



# There is No Effect of Total Sperm Count on Pregnancy Rates in ICSI Cycles

## İcsi Sikluslarında Toplam Sperm Sayısının Gebelik Yakalama Oranına Etkisi Bulunmamıştır

Effect of Total Sperm Count in ICSI Cycles

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### Özet

**Amaç:** Total sperm sayısının gebelik oranlarına etkisinin araştırılması. **Gereç ve Yöntem:** Bu retrospektif kohort çalışma, Ocak 2010 ve Aralık 2012 tarihleri arasında toplamda 661 İCSI siklusunu içeren iki farklı yardımcı üreme teknikleri merkezinin verilerinden elde edilmiş olup, bu sikluslarda total sperm sayısının ile gebelik elde etme oranlarını karşılaştırmıştır. **Bulgular:** Gruplar arasında gebelik oranlarında fark bulunmasına rağmen bu fark istatistiksel olarak anlamlı bulunmamıştır. **Tartışma:** Çalışmamızda İCSI sikluslarında total sperm sayısının gebelik oranlarına etkisi olmadığı gösterilmiştir.

### Anahtar Kelimeler

Sperm Sayımı; İCSI; Gebelik Oranları

### Abstract

**Aim:** To determine whether the total sperm count has any effect on pregnancy rates in ICSI cycles. **Material and Method :** This retrospective cohort study was performed on single ICSI cycles of 661 couples in two separate Assisted Reproduction Technology Centers between January 2010 and December 2012. Total sperm count and pregnancy rates were compared. **Results:** Pregnancy rates showed difference among total sperm count groups but there was no statistically significant difference between them. **Discussion:** It is shown that there are no statistically significant effect of total sperm count on pregnancy rates in ICSI cycles.

### Keywords

Total Sperm Count; İCSI; Pregnancy Rate

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## Introduction

A lot has happened in 30 years since World Health Organization published the book on evaluation of sperm in 1980. Although its importance on fertility is known, sperm studies couldn't be done in a standard way for many years. At present while lots of new research is being planned, WHO published the 5th edition of sperm parameters in 2010. Sperm parameters are very important determinants of success in intrauterine insemination (IUI) [1,2]. Also it is known that total motile sperm count has an important role in the success of in vitro fertilization (IVF) [3,4]. Nowadays, the most common method used is intra cytoplasmic sperm injection (ICSI) which can provide pregnancy in severe male factor infertility [5,6,7]. Today, a more advanced method called intra cytoplasmic morphologically selected sperm injection (IMSI) is being used and better pregnancy rates are emphasized in many publications [8,9,10]. While sperm DNA disorders is being examined, local hospitals still use basal sperm evaluation values and semen analysis as the easiest way to evaluate testicular function [11, 12].

## Material and Method

This study is undertaken by retrospectively evaluating the data of patients who consulted our Assisted Reproduction Technology Centers between January 2010 and December 2012. Data of the patients were collected by scanning the files in archives section. Patients were contacted by telephone for information that cannot be obtained from the records. ICSI was planned and performed in all patients. Controlled ovarian hyperstimulation (COH) was done in one of the two ways in all patients who were included in the study group. In the first one, controlled ovarian hyperstimulation was performed by a GnRH agonist Luprolide Acetate (Lucrin, Abbott, USA) with recombinant-FSH (Organon and SeronoBenelux BV, The Hague, TheNetherlands). GnRH antagonist Cetrorelix 0.25 mg (Cetrotide, Serono Laboratories, Aubonne, Switzerland) was used with recombinant-FSH in the second technique. Ovarian response was observed by intermittent follow-up of the estradiol (E2) measurements and transvaginal follicle measurements. 250 mg recombinant Human Chorionic Gonadotrophin (hCG Ovitrelle Merck Serono SA, Bari, Italy) was administered when follicles reached the desired size, and oocytes were collected by the help of transvaginal ultrasonography (USG) after 36 hours. Oocytes were extracted from the surrounding cumulus cells by hyaluronidase (80 IU/ml LifeGlobal, Connecticut USA) after they were left 2-3 hours in the culture medium. ICSI was performed in all patients in standart ways. 3rd day embryo was transferred to all patients with ultrasound guidance. Luteal phase support was given in all patients one day after oocyte pick-up with vaginal suppository progesterone twice daily. (Crinone, Serono). B-hCG levels were checked 12 days after the transfer for pregnancy. Sperm parameters assessment was done in the day of oocyte retrieval in fresh semen. Total sperm count, volume, motility and morphology were evaluated. Total sperm count was determined by using Makleror Neubauer Counting Chamber. Statistical relationship between sperm count and pregnancy rates were calculated. Total sperm count was divided into six groups as less than  $0.5 \times 10^6$ ,  $0.5-1 \times 10^6$ ,  $1-5 \times 10^6$ ,  $5-10 \times 10^6$ ,  $10$  to  $15 \times 10^6$  and more than  $15 \times 10^6$ . Evaluation was performed in totally

661 couples in a single cycle. The patients whose cycles were cancelled for any reason, were not evaluated in this study. To exclude the impact of poor ovarian response and ovarian hyperstimulation, only patients in which 4 to 30 oocytes collected were included in study.

## Results

In our study with single cycle of 661 couples: 35 patients' total sperm count (TSC) was less than  $0.5 \times 10^6$  and nine pregnancies occurred in this group. Pregnancy rate was found as 25.71 %. Five pregnancies occurred in the group of 19 patients whose TSC was  $0.5-1 \times 10^6$ , and pregnancy rate was 26.31%. 15 pregnancies occurred in 43 patients whose TSC was  $1-5 \times 10^6$ , and pregnancy rate was 34%. 18 pregnancies occurred in 51 patients whose TSC was  $5-10 \times 10^6$ , and pregnancy rate was 35.29%. 9 pregnancies occurred in 25 patients whose TSC was  $10-15 \times 10^6$ , and pregnancy rate was 35.29%. There were 488 patients who have more than  $15 \times 10^6$  TSC and 155 pregnancies were achieved in this group. Pregnancy rate was calculated as 31.76%. Number of pregnancies and pregnancy rates between the two groups were different, but there was no statistically significant difference. According to the chi-square test, P value was found as 0.9.

Number of pregnancies and pregnancy rates are shown in Table 1. Figure 1 shows the distribution of pregnancies among groups, and pregnancy rates are shown in Figure 2.

Table 1. Distribution of groups and pregnancies

Total sperm count	The number of patients (Piece)	Number of pregnancies (Piece)	Pregnancy rate (%)
Group 1 (less than $0.5 \times 10^6$ )	35	9	25.71
Group 2 (between $0.5-1 \times 10^6$ )	19	5	26.31
Group 3 (between $1-5 \times 10^6$ )	43	15	34.88
Group 4 (between $5-10 \times 10^6$ )	51	18	35.29
Group 5 (between $10-15 \times 10^6$ )	25	9	36.00
Group 6 (more than $15 \times 10^6$ )	488	155	31.76

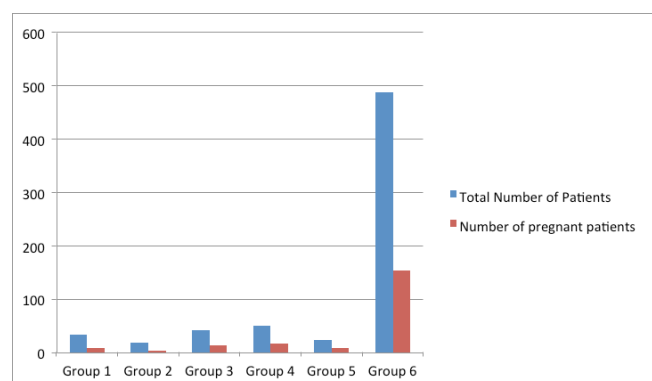


Figure 1. Distribution of pregnancy rates

## Discussion

Many studies were done on sperm parameters in the past. These were about IUI, IVF, ICSI cycles and most results were not satisfactory. Of course randomized studies with larger number of patients should be done but we humbly wish to contribute to these efforts in that accord.

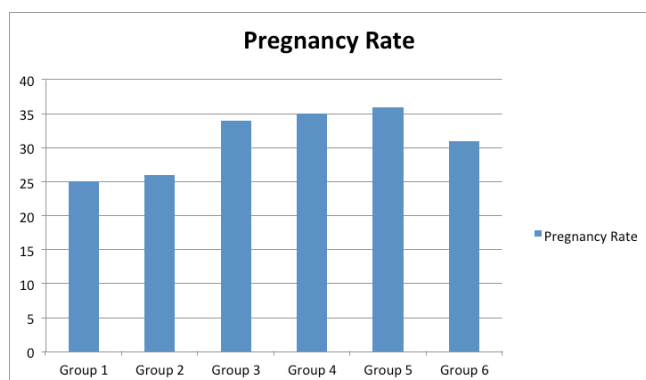


Figure 2. Pregnancy rate

As we know, a normal male can leave 300 million sperms into the vagina by one ejaculation, and only a few hundred of them can reach fallopian tube's ampullary side. Sperm rests here for 1-3 days for the fertilization of the oocyte [13]. Sperm completes its process of capacitation during this trip. By skipping these steps, we can reach higher success rates in patients with lower sperm counts in ICSI.

Total sperm count, motility and morphology was compared with the results of patients undergoing ICSI in an article published by Zsolt et al in 1998. Although there was numerical differences in clinical pregnancy rates and embryo quality, TSC was not found to have a statistically significant effect on the results in ICSI cycles [14].

Repping et al made 1569 cycles on 892 couples in 2002 and they said total motile sperm count was determinative in pregnancy failure in IVF [15]. According to this study IVF failure was more evident when the sperm count was low. The results of this study was found like that because many levels which is bypassed in ICSI was considered a handicap in IVF.

In a study by Arat et al made in 2012 on 666 patients in 1456 cycles, it was shown that, the number of total motile sperm did not affect embryo quality and implantation rate [7].

Again in 2012, Arian et al examined 560 ICSI cycles slightly different than our study. The difference of their study from our's was that they took sperm ranges wider and evaluated fertilization percentages. In our study, we evaluated TSC less than  $0.5 \times 10^6$  as a separate group. Arian et al showed that pregnancy rates did not change while fertilization rates were lower in the TSC less than  $10 \times 10^6$  group [16]. At the end of our study we found that pregnancy rates are lower in the TSC less than  $1 \times 10^6$  group, but no statistically significant difference was found.

Amanda Souza Setti et al published a study in 2012. In this study, fertilization rates, D3 and D5 embryo quality was found to be much better in Intracytoplasmic morphologically selected sperm injection (IMSI) than Intracytoplasmic sperm injection (ICSI). In this study, it is also said that good results were achieved when oocyte morphology was also included in evaluation [17,18].

There are similar studies as our's and also at the present time sperm DNA fragmentation is performed in many centers but still the choice for treatment is determined by a simple sperm parameters analysis in many technologically insufficient centers. Of course more studies should be performed with more

patients and cycles count and perhaps sperm DNA oriented examinations will take over features like number, morphology and motility in the future but for the present time we believe our study contributes to the current literature.

### Competing interests

The authors declare that they have no competing interests.

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