Original Research Article

Effect of different Seasons on pregnancy gender outcome in sample of Iraqi women

Abstract

Background: Sex ratio is important for human life since its creation, some families prefer male than females, also its related to some medical problems that affect certain sex than another. Studies showed that males are more fragile, and might die earlier than females. Climate has a certain effect on male to female ratio of the pregnancy outcome and certain seasons are in favor of male than female reproduction.

Objectives: To evaluate the effect of climate and seasonal variation on the sex of live births in a sample of pregnant Iraqi women.

Subjects and Methods: This study was carried out on 2424 live babies (apart from 225 miscarriages) of women attending Al–Numan teaching hospital and Al-Husaynia health care center, from January 2017 till January 2019.The time of last menstrual period recall was taken from each mother of this study. an early ultrasound test was done to confirm the accuracy of pregnancy duration. The gender of live babies, maternal age and parity were recorded .

Results: The highest birth rate were in Autumn (721) then Winter (662), Spring (577) and the least in summer (521).

The male to female ratio increased with maternal age. Mothers of 30 years and over have 1.09male female ratio as compared with those under the age of 30 years (0.929).

The male female ratio was highest in Autumn 1.06 compared with other seasons; 0.97, 0.9233 , 0.887 Winter, Spring and Summer respectively. The abortion rate was only (0.09) from total births.

Conclusion:

The best season for conception in Iraq was Autumn. The total male female ratio regardless the season was 0.9659. The male female ratio was best in Autumn then Winter , Spring , lastly Summer. Sex differences shows that; males are conceived in seasons of more favorable conditions for reproduction.

Key words: Birth rate, climate, Iraqi women ,gender, maternal age, pregnancy, seasons, sex ratio.

Introduction:

Sex ratio is important for human life since his creation . the gender of a pregnancy outcome has many implications like socioeconomic, some families prefer male babies than females, somehealth problems affect certain sex more than the other etc. most studies had shown that males are more susceptible to be affected by harsh environmental conditions like heat i.e. they are more delicate and might die earlier than female babies [1]. Human studies suggested that climate has certain effect on male to female ratio of normal pregnancies and certain seasons are in favor of male than female reproduction. Mothers usually get pregnant with male babies at optimal conditions than females.

The male to female ratio (i.e. sex ratio) decreases, as a results of changes in conditions of environment like; contaminated environment[2; 3], destructive earthquakes , smoking parents [4,5], and aged mothers or fathers [6.]

Paternal age is of importance especially in mothers with multiple pregnancies, because the nutrients and energy available for their babies are less[5,6]. Hopefully the diurnal pattern and changes in temperature and environments in different seasons are important for conservation of species. The plan of people using certain seasons for breeding by designing the time of reproduction and hence delivery to seasons that are more favorable for the survival of newborn. Cagnacci and Volpe, claimed that human being are not seasonal breeders. but if human follows certain rules for conception as changes in climates according to seasonal variation[7], This would have good applicants for babies to be conceived and then delivered in better situations so give us a good environment for more male babies in more favorable conditions .Melnikov *et al.* reported an excellent percentage of mother conception with male babies in western parts of Siberia during summer time, but less male ratio in winter [8].

Since the length between conception and delivery i.e gestational period might vary, so the Sex ratio at birth may not be very accurate [9]. So in this study evaluation of the effect of variation between seasons and its effect on reproduction rates and the sex ratio was detected as accurate as possible

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Subjects and methods:

This study was carried out on 2481live birth (apart from 225 miscarriages) from women attending Al –Numan teaching hospital and Al -Husaynia health care center in Baghdad, from January 2017 till January 2019.The pool of mothers was from Baghdad center and rural areas around it.

Information on the time of conception was taken from mothers of the babies involved in the study. For every single pregnancy, the time of conception had been taken according to the date of the last menstrual period and was confirmed by gynecological examination.

To be accurate in calculating the duration of pregnancy , an early ultrasound test was done to confirm the accuracy of pregnancy.Women ageranges between (15–45 years),

and only live healthy births involved in the season variation of male female ratio, while the miscarriages were calculated independently.

The ratio of the sex was assessed to evaluate both the month at which pregnancy occurred and the month at which they have their babies. The duration of pregnancy of every single delivery, and the sex of babies i.e male to female ratio of pregnancies that was ended at different weeks of gestation was assessed. The sex ratio was calculated according to the month and the season of delivery.
Observation of variation in sex ratio at different times of gestation were assessed, and at different months and so in different seasons of the year.

Results:

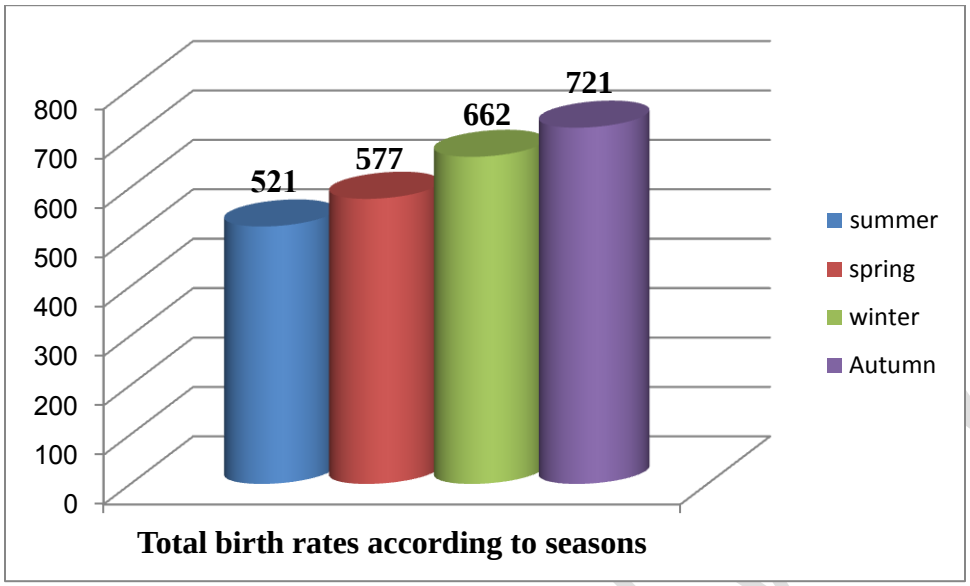
This study included 2736 pregnancies :2481 normal live birth from Iraqi women and 255 are aborted early in pregnancy. The study carried out from January 2017 till January 2019.

Table 1 shows the demographic data of the studied group; the age of mothers was (15-45 year) with a mean± SD of (30 ± 5.6 years)

Table 1: The demographic data of all women with their new born babies participating in this study

Total no.	**2736**
Mother age	**15-45**
Number of live births	**2481**
Number of male babies	**1219**
Number of female babies	**1262**
No of miscarriages	**225**

The differences in number births between seasons are shown in Figure 1.



Figure(1) seasonal variation of total birth rates

This figure shows that the highest birth rate was in Autumn (29.1%) then Winter (26.7%), Spring (23.2%) and least in summer (21%).

The distribution of pregnancy outcomes as male and female are shown in figure 2. The highest number. of males were in autumn then winter spring and summer respectively.

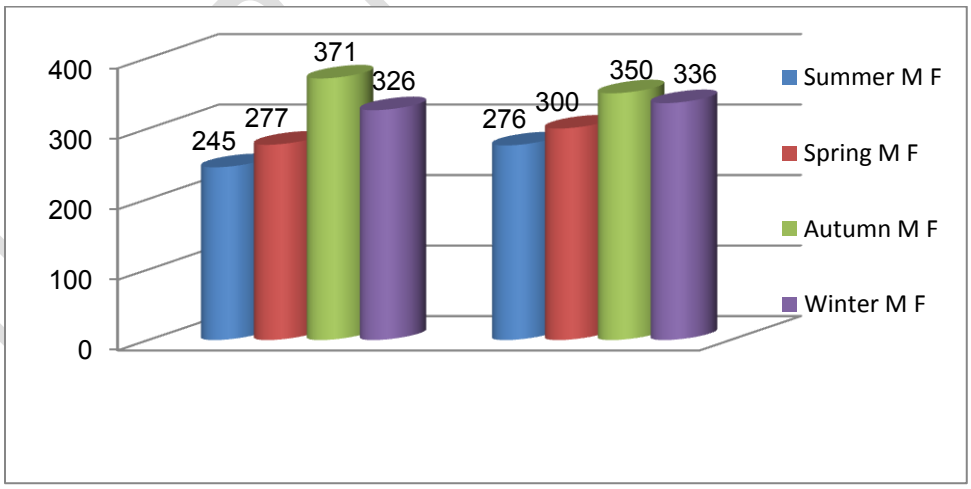


Figure (2) The differences between male and female outcome of pregnancy according to season(left side male ;right side female)

The total male female ratio in the studied group is shown in (Table 2) . The male to female ratios was 0.9659.

The male female ratio increased with mothers age. At the age of 30 years and over the male to female ratio was 1.09 as compared with those under the age of 30 years which was 0.929.

While the best season for males was Autumn as shown by male female ratio of 1.06. then Winter, Spring and Summer shows; 0.97,0.9233 ,0.887 respectively.

Table(2) Characteristics of the birth-sex ratios according to age and season.

Characteristic	Male	Female	Sex Ratio (M/F)	*p*-value
Mother Age				
≥30 total 600	**313**	**287**	**1.090**	**0.05**
<30 1881	906	975	0.929	0.05
Total male&female2481	1219	1262	0.9659	0.05
Pregnancy Season				
Summer	245	276	0.887	0.05
Spring	277	300	0.9233	0.05
Autumn	**371**	**350**	**1.06**	**0.01**
Winter	326	336	0.97	0.05

P≤ 0.05 regarded as significant

Table (3) Miscarriages during seasons

Miscarriage history	Total of seasons	Winter	Spring	Summer	Autumn	P value
<30 year	124	41	4	35	44	0.01
≥30 year	101	36	3	18	44	0.01
total	225	77	7	53	88	0.01

P≤ 0.05 regarded as significant

Table 3 shows miscarriages .The total abortion rate was only 0.09, which was more under the age of 30 ,and less over 30 years.

Highest number of miscarriages were in Autumn then in Winter, Summer and the least were in Spring.

Discussion:

The results of this study showed that pregnant females in summer or spring are more likely to deliver girls than boys, when they are compared with pregnant in autumn then winter . Our results were partly aligned with previous studies that stated there is a seasonality variation of birth-sex ratio they pointed to variation in sex with different seasons[10].

Another study conducted In Siberia showed that summer season in Siberia is the season of male babies[8].Male babies are more fragile than female so it requires cool weather ,in Iraq summer has long day 16 hours and very hot temperature ranges between 47- 52 ° C. that' s why summer is not the season for male in Iraq.

This is the 1st study done in Baghdad , the change in male ratio can be attributed to effect of melatonin since it increases ovulation and it's a survival factor for sperms as well [11], when the weather in Iraq transferred from summer to Autumn day night cycle changed: day hours12 hour especially in October and November. Melatonin release is more this means more antioxidant and good fertility environment hence good fertility rates [12,13,14] and so it's a good climate for male babies since melatonin level is higher [15]. The abortion rates were highest in autumn due to the large number of pregnancies so in comparison with another seasons it seems more. The male to female ratio increased with maternal age it was more at 30 years and over (1.09) as compared with those under the age of 30 years (0.929).This can be attributed to the increased age of marriage in Iraq and can be explained that the more mature the mother is it takes more care of herself, as good nutrition as well as good sleeping hours.

Conclusions:

From this study we concluded that the best season for conception in Iraq was Autumn. The total male to female ratio regardless the season was 0.9659. The male to female ratio was best in Autumn then Winter , Spring and lastly Summer. This supports the idea that more males than females are conceived in seasons with more favorable reproductive conditions. The male to female ratio increased with maternal age it was more at 30 years and over (1.09) as compared with those under the age of 30 years (0.929).

Ethical clearance-taken from Republic of Iraq/ministry of health,/Baghdad Al Russafa Health **.**

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