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Effect of Seasonal Variations on human semen parameter

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Abstract

Background: Effect of seasonal variations in human fertility has been intensively researched; some studies acknowledge influences of seasonal changes on natural conception while others cannot confirm them. The aim of this study was to assess the presence of a possible Seasonal pattern in the functional parameters of Semen samples.

Materials and Methods: This study was carried out on 335 Semen samples that were collected and analyzed according to the average highest temperature of the Normo-spermic men between January 2019 and December 2 014 at the Fertility Center in Al-Sadr medical city. Najaf Iraq.

Results: ALL Semen Parameters displayed trends opposite to average highest temperature variations. Semen volume, sperm concentration sperm motility and normal sperm morphology were significantly lower ($p<0.05$) in summer than other seasons of the red year: Semen volume sperm concentra and normal sperm morphology was found to be statistically significantly higher in the winter ($p<0.05$). The percentage of sperm motility was a significantly ($p<0.05$) is higher in spring The highest values of Semen volume sperm concentration and sperm morphology was recorded in January and February, while a higher sperm motility was found during the march any of the year.

Conclusion: We observed that was significant effect of season on the semen parameters. Highest environment temperature may be a determining factor for the seasonal variations in semen quality.

Keywords: *Seasonal variation, semen Parameters, temperature, months*

Introduction

Infertility, defined as the anability to conceive after 12 months of regular unprotected sexual intercourse, is present in approximately 15 - 20 % of couples(1). Male Infertility is responsible of about 6-50% of all cases of couples infertility , including genetic disorders , alteration of the Semen and disorders in hypothalamic-pituitaryadrenal axis due to congenital or acquired conditions (2).

Impact of Seasonal variation on human semen quality of fertile male.

Seasonal variations in semen have been studied intensively during quality the past years (3). Seasonal Variation in conception and birth rates have drawn attention to the

relationship between seasonal changes in sperry parameters. Changes in temperature and photoperiod were suggested to partially responsible for the circannual variations observed in sperm parameters by various researchers(4). Semen analysis is frequently used to evaluate male infertility. Assessment of semen quality is based on an evaluation of several parameters, including semen volume, PH, sperm concentration, sperm motility and sperm morphology (5).

Semen Parameters Seasonal variations in in both fertile have been reported and infertile men (6). Therefore & in this study we aimed to investigate the variation in semen quality in Al-Najaf Iraq during different durations of the year.

Materials and methods

This retrospective study include a consecutive series of 335 semen samples that were collected from patients as a part of the basic evaluation of the Normospermic men between January 2019 to December 2019 at the fertility Center in Al-Sadr medical city Najaf. Iraq.

Each record contain the patients date of birth, date of semen analysis, and semen analysis results (semen volume, pH, sperm concentration, motility and morphology). as well as the season in which each semen analysis was performed: Winter was defined as December, January, and February; Spring as March, April and May ; Summer as June, July, and August ; and fall as September, October, and November.

Collection of semen Samples

Semen was collected by masturbation into asterile, wide mouthed polystyrene container in a private collection room in the Laboratory. The recommended Period of abstinence was 2-7 days.

Semen specimens were allowed to Liquefy for at least 20 minutes in an incubator at 37 ℃ and were analyzed within 60 minutes after the samples were collected.

The Parameters for the semen analysis were analyzed and classified according to the World Health Organization (WHO) criteria (WHO,1999).

Groups

The temperature of AL-Najaf city rises gradually from march to August and then decreases gradually from se September to February e with the lowest Level in January and the highest in August. The data from 335 semen samples were divided into four groups according the average highest temperature (AHT) and the date of ejaculation (Table 1).

Table 1: Groups of samples according to the AHT minimal variation and the date of ejaculation day during the years of 2019.

Groups	Dates	AHT
winter	December to February	19 ℃
spring	March to May	30 ℃
summer	June to August	45 ℃
Fall	September to November	32 ℃

Statistical analysis

To investigate whether there were differences in semen Parameters across season. We performed SPSS analyses (Statistical package for social sciences) version, 20 (2011). Chi-square were utilized to evaluate differences among the different seasons. For analysis, we use independent sample to test, and mean with standard divation as descriptive statistics .A.P value of less than 0.05 was considered to be statistically significant.

Results

A total of 335 semen samples of Normospermic patients were involved in this study during their attendance at the Fertility Center , Al-Sadr medical city Najaf Iraq. The mean age for normospermic patients was 32.32 ± 4.34 years.

As shown in Fig. 1, the monthly temperature Parameter changes in AL-Najaf. Maximum temperature was during the summer especially in the months of July and August. While the minimum temperature was during the winter especially in the months of January.

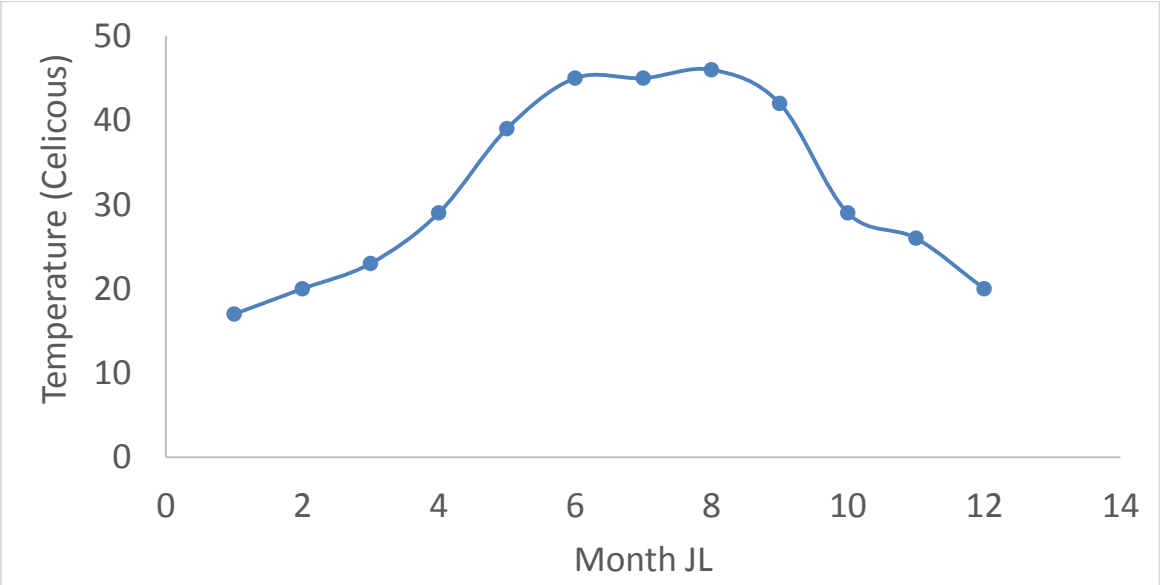

Figure1: Monthly temperature changes

There was a significant effect of average highest temperature (AHT) on all semen parameters ($p<0.05$). Semien volume e sperm concentration, sperm motility and normal sperm morphology parameters from the different groups are shown in Table 1.

All semen parameters displayed trends opposite to AHT variation. Semen volume a sperm concentration, sperm motility and normal sperm morphology were significantly lower ($p<0.05$) in summer than other periods (2.4 ± 1.22 ml, 39.1±20.23 million/ml , 46±17.56 % and 30±18.66%, respectively).

The average of semen volume that was Statistically significant ($p<0.05$), the peak of semen volume was found in winter (3.8±1.61mL) and then in spring and fall (3.3±1.51 and 3.3±1.49 mL).

The highest sperm concentration was a significantly in winter (67.8±30.53 million / mL) and then in spring (61.3± 29-12 million /ml).

The average values of sperm motility that was a significantly ($p<0.05$) is higher in spring (63.3± 22.91%) and in winter (61±20.311%). The seasonal average Normal sperm morphology is significantly ($p<0.05$) in winter (44.6± 21.51 %) and then in Fall (37.3±20.34 %).

Table2: Seasonal Variation in normozoospermic sperm samples.

Sperm parameters	Spring(n=72) mean±SD	Summer (n=88) mean±SD	Fall (n=90) mean±SD	Winter (n=85) mean±SD	P. value
-Volume (ML)	3.3±1.51	2.4±1.21	3.3±1.49	3.8±1.61	0.002
Concentration (M/MK)	62.3±29.12	39.6±20.23	59±26.32	67.6±30.53	0.024
Total motility (%)	63.3±22.91	46±17.56	56±19.13	61±20.31	0.029
Normal morphology (%)	34.3±19.72	30±18.66	37.3±20.34	44.6±21.51	0.037

Test for trend ($p<0.05$)

Figure 2. Shows semen volume rates during - the twelve months of 2019. The highest value of semen volume was recorded in January and February (4.2 and 3.8)mL, the a gradual decrease occurred to reach the lowest value for semen volume in July and August (2.1 and 2.4) mL, then the average semen volume began to increase gradually in September (3.4) mL, to reach its highest and December value in November (3.5) mL, that was statistically Significant ($p<0.05$).

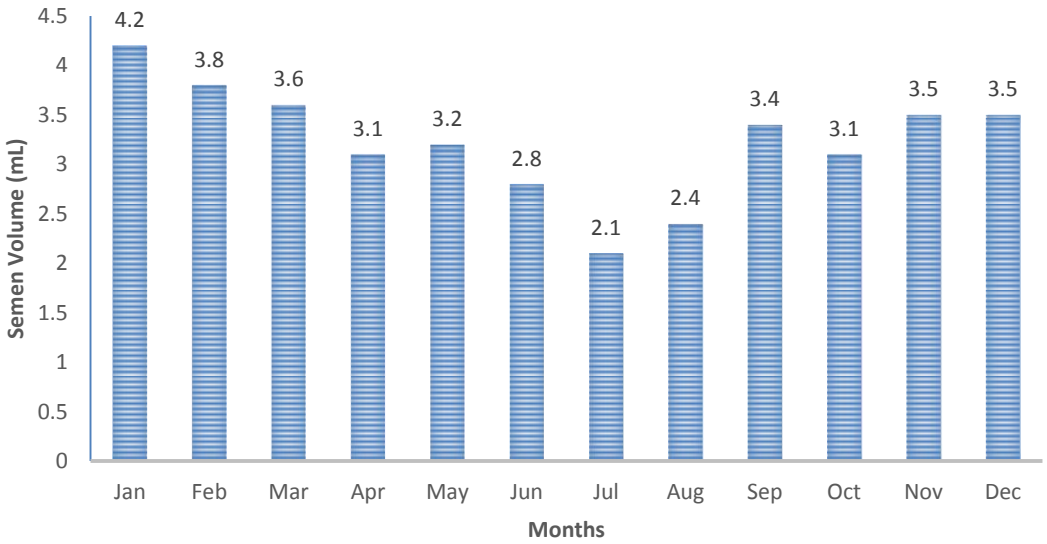

FIGURE 2: COMPARISON OF SEMEN VOLUME AMONG DIFFERENT MONTHS

As shown in figure 3, the sperm concentration rate was significantly ($p<0.05$), hest in January (77) million /mL and the lowest in July and Angst (32) million/mL. A higher sperm motility was found during the March and February (68 and 65) % although was decrease from April, May and June (60, 62 and 52 respectively)% and then reach to the Lowest value July and August (45 and 41)%, while the percentage of motility increase gradually from September (50%) to reach (63%) in December, that was statistically significant ($P<0.05$) Figure 4.

Monthly variation in normal sperm morphology are shown in figure 5. The mean of normal morphology was significantly ($P <0.05$), the higher value was in January and February (50 and 44%) were lower than in July and August (28 and 29 %).

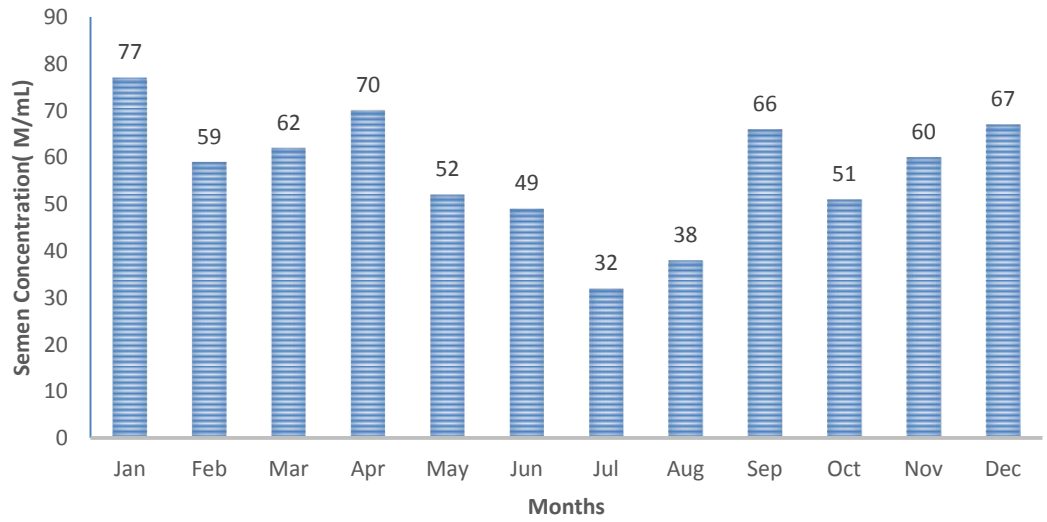

FIGURE 3: COMPARISON OF SPERM CONCENTRATION AMONG DIFFERENT MONTHS OF YEAR 2019

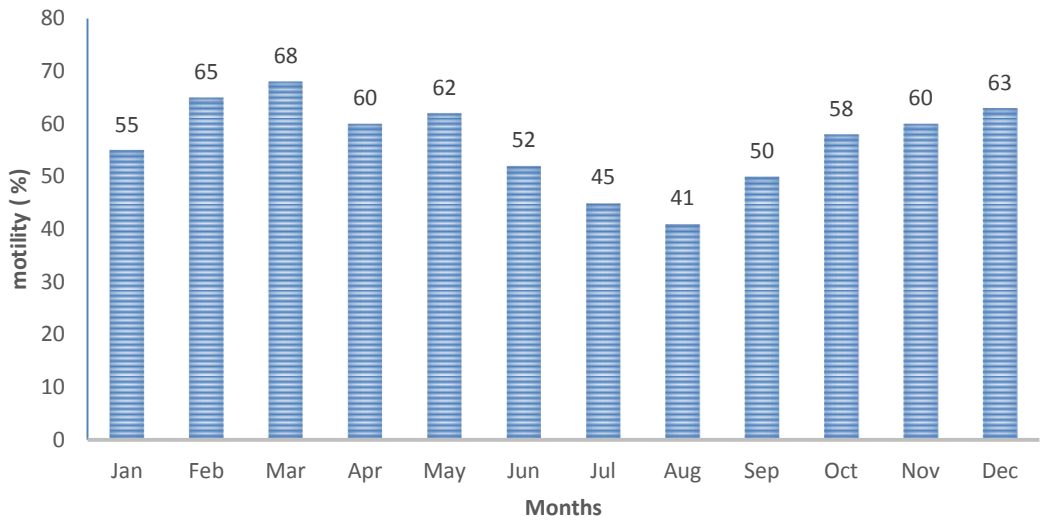

FIGURE 4: COMPARISON OF MONTHS SPERM MOTILITY DIFFERENT MONTHS OF YEAR 2019

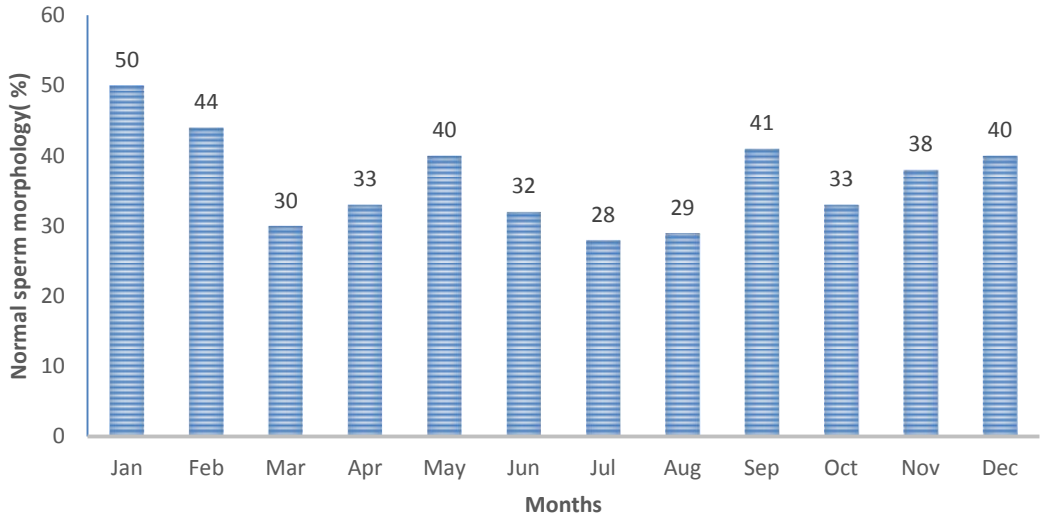

FIGURE 5: COMPARISON OF NORMAL SPERM MORPHOLOGY AMONG DIFFERENT MONTHS OF YEAR 2019

Discussion

This study was conducted in the AL-Najaf. Iraq. The climate in Iraq, especially in the south and the middle, is characterized by the presence of four true seasons: Winter, Spring Summer and Autumn where temperatures rise in summer to approximately 45 ℃ or more in July and August, while the temperatures in the winter & falls to less than 17℃ in January and February.

The climate is mild in the spring (figure 1). These differences were related of environmental temperatures on testicular temperatures and then on the DNA senthesis, infact, high environemental temperetures may be associated to reduction of

spermatogenesis and therefore to semen quality (7). In the present study, semen volume e sperm concentration, sperm motility and normal sperm morphology.

Show Peak values in winter versus the Lowest values during the Summer (Table 1). A higher Semen volume shows in winter than in other seasons and is Lowest in Summer

Similarly, Reinberg et al (8) demonstrated a peak Semen volume during winter. However, Centola and Eberly (9) did not demonstrated aseasonal variation in semen volumes whereas Chen et al (10) reported no seasonal effect on the Semen volume in accordance with the studies Published by (11,12).

Some of the Published Studies reported a peak mean sperm concentration during the winter (13,14), and a lowest sperm count in summer (15,16). These researchers speculated that changes in sperm concentration might be related to changes in the temperature and photoperiod as a temperature 2-3 ℃ below the rectal temperature is required for normal spermatogenesis and sperm production inhibited by increased temperature in the testes (17). The results of the studies on seasonal variations in sperm motility are inconsistent (18), showed no seasonal variations insperm motility On the other hand , Levitas et al (19) demonstrated the peak sperm motility was observed in summer while the Lowest values were recorded in winter months. In accordance with this study, DeGeorgi etal (20) found a higher sperm motility during summer. In another Study (21) reported that the total sperm motility was highest in the winter and fall seasons. In our study, the sperm motility was highest in spring and winter and similar to the study by Levine (22) the highest value of total sperm motility in spring was attributed to the increase in sperm motility values. However, the study presented above also showed that sperm motility which may reflect an increase in fecundability was found to be significantly increase in spring and winter samples.

The results of present study was showed the peak percent mean normal sperm morphology was present in winter followed by the fall and our data also supported aseasonal pattern compatible with impaired sperm morphology during the summer months and agradual increase in the samples given during the fall and winter months. This finding might imply the possibility of higher success rate in infertility treatment during winter and fall. In some studies, investigators reported no statistically significant seasonal changes in sperm morphology (22, 23).

Levitas et al (24) showed that the mean percent normal morphology was highest among the winter and spring and Lowest in summer.

Conclusion, this study revealed the impact of seasonal variation in several semen parameters. Highest environmental temperature me be an unfavorable factor effecting the seasonal changes in semen quality.

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