Association between Fetus Gender and Some Physiological and Morphological Characteristics of Pregnant Women

العلاقة بين جنس الجنين وبعض الصفات الفسلجية والمظهرية للنساء الحوامل

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الخلاصة:
الهدف:تحديد الإرتباط بين بعض الصفات المظهرية والفسلجية للأم (مثل فصائل الدم و حركة الجنين والميول للطعام أثناء الوحام وبعض السلوكيات وشكل البطن ولون حلمة الثدي و مظهر الوجه) مع جنس الجنين.
المنهجية: تم جمع البيانات من (٧٦٦) أمراة حامل (من اللواتي يراجعن مراكز الرعاية الصحية الأولية للحوامل والعيادات الطبية)وكانت جميع العينات المشمولة في الدراسة قد تم تحديد جنس الجنين لهابإستخدام الأمواج فوق الصوتية للفترة الثانية من الحمل للفترة من نيسان2015 الى نيسان 2016. تمت الإستعانة بالحزمة الإحصائية للعلوم الاجتماعية (SPSS) بإصداره الحادي والعشرين (Version 21). تضمن الإحصاء الوصفي تسجيل التكرار وإستخراج النسب المئوية للمجاميع قيدالدراسة، ولغرض بيان الفروق الإحصائية فيما بينها، أستخدم اختبار مربع كاي(Chi-Squared test)وتمت المقارنة على مستوى($P\leq0.05$) و على مستوى ($P\leq0.01$).
النتائج:أظهرت الدراسة ان النسبةالمئوية للمواليد من الذكور بلغت 50.91 % في حين كانت نسبة المواليد من الإناث 49.086% وعلية فان نسبة الذكور إلى الإناث كانت تقريبا 104-100 وهي نسبة طبيعية .أشارت النتائج الى وجود إرتباطا معنويا بين أول حركة للجنين والميول للطعام للأم اثناء الوحام ولون حلمة الثدي للأم أثناء فترة الحمل مع جنس الجنين في حين لم تظهر باقي الصفات (فصائل الدم والسلوك والشكل البطن ومظهر الوجه للأم اثناء الحمل) إرتباطا معنويا مع جنس الجنين.
الاستنتاج: يمكن إعتماد بعض الصفات المظهرية للأمهات أثناء فترة الحمل في تحديد جنس الجنين .
التوصيات: توصي الدراسة الحالية الى إجراء تقييم أكثر شمولا بإعتماد صفات أخرى ودراسة علاقتها بتحديد جنس الجنين .

ABSTRACT:
Objectives: Effect of some physiological and morphological characteristics of pregnant women (such as ABO blood groups, first baby movement, food craving, behaviors, abdomen shape, nipple color and face appearance) to determine baby gender have been investigated.
Methods: Total (766) pregnant women (visit primary health care centers and medical clinics at Al-Najaf city from the period of april 2015- april 2016) using special questionnaire. SPSS .ver.21 statistical software for window was used to analyze data.
Results: The results of the present study show that the percentage of the male sex was (50.91%) whereas about (49.086%) for female sex represented a normal sex ratio was 104-100. The results indicate that a significant association between first baby movement, food craving as well as nipple color of pregnant with baby gender, while there is no significant correlation between the othercharacteristics and baby sex (blood groups, behaviors, abdomen shape and face appearance).
Conclusions: some characteristics of pregnant mothers may be used in determination of baby gender.
Recommendations: studies are needed to make a comprehensive assessment of the correlation between other characteristics and baby sex.
Key words:gender,ABO blood groups, first baby movement, food craving, behaviors, abdomen shape, nipple color, face appearance, relationship.

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Introduction:

Pregnancy is a state that allows a life form to develop with the support and protection of its mother's body.Technologies that allowed for the identification of fetal sex in utero were first introduced in the 1970s. Since then, sex determination techniques have become more affordable, less technically demanding, and less invasive. These involved: amniocentesis and chorionic villus sampling, ultrasound and blood test[1,2].

Sex selection and gender preference have been considered since ancient time. Anaxagoras, a Greek scientist was the first person who related the sex of the fetus to testis. The natural sex ratio at birth is usually 104–107 males to 100 females. Pre-selection of gender of offspring is a subject that has held the man's attention since the beginning of recorded history[3]. While the natural sex ratio at birth is usually 104–107 males to 100 females, in Chinese census data show that 20 years ago, there were 108 males under the age of 5 for every 100 females, and that by 2000 this ratio had shifted to 117 males to 100 females, with some regions reporting ratios of130, in the Indian census of 2001 the sex ratio in the age group 0-6 was 117.8, with some northern states such as Punjab having ratios as high as 120-125. These trends are mirrored in other Asian countries such as South Korea and Taiwan, which have sex ratios at birth of 108 and 109 respectively[4,5,6].

Recently, there are many methods of sex selection such as: The consumption of particular foods, the use of various vaginal douches and the timing of intercourse in relation to ovulation, sperm sorting, pre-implantation genetic diagnosis (PGD), selective abortion, Infanticide, Periconceptual methods, post conceptual methods. There are also methods which use different food combinations and special diets to maximize the chance of having a baby with specific sex [7]. The recent dramatic increase in sex ratios at birth is a result of the convergence of three factors: persistent son preference, decreasing ideal family size, and the rapid spread of prenatal sex determination technology. Understanding the specific dynamics and nuances of each factor is crucial to devising effective, context-specific strategies to halt the expansion of prenatal sex selection. Son preference, the oldest and most deeply rooted of the three factors, may be motivated by economic, social, and/or religious factors[7,8,9].

The study was carried out to investigate the relationship between someof the physiological and morphological characteristics of pregnant mothers during pregnancy (such as a food craving, movement, appearance and blood groups) and baby gender using the statistically significant correlationbetween these variables.

Objectives

Effect of some physiological and morphological characteristics of pregnant women (such as ABO blood groups, first baby movement, food craving, behaviors, abdomen shape, nipple color and face appearance) to determine baby gender have been investigated

Materials and Methods

The present study was involved (766) pregnant women during March 1st of 2015 to October 1st of 2015 visit primary health care centers and medical clinics in Al-Najaf city. All pregnant samples involved in the present study identified their fetus gender by ultrasound duringthe second trimester. The data were collected by direct interview

using a special questionnaire to obtained socio-demographic information. A questionnaire was constructed by the researcher for the purpose of the study which consists two parts:

Part A (For fetus):

I- Fetal gender (male, female)

II- First movement (2nd month, 3rd month, 4th month, 6th month)

Part B (For pregnant women):

I- Blood group (A, B, AB, O)

II- Food craving (sweet, bitter, sour, salty)

III- Behavior (sleep too much, lack of sleep, light movement, heavy movement, nose bleeding, leg cramp.

IV- Abdomen shape (protrude and low, wide and high)

V- Facial appearance (brownness and freckled , whiteness and clear)

VI- Nipple color (dark, faint)

Data analysis:

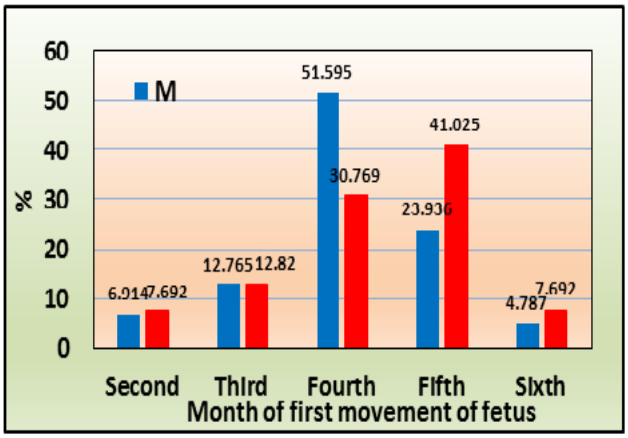
SPSS .ver.21 statistical software for window was used to analyse data. Non-Parametric test (Chi-Squared test (χ^2) was used to detect the significant differences between studing groups of this study. $P<0.05$, $p<0.01$ were considered to be significant at 5% and 1% respectively.

RESULTS:

Total (766) pregnant women were participating in the present investigation, from which 49.086% (376) pregnant withfemalesbabies, whereas 50.913% (390) women have males, which mean that sex ratio was about 104 males to 100 females , represented normal ratio.

Table (1): Frequency of first movement of fetus.

First movement of fetus	Male fetus		Female fetus		Total No.	%
	No.	%	No.	%		
2nd month	26	6.914	30	7.692	56	7.310
3rd month	48	12.765	50	12.82	98	12.793
4th month	194	51.595	120	30.769	314	40.992
5th month	90	23.936	160	41.025	250	32.631
6th month	18	4.787	30	7.692	48	6.266
χ^2 value =73.406 P=0.00			χ^2 value =20.465 P=0.00			



As shown in Table (1), higher percentage of fetus movement occurred in the 4th month (51.595%) in comparison to other months, there are significant differences ($P<0.01$) in the frequency of first movement of fetus in respect to month of gestation of Pregnant women (male gender). Higher percentage of fetus movement occurred in the 5th (41.025%) and 4th month (30.769%) in comparison to other months, there are

significant differences (P<0.01) in the frequency of first movement of fetus in respect to month of gestation of Pregnant women (female gender).

Table (2):Correlation betweenfirst movement and baby gender.

Parameters	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.518	4	0.033
Likelihood Ratio	10.635	4	0.031
Linear-by-Linear Association	2.228	1	0.136

To evaluate whether the two features, baby movement and gender, are correlated, we suggest the following hypothesis: *(Null hypothesis =character and gender of newborns are independent) and Alternative hypothesis = character and gender of newborns are dependent (related)).*

Table (2) gives the results of Chi-Square test, against the Pearson Chi-Square the asymptote significant value was 0.033, and according to this value we reject the Null hypothesis, mean that the two variables are dependent (there is a correlation at P<0.05 between first movement of fetus and gender.).

Table (3): Frequency of blood groups of pregnant women

Blood groups	Male fetus		Female fetus		Total No.	%
	No.	%	No.	%		
A	96	25.531	110	28.205	206	26.892
B	116	30.851	98	25.128	214	27.937
AB	28	7.446	30	7.692	58	7.571
O	138	36.17	142	36.41	278	36.292
χ^2 value = 85.279 P = 0.000			χ^2 value = 68.399 P = 0.000			

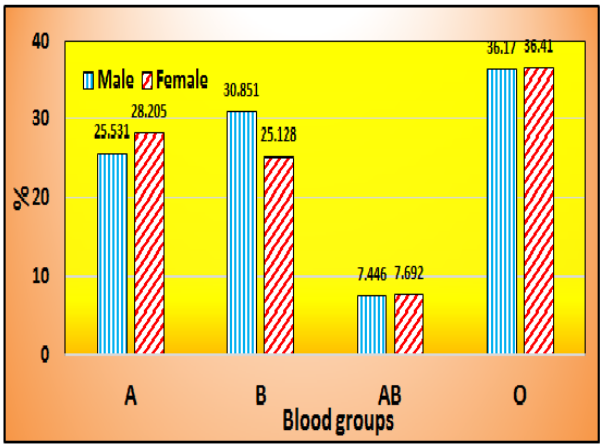


Table (4):Correlation between blood groups and baby gender.

Parameters	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.738[a]	3	0.864
Likelihood Ratio	0.739	3	0.864
Linear-by-Linear Association	0.001	1	0.973

Table (4) gives the results of Chi-Square test, against the Pearson Chi-Square the asymptotic significant value was 0.864, and according to this value we agree the Null hypothesis, mean that the two variables are independent (no correlation between Blood group and gender)

Table (5): Tendencies of Pregnant women towardfood craving

Table (5), shows that pregnant women with males have a sour taste tendenciestowardfood craving higher (68.617%; p=0.000) than other taste, but the bitter taste represented the lowest (2.127 %). In other word tendencies of pregnant women (with male fetus) towardfood craving shows significant differences at p<0.01.Tendencies of Pregnant women (female gender) towardfood craving shows that there are significant differences (P<0.01)in their frequency of different taste. Sweet taste and sour were the highest percentage (48.717 %) whereas; salty food was the lowest (4.615%).

Table (6):Correlation between food craving and baby gender.

Parameters	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.979	3	0.000
Likelihood Ratio	26.759	3	0.000
Linear-by-Linear Association	23.372	1	0.000

Table 6 gives the results of Chi-Square test, against the Pearson Chi-Square the asymptotic significant value was 0. 000, and according to this value we reject the Null hypothesis, mean that the two variables are dependent (there is a correlation between food craving and gender).

Table (7): Frequency of behaviour of pregnant women during pregnancy

Behaviors	Male fetus		Female fetus		Total No.	%
	No	%	No	%		
Sleep too much	180	47.872	154	39.487	339	43.603
Lack of sleep	76	20.212	80	20.512	156	20.365
light movement	62	16.489	50	12.82	112	14.882
heavy movement	160	42.553	198	50.769	358	46.736
Nose bleeding	30	7.978	44	11.282	74	9.660
Leg cramp	114	30.319	200	51.282	314	40.992
χ^2 value=44.927 P= 0.000			χ^2 value=54.452 P= 0.000			

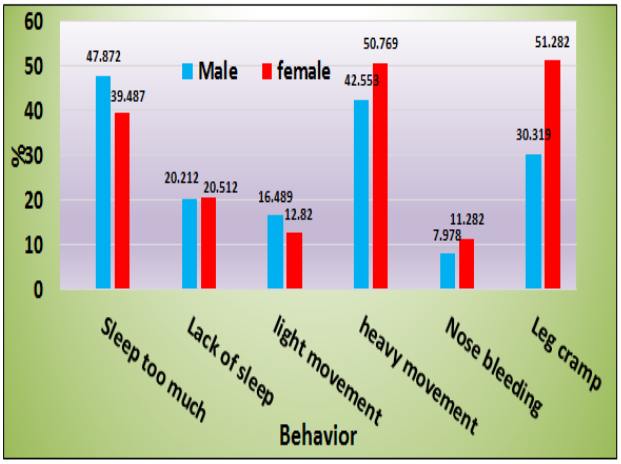


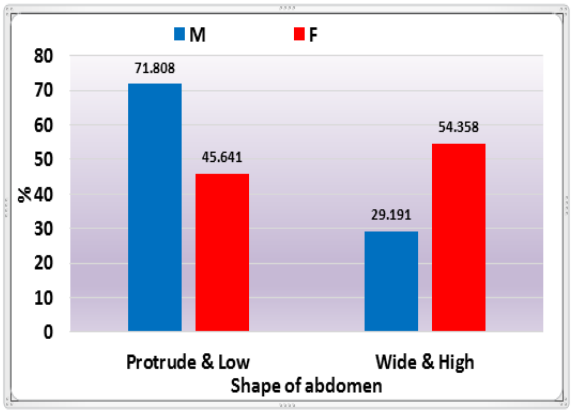
Table (8): Correlation between behavior and baby gender.

Parameters	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.632	5	0.249
Likelihood Ratio	6.675	5	0.246
Linear-by-Linear Association	5.871	1	0.015

Table 8 gives the results of Chi-Square test, against the Pearson Chi-Square the asymptote significant value was 0. 249, and according to this value we accept the Null hypothesis, mean that the two variables are independent (there is no correlation between type of behavior and gender).

Table (9): Frequency of abdomen shape for pregnant women.

Abdomen shape	Male fetus		Female fetus		Total No.	%
	No.	%	No.	%		
Protrude and low	170	71.808	178	45.641	448	58.985
Wide and high	106	29.191	212	54.358	318	41.514
χ^2 value=18.307 P=0.00			χ^2 value=0.640 P=0.484			



In Table (9), protrude and lowAbdomen shapefor pregnant women (male sex) was higher (71.808%; P=0.000) than Wide and highAbdomen shape (29.191%).

No significant differences (p=0.484) were observed between shapes of abdomen for pregnant women (female sex), although Wide and high abdomen shape was slightly higher (54.358%) than protrude and lowAbdomen shape (45.641%).

Table (10):Correlation between abdomen shape and baby gender.

Parameters	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	13.254	1	0.000	
Likelihood Ratio	13.419	1	0.000	
Fisher's Exact Test				0.000
Linear-by-Linear Association	13.188	1	0.000	

Table 10 gives the results of Chi-Square test, against the Pearson Chi-Square the asymptotic significant value was 0.000, and according to this value we reject the Null

hypothesis, mean that the two variables are dependent (there is a correlation between shape of abdomen and gender).

Table (11):Frequency of face appearance of pregnant women.

Table (11) &Figure (6) show no significant differences (p=0.841) were observed between Face appearance characteristics of pregnant women (male fetus). Approximately, both features of Face appearance have same percentage. Brownness and Freckled face appearance represents (62.564%), this percentage was about twice time more than Whiteness and Clearface appearance (37.435%) in pregnant women (female sex) . Chi-square test shows a significant differences at P<0.01 between them.

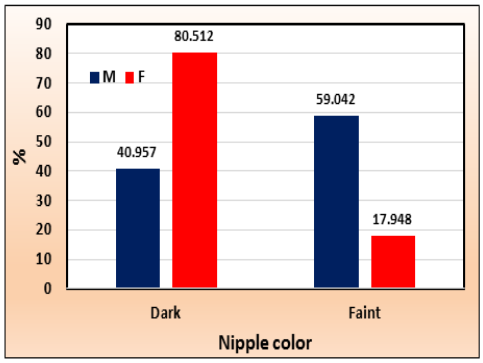
Table (12):Correlation between face appearance and baby gender.

Parameters	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	2.938	1	0.087	
Likelihood Ratio	2.945	1	0.086	
Fisher's Exact Test				0.116
Linear-by-Linear Association	2.923	1	0.087	

Table 12 gives the results of Chi-Square test, against the Pearson Chi-Square the asymptotic significant value was 0.085, and according to this value we accepts the Null hypothesis, mean that the two variables are independent (there is no correlation at P<0.05 between face appearance of pregnant and gender).

Table (13):frequency of nipple color of pregnant women .

Nipple color	Male fetus		Female fetus		Total No.	%
	No.	%	No.	%		
Dark	154	40.957	314	80.512	468	61.096
Faint	222	59.042	70	17.948	292	38.120
χ^2 value=3.240 P=0.089			χ^2 value =40.091 P=0.000			



In Table (13). although, faint nipple color have more percentage (59.042%) than dark (40.957%), no significant differences (p=0.089) were observed between nipple color characteristics of pregnant women (male gender). Dark nipple color have higher percentage (80.512%) than faint (17.948%). Significant differences (p=0.000) were observed between nipple color characteristics of pregnant women (female gender).

Table (14): Correlation between nipple color and baby gender.

Parameters	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	34.942	1	0.000	
Likelihood Ratio	36.357	1	0.000	
Fisher's Exact Test				0.000
Linear-by-Linear Association	34.766	1	0.000	

Table 14 gives the results of Chi-Square test, against the Pearson Chi-Square the asymptotic significant value was 0.000, and according to this value we reject the Null hypothesis, mean that the two variables are dependent (there is a correlation at P<0.01 between nipple colorof pregnant and gender).

Discussion:

The results of the present study revealed that sex ratio was normal, about 104 males to 100 females. The natural sex ratio at birth is usually 104–107 males to 100 females in Chinese census data show that 20 years ago, there were 108 males under the age of 5 for every 100 females, and that by 2000 this ratio had shifted to 117 males to 100 females, with some regions reporting ratios of130[2,4].The recent dramatic increase in sex ratios at birth is a result of the convergence of three factors: persistent son preference, decreasing ideal family size, and the rapid spread of pre-natal sex determination technology. Understanding the specific dynamics and nuances of each factor is crucial to devising effective, context-specific strategies to halt the expansion of prenatal sex selection. Son preference, the oldest and most deeply rooted of the three factors, may be motivated by economic, social, and/or religious factors[10].

Disregarding the babies' blood groups, the sex ratio is higher for babies of AB than of non-AB mothers. Disregarding the mothers' blood groups, the sex ratio is lower for A than non-A babies, while in the author's own series, included above, the ratio is lower for A babies possessing than for those not possessing detectable A1 antigen.It is suggested that a possible cause of these differences is sex-differential fetal mortality caused by interaction of the ABO genes, and some of the sex-determining genes, with oestrogen and progesterone.On the other hand, many researches study the relationships between gender and another factors such as ABO blood groups, mothers diets.In the aggregate of the seventeen published series of the ABO blood groups of newborn babies and their mothers there are substantial reciprocal differences by maternal ABO blood group in respect of the ratio of male to female babies[8,11].

Recently, there are many methods of sex selection such as: The consumption of particular foods, the use of various vaginal douches and the timing of intercourse in relation to ovulation, sperm sorting, pre-implantation genetic diagnosis (PGD), selective abortion, Infanticide, Periconceptual methods, postconceptual methods. There are also methods which use different food combinations and special diets to maximum the chance of having a baby with specific sex [5,7].

The old believe is that eating salty, savoury foods leads in delivering a male and calcium rich foods to a female. Some believe that the ratio of the minerals sodium, potassium, calcium and magnesium are important in determining of baby gender. It was shown that pregnant female house mice maintained on a consistent low-food diet give birth to a lower proportion of males than control females fed ad libitum [10,12,13].

The diet may influence the conditions within the reproductive tract and the outer barrier surrounding the ovum, enabling only one of the two types of sperm to penetrate the depending on which diet is adhered to. Langdon and Proctor first published the preconception Gender Diet `based on results reported the theory is that, by altering your diet to include and exclude certain foods, the conditions in the reproductive tract will be directly affected, increasing the odds of conceiving a particular sex [6,11, 12].

We hear these sorts of relationships that it seems completely normal or believable, but like other folklore around the world behind guessing a baby's gender, it's not based on anything factual, so other studies are needed to discover the scientific basis behind these beliefs.

Conclusions:

Some characteristics of pregnant mothers may be used in determination of baby gender.

Recommendations:

Studies are needed to make a comprehensive assessment of the correlation between another characteristics and baby sex.

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