition in a variety of ways, including the gender of the fetus. However, several research have been published that suggest a link between maternal nutrition and the baby's gender. In other words, the baby's gender can be determined by the mother's nutrition. This study aimed to evaluate the relationship between maternal diet and baby gender.

[#] Consultant

[≡] PHD

[‡] General Practitioner

^o Medical intern

*Corresponding author: E-mail: Dr.huda1992@outlook.com;

Methods: This was an analytical cross-sectional study to spot light on the relationship between maternal diet and baby gender. Since the aim of the study was to determine the relationship between maternal diet and baby gender among Saudi, this is the suitable design for this research. The study was carried out among Saudi population. Data were collected from general population using questionnaire during the period from April to October 2021.

Results: The study included the participation of 755 women from different age groups in the Kingdom of Saudi Arabia. The most prevalent age group was 36-40 years (n= 193, 25.6%) followed by the age group more than 40 years (n= 189, 25%) while the least frequent age group was below 22 years (n= 83, 11%). The number of participants who reported having one children were 116 participants. On asking the participants who had male babies whether they craved for special food or not, their answers varied. Salty food, pickles and potato chips were preferred among 298 participants while sweets and chocolate were the favorite food among 155 participants. The special diet is statistically significant with the baby gender at p value of 0.001.

Conclusion: The current study showed that diet preference among mothers affects the gender of the baby as the results showed. Some mothers intentionally reported following special diet in order to have specific gender.

Keywords: Desirable fetus; gender; diet; specific gender; pregnancy complications.

1. INTRODUCTION

The human diet entails the simultaneous consumption of a wide range of nutrients and foods that are strongly linked and may have both synergistic and inhibitory effects [1-2]. These interactions may make it more difficult to discover probable links between certain meals and health consequences [2-3]. Cultural, social, economic, and environmental factors all impact dietary preferences [4].

Healthy eating habits during pregnancy have been shown to alter fetal development and contribute to the prevention of pregnancy difficulties [5-6] as well as the onset of illnesses in adulthood [7]. An proper diet aids postpartum recovery and promotes breastfeeding [8]. Furthermore, pregnant women are more concerned about their nutrition and food choices than non-pregnant women [9], making pregnancy an opportune opportunity to make dietary modifications [10]. Nutritional intake, sociodemographic variables, and baby outcomes have all been linked to dietary patterns during pregnancy [8-15].

Vitamin, mineral, and protein-rich diets have been linked to a greater birth weight [13]. Older women with a higher education are more likely to eat a balanced diet and have a reduced prevalence of pre-gestational overweight [8, 12, 14]. Increased parity, maternal overweight before to pregnancy, being unmarried and jobless, and smoking have all been linked to bad eating patterns during pregnancy [12,14].

A study conducted in Brazil's Southern Region found a link between diet and socioeconomic position, revealing that women with higher socioeconomic class are more likely to eat a healthy diet [16]. However, a research of a group of young people found that, while socioeconomic status had an impact on eating habits, having a better level of education or a greater income was not a protective factor for healthy eating [17].

In Saudi Arabia, comprehensive nutritional assessment and guidance are not routine during prenatal care, and medical professionals frequently lack a thorough understanding of the sociodemographic factors that influence pregnant women's eating habits, resulting in significant variation in nutritional advice given to pregnant women.

1.1 Literature Review

A good diet is essential for a healthy lifestyle at any time, but it is especially crucial while you are pregnant or hoping to get pregnant. Healthy eating throughout pregnancy will aid the baby's development and growth. Environmental exposure may influence the physiology of organ systems, resulting in prenatal development retardation and an increased risk of chronic disorders later in life [18].

Maternal diet is one of the most significant external stimuli impacting fetal growth and development, and it is one of the most adjustable elements throughout pregnancy, when a higher supply of nutrients and energy is necessary to satisfy the needs of fetal development [19]. As a

result, strong maternal nutritional status, in combination with other healthy living variables, aids in maintaining a proper balance in fetal nutrition and endocrine condition during pregnancy, which is critical to the mother's and child's health [20].

In the past, dietary evaluation in pregnant women was done by looking at the amount of various foods consumed, their caloric content, and the contribution of micro- and macronutrients [21]. Because probable interactions between foods and nutrients may be ignored if the maternal diet is not taken into account as a whole [22], there is a rising interest in the study of dietary patterns in pregnancy [23].

Diet is a nutritional pattern that reflects the many traditions and cultural interrelations that have emerged over time in the basin's civilizations. It has traditionally been described as a diet heavy in vegetable foods (oil, fruits, vegetables, legumes, grains, nuts), moderate in dairy products, fish, poultry, and eggs, and low in red meats [24]. Given this, the MD appears to ensure a sufficient caloric and nutritional delivery in appropriate proportions [25]. This dietary pattern is low in saturated fatty acids, high in carbs, fiber, and antioxidants, and high in monounsaturated and n-3 polyunsaturated fatty acids, which come predominantly from olive oil and fish consumption [26].

During the perigestational stage, the consequences of sticking to the routine have been explored. It has been reported that these women had a lower risk of preterm delivery [5,9,13,14], miscarriage [15,16,17], hypertensive disorders [18], or gestational diabetes [19,20], as well as a lower weight increase [5,21,22]. It's also been linked to a lower risk of congenital malformations like spina bifida [23] or cardiac defects [24], as well as a lower risk of intrauterine growth restriction [9,21,25,26,27] and even long-term effects like better bone quality [28,29] and a lower risk of atopy [30,31] and/or abdominal obesity in childhood [32].

However, in today's world, when this traditional food pattern is becoming less frequent, all of these advantages are gone. In the previous 40 years, there has been a significant transformation in food intake habits in Spain, across all age groups [33,34]. Healthy lifestyle habits are being abandoned in favor of a more westernized pattern, with a higher intake of refined sugars and animal-derived foods,

particularly red meat and derivatives, and a lower intake of plant-based foods, resulting in an increase in saturated fats and cholesterol in the diet [33,35,36].

This trend appears to affect pregnant women as well, so it would be beneficial to identify the profile of women who are more likely to have low adherence (LA) versus optimal adherence (OA) and to raise awareness about the importance of good nutrition and its impact on the newborn's development [3,37].

2. METHODS

2.1 Study Design

This was an analytical cross-sectional study to spot light on the relationship between maternal diet and baby gender. Since the aim of the study was to determine the relationship between maternal diet and baby gender among Saudi population, this is the suitable design for this research.

2.2 Study Setting

The study was carried out among Saudi population. Data were collected from general population using questionnaire during the period from April to October 2021.

2.3 Sampling and Sample

Participants were chosen via probability simple random sampling technique. Participants were selected from the general population. The expected number of sample size was 500 participants. However, the study included 755 participants.

Inclusion criteria: Mothers from general population.

Exclusion criteria: none.

2.4 Instruments

Data collection tool was self-designed and base on latest literature. It contained the following information: (1) basic information about participants and (2) disease related information.

2.5 Statistical Analysis

Data obtained from questionnaire were entered and analyzed using SPSS program version 23

computer software. Sociodemographic data are presented using descriptive statistics as means, median, percentages and standard deviation. Independent T test and one-way Anova are used to show statistical significance among patients' characteristics and tool scores. Chi square test is used to show relationship between categorical variables. Univariate and multivariate analysis will be performed to investigate association between gender of parents, education level and knowledge and prevent of tooth decay.

3. RESULTS

The current study aimed to examine the relationship between food preference and gender of fetus during pregnancy and after giving birth. The study included the participation of 755 women from different age groups in the Kingdom

of Saudi Arabia. The most prevalent age group was 36-40 years (n= 193, 25.6%) followed by the age group more than 40 years (n= 189, 25%) while the least frequent age group was below 22 years (n= 83, 11%). The distribution of age groups among study participants is presented in Fig. 1. Slightly more than half of participants were Saudi population (n= 451, 59.7%) and the rest were non-Saudi participants (n= 304, 40.3%).

Study participants reported having different numbers of children at time of filling the questionnaire. The number of participants who reported having one children were 116 participants. The rest of results of number of children are presented in Fig. 2 and the distribution of number of children among age groups is presented in Table 1.

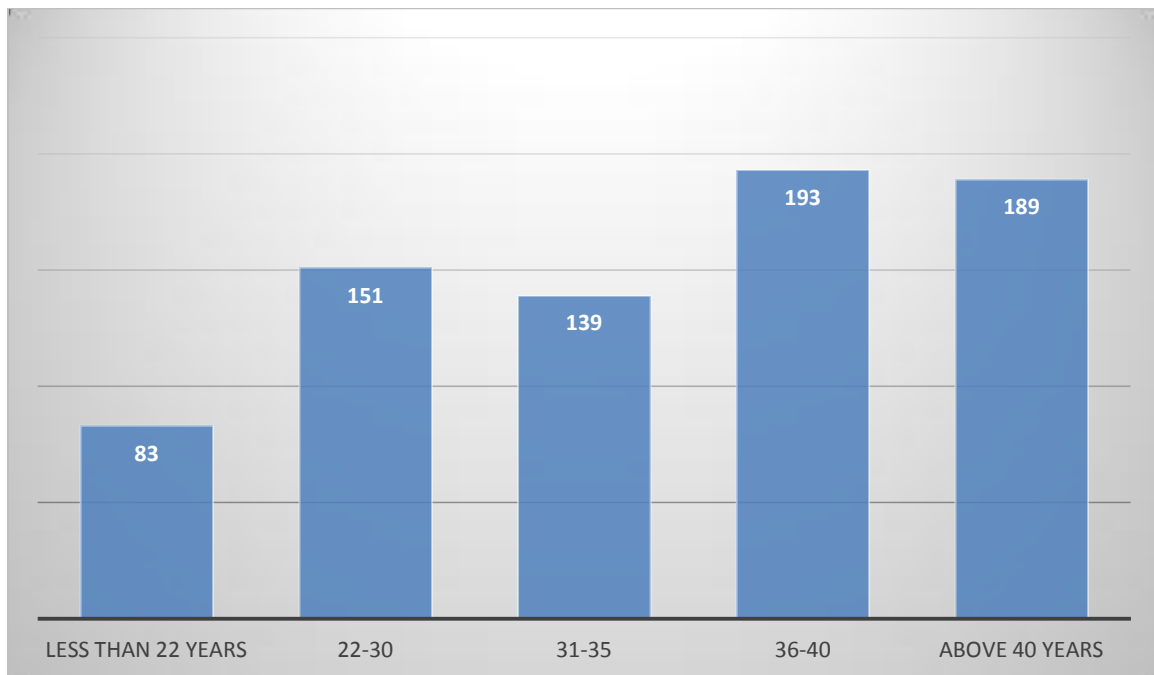


Fig. 1. Age Groups Distribution among Study Participants

Table 1. Number of children distributed by age groups among study participants

No. of children	Less than 22	22-30	31-35	36-40	More than 40
1	58	39	9	5	5
2	19	71	28	17	9
3	3	22	45	52	31
4	2	10	35	63	38
5	0	8	21	48	38
More than 5	1	1	1	8	68

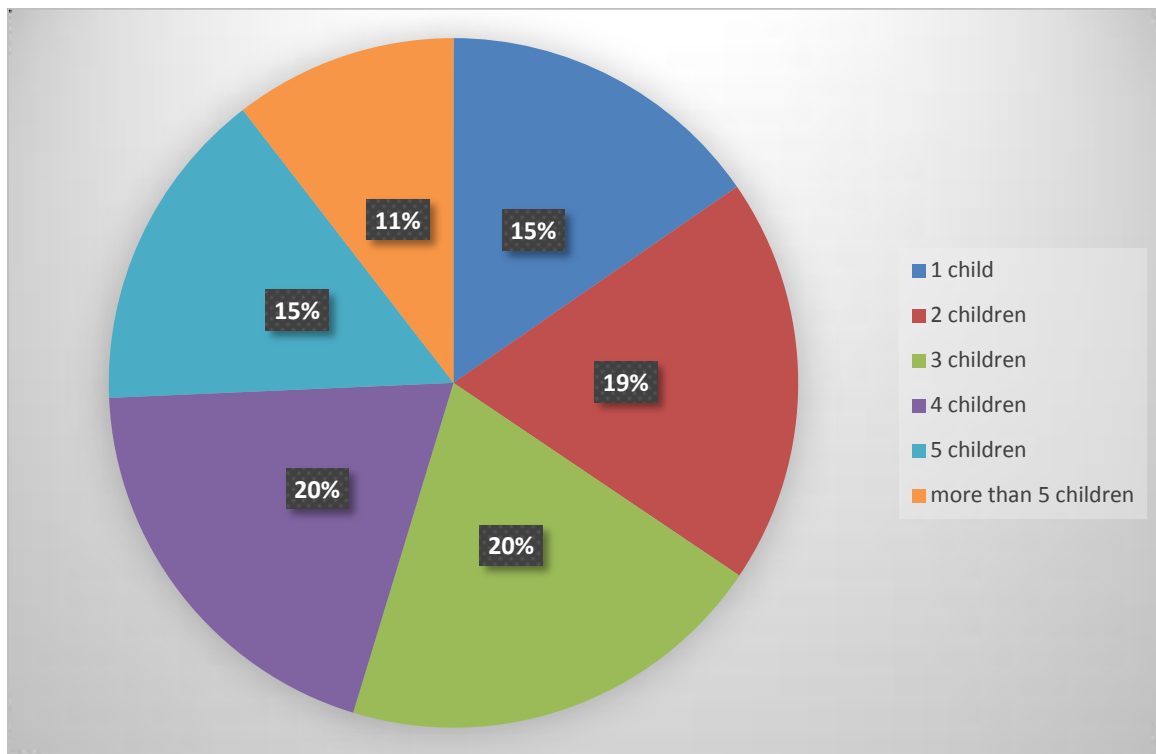


Fig. 2. Number of Children among Study Participants

On asking the participants who had male babies whether they craved for special food or not, their answers varied. Salty food, pickles and potato chips were preferred among 298 participants while sweets and chocolate were the favorite food among 155 participants. On the other hand, 186 participants answered others and the rest reported not having a male baby yet (Table 2).

On the contrary, the food was craved during the pregnancy of female baby was close to the percentages of male food. There were 193 participants craved for salty foods and 226 participants craved for chocolate and sweets. There were 224 participants answered others and 112 participants reported not having a female baby yet (Table 2).

There were 95 participants reported following special diet to determine the gender of the baby (12.6%). Among them, participants who wished for male baby ate banana, avocado, apples and sea food and others. The special diet mothers followed to have a male baby is presented in Fig. 3 while the special diet mothers followed to have female baby is presented in Fig. 4. The special diet is statistically significant with the baby gender at p value of 0.001.

Regression analysis for the effect of the diet on the baby gender is presented in the following Table 3.

4. DISCUSSION

Human civilization is well-known for its gender preferences. The traditional background and cultural customs that have been passed down through generations frequently impact a couple's gender choice for children [38-41]. In both rich and developing nations, there are significant variances in gender preferences. An empirical assessment of standardized data on gender preference for children in 17 European nations revealed a considerable tendency toward a mixed sex makeup. Girl preference was seen in the Czech Republic, Lithuania, and Portugal. The socioeconomic conditions and family policy in all of the nations studied were comparable [42]. Individual studies from the United Kingdom and Turkey [43-44] have also found a high preference for daughters.

Another study found that the majority of people in 50 developing nations had a balanced gender preference, meaning they wanted an equal number of boys and girls. With the exception of Bolivia, Latin America and the Caribbean, as well

as numerous Southeast Asian nations, exhibited a strong preference for daughters. In Southern Asia, Western Asia, and Northern Africa, son preference was more widespread [45]. Individual studies from Egypt, Nepal, and China [45-47] have found that males are preferred over daughters. Son preference was demonstrated in

16 of the 28 nations in Sub-Saharan Africa that were part of the study. This study found that while son preference was not universal, daughter preference was widespread in several nations [45]. India, China, and South Korea have all shown a high preference for sons among the countries of Southeast Asia [48].

Table 2. Type of food mothers craved for during pregnancy of male or female baby

Type of food	Male baby	Female baby
Salty food, pickles and potato chips	298	193
Sweets and chocolate	155	226

Table 3. Coefficients regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7.837	.872		8.982	.000
Sea food	.386	.283	.089	1.362	.175
Banana, avocado and apple	.175	.155	.083	1.129	.260
Butter and milk	-.143	.189	-.048	-.755	.451
Breakfast cereals	.275	.211	.082	1.305	.193
Lean meat	-.249	.182	-.090	-1.369	.172
Fish	.031	.115	.017	.271	.787
All meat	-.454	.239	-.120	-1.899	.059

a. Dependent Variable: Fetus gender

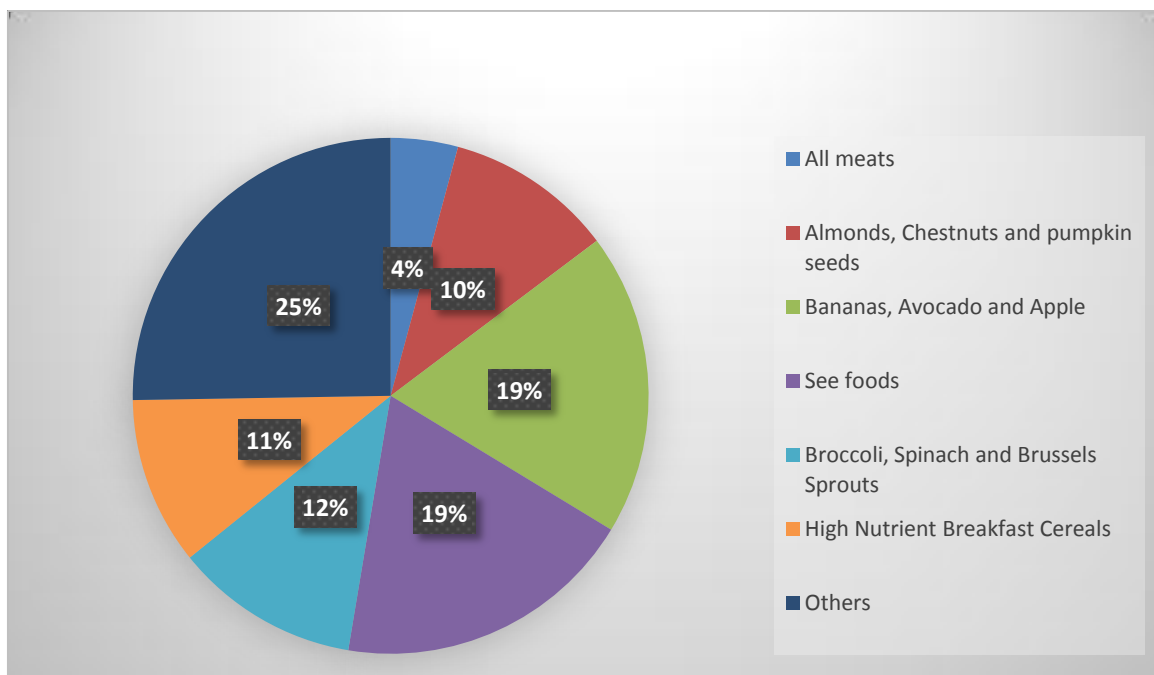


Fig. 3. Special Diet for Male Baby

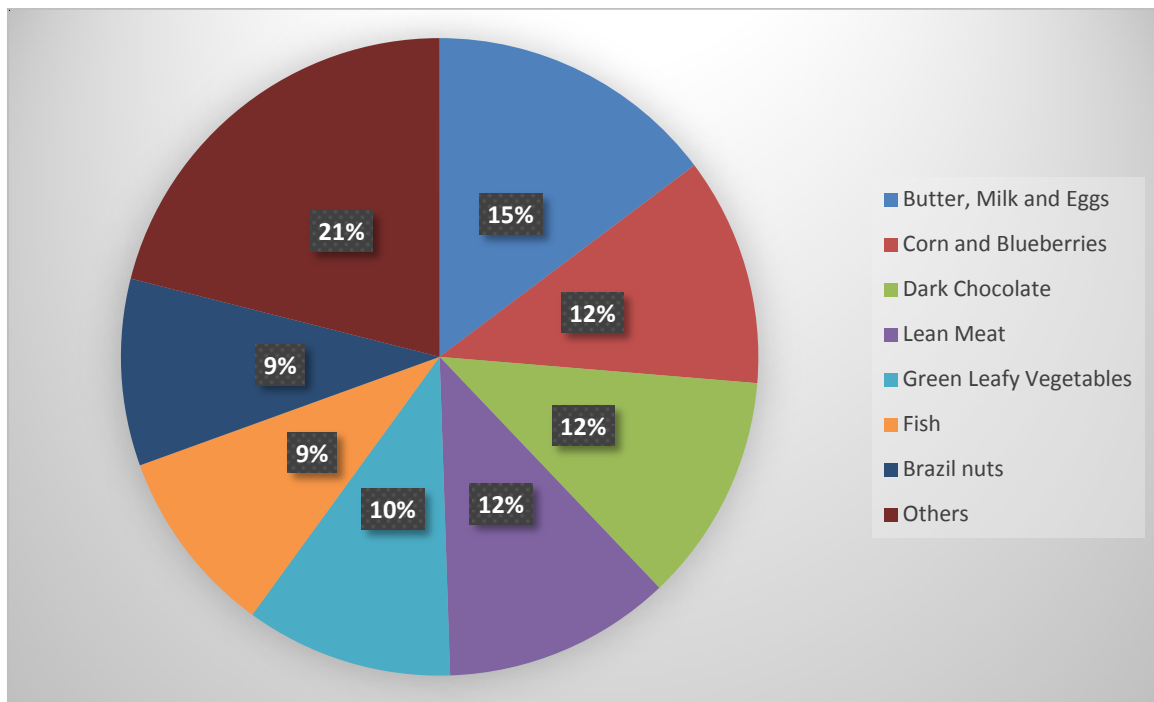


Fig. 4. Special Diet for Female Baby

New research from the UK suggests that a baby's sex is linked to his or her mother's diet around The discovery and the timing of conception may explain why fewer males are born presently in the industrialized world, including the United Kingdom and the United States.

The researchers discovered a robust correlation between a high-energy diet consumed around the time of conception and the delivery of sons.

In developed nations such as the United Kingdom, the United States, and Canada, the birth rate for males has progressively declined over the previous four decades. According to the researchers, the drop is slight but continuous, at roughly one in 1,000 births every year.

Dr. Fiona Mathews of the University of Exeter and colleagues looked at the diets of 740 first-time moms in the UK who didn't know the gender of their unborn child for the research. Pregnant women were given information on their eating habits before, during, and after conception, as well as during the first several months of their pregnancy.

Women's educational status and work have been demonstrated to impact gender preference.

According to the International Center for Research on Women (ICRW), the single most important factor in decreasing son preference is mothers' education [19]. The role of a girl in the home may change as a result of a woman's education, and her preference for sons may decrease. Women who have earned education beyond elementary school, such as secondary or higher education, have a different perspective on their sons as the primary source of economic and social support [20]. Employed women will have a lesser son preference since they will see having a girl as equal to having a male in terms of providing for their family.

However, the situation in India with regard to son preference is concerning, since it is commonly linked to the neglect and death of millions of girls as a result of infanticide, sex selective abortions, poor nutrition, and a lack of medical treatment [5]. India is a diverse country, with distinct faiths, regions, and demographic groups displaying a wide range of views and interests. There is a cultural split between the states of North and South India. In comparison to South India, the exogamous marriage system in North India favors a strong patriarchal value and less female liberty. In India's northern and western states, high levels of gender discrimination against women have been recorded [49].

In human civilization, the family is the most basic unit. The size and makeup of the home are crucial aspects of the family and society as a whole. A healthy sex ratio is essential for creating and maintaining a stable society. In India, people have a significant preference for male children, and this discrimination or prejudice persists despite socioeconomic progress and greater growth rates. The preference for sons has been linked to preferential termination of female fetuses and even infanticide of females.

5. CONCLUSION

The current study showed that diet preference among mothers affects the gender of the baby as the results showed. Some mothers intentionally reported following special diet in order to have specific gender.

CONSENT AND ETHICAL APPROVAL

Administrative approval will be sought from the unit of biomedical ethics research committee. Ethical approval was sought from the ethical committee of the faculty of medicine, King Abdul-Aziz university. An informed consent was sought from the participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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