MALE AND FEMALE FACTORS CONTRIBUTING TO HIGH PREGNANCY RATE OF INTRAUTERINE INSEMINATION

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INTRODUCTION

During previous decades infertility has become a considerable public health issue among one of every seven couples who try to conceive worldwide. According to World Health Organization (WHO), infertility is a disorder of the male or female reproductive system which fails to accomplish clinical pregnancy within one year or more with unprotected regular sexual intercourse. When considering the underlying pathology of infertility, in some cases individually the male or the female and in some cases both the male and female factors may affect infertility. It is estimated that 35% of female factors, 30% of male factors, and 20% of both male and female factors affect infertility. Approximately 15% of infertility cases are unexplainable (Leaver, 2016).

The present study is concerned about male and female factors which affect infertility. According to published literature, several factors can affect male fertility, such as abnormal sperm parameters, genetic factors, hormonal imbalance, anatomical problems, environmental factors, psychological status, etc. (Leaver, 2016). Seminal fluid analysis (SFA) is a test used to detect the fertility status of semen samples by analyzing sperm parameters. Intrauterine insemination (IUI) is a fertility treatment method used to inseminate processed sperms into the uterus at the time of ovulation. Published studies show controversial results related to factors that contribute to a high pregnancy rate of intrauterine insemination. The objective of the present study was to determine the contribution of epidemiological factors (age of the female partner, period of infertility, number of days of abstinence from ejaculation and Number of IUI partner), pre-processed (Total sperm count, percentages of progressive sperm motility, non-progressive sperm motility, sperm morphology, sperm viability and semen volume) and post-processed (Density gradient semen processing method) sperm factors (concentration, progressive sperm motility) on pregnancy rate of intrauterine insemination.

METHODOLOGY

The present study is a descriptive, retrospective study. The study setting was the Fertility and Andrology clinic of the professorial unit of the Colombo South Teaching Hospital (CSTH), Sri Lanka. The total study sample composed of 140 SFA reports and the corresponding IUI reports (post-processed SFA reports) of couples who were treated with IUI from January 2017 to August 2021 from the Fertility and Andrology clinic of the professorial unit of CSTH. When considering the sample selection criteria, all the SFA reports and the corresponding IUI reports of the IUIs that were performed from January 2017 to August 2021 were included in the present study. The IUIs that were performed from January 2017 to August 2021, which do not have the corresponding IUI reports and all the infertility cases related to a cause of female infertility (except female age) were excluded from the present study. The data of key demographic factors, sperm factors and pregnancy status were extracted to a pre-designed data collection form. The above-extracted data were transferred to the datasheets of SPSS version 22.0 for analysis using frequency test, cross-tabulation and Pearson correlation test. Ethical approval was taken from the ethics review committee of Colombo South Teaching Hospital, Sri Lanka.

RESULTS AND DISCUSSION

RESULTS

Out of 140 study samples, 26 (Total Pregnancy Rate-18.57%) couples have shown successful IUI pregnancy. In the total study sample, the age range for the female was 22 to 44 years and the mean age ± SD of the females was 33.28±6.00. Female age was categorized into five age groups as shown in figure 1 and analyzed with the pregnancy rate of IUI (PR-IUI) using the Pearson correlation test. A significantly high IUI-PR was noted when (Pearson correlation= 0.310, p=0.000) the age of the female partner is less than 30 years compared to female age above 30 years. The number of IUI cycles was grouped into 07-groups as shown in figure 2 and analyzed with the pregnancy rate of IUI using the Pearson correlation test. A significantly high IUI-PR was noted with the first two IUI cycles compared to more than two cycles (p-value=0.017, OR=0.271).

Fig 01: Distribution of different categories of age of the female partner among total individuals and individuals with reported pregnancies

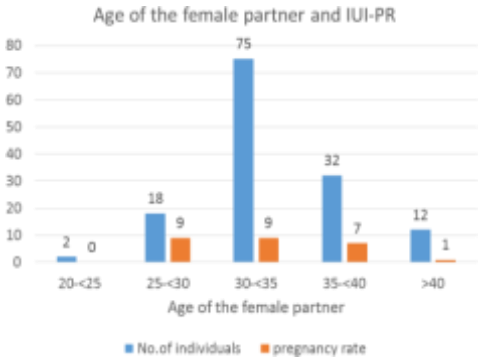
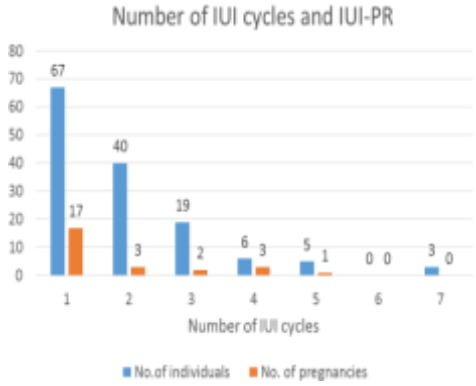
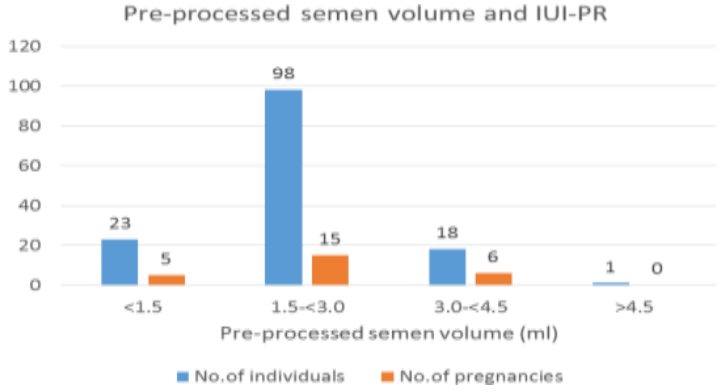


Fig 02: Distribution of different categories of number of IUI cycles among total individuals and individuals with reported pregnancies



Pre-processed semen volume was grouped into 1.5 milliliter groups as shown in figure 3 and analyzed with IUI-PR using Pearson correlation test. A significantly high IUI-PR (p-value=0.043, OR=2.55) was noted when pre-processed semen volume is more than 3.0 ml group compared to less than 3.0 ml groups.

Fig 03: Distribution of different categories of pre-processed semen volume among total individuals and individuals with reported pregnancies



The percentage of pre-processed progressive and non-progressive sperm motilities were categorized into three categories as 0-31 percentage, 32-64 percentage , more than 64 percentage and 0-7 percentage, 8-15 percentage, more than 15 percentage respectively.. A significantly high IUI-PR (p-value=0.034, OR=3.12) was noted when the pre- processed progressive sperm motility is more than 32 percent compared to less than 32 percent. Also, a significantly high IUI-PR (p-value=0.003, OR=4.29) was noted when the non-progessive sperm motility is less than 15 percent compared to more than 15 percent.

Fig 04: Distribution of different categories of percentage of pre-processed progressive sperm motility among total individuals and individuals with reported pregnancies

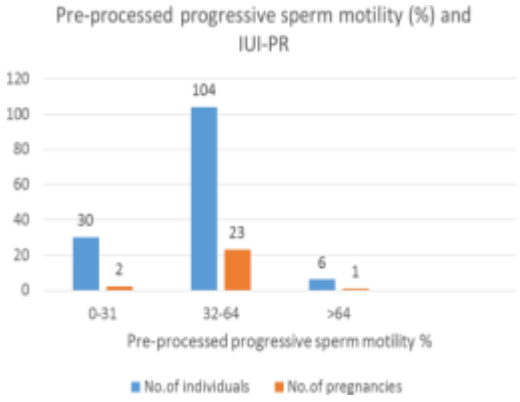
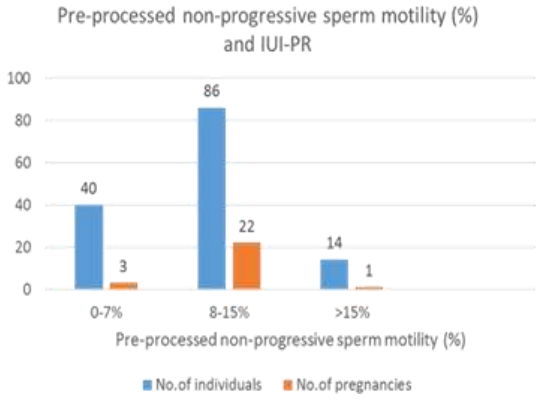


Fig 05: Distribution of different categories of percentage of pre-processed non-progressive sperm motility among total individuals and individuals with reported pregnancies



However, the number of days of abstinence from ejaculation (p-value=0.222), pre-processed total sperm count (p-value=0.093), percentage of pre-processed sperm morphology (p-value=0.082), percentage of sperm viability (p-value=0.093), post-processed sperm concentration (p- value=0.175) and percentage of progressive sperm motility (p-value=0.172) are non- significant factors contributing IUI-PR.

DISCUSSION

The total IUI-PR of the present study was 18.57% (n=26). According to WHO, the IUI-PR should be within 15%-20%. The present study results on the age of female partners with IUI-PR are strengthened by the published studies such as (Loto, Akindojutimi, Akinwole, Ademulegun, & Akinmade, 2017). According to Loto (2017), female age has been concluded as one of the most predictive factors of high IUI-PR. A high IUI-PR was noted with the first two IUI cycles of the present study. According to Tay, Raj, Kulenthran, & Sitizawiah, 2007, a high IUI-PR can achieve within the first three IUI cycles. The present study results show that a high IUI-PR can be achieved when pre-processed semen volume is more than 3 ml compared to less than 3 ml. However, according Ok et al., 2013, pre-processed semen volume or post-processed semen volume does not show a significant contribution to high IUI-PR. All the post-processed semen volumes, which were relevant to the present study were composed of a constant volume of 0.5ml. According to the present study results, the percentage of pre-processed progressive sperm motility has a significant contribution to high IUI-PR. According to Ruiter-Ligeti, Agbo, & Dahan, 2017, if the percentage of pre-processed sperm motility is 24 ± 22 %, the pregnancy rate of IUI is significantly high (p=0.0001). The above findings were important to strengthen the present study results regarding the percentage of pre-processed sperm motility to high IUI-PR.

However, the number of days of abstinence from ejaculation did not show any significant contribution to high IUI-PR in the present study. According to Degirmenci et al., 2020, high oxidative stress, the number of days of abstinence from ejaculation above 4 days may lead to the reduction of the pregnancy rates in IUI. The pre-processed total sperm count did not show a significant contribution to high IUI-PR. A recent study done by Findeklee, Radosa, Radosa, & Hammadeh, 2020, has shown a negative correlation contribution of the pre-processed sperm count with the pregnancy rate of IUI. The present study results have shown that the percentage of sperm morphology shows no significant contribution with IUI-PR. Studies conducted by Luco, Agbo, Behr, & Dahan, 2014and Lockwood, Deveneau, Shridharani, Strawn, & Sandlow, 2015 have also shown that percentage of sperm morphology has no significant contribution to high IUI-PR. Post-processed sperm concentration and percentage of post-processed progressive sperm motility did not show significant contribution to high IUI-PR in the present study.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

A significantly high IUI-PR was noted when the pre-processed sperm concentration was >30M/ml, pre-processed total sperm motility was >40%, pre-processed progressive sperm motility was >32%, pre- processed non-progressive sperm motility was <15%, pre-processed semen volume was >3 ml, age of the female partner was <30 years, period of infertility < 1 year and with first two IUI cycles. However, the Number of days of abstinence from ejaculation, pre-processed normal form of sperm morphology (%), pre-processed total sperm count, sperm viability (%), post-processed sperm concentration, and post-processed progressive sperm motility (%) did not show a significant contribution to high IUI-PR.

RECOMMENDATIONS

The present study was initially designed as a prospective study. However, due to the COVID-19 pandemic couples who turned up for IUIs drastically dropped and the study was redesigned from prospective to retrospective. A prospective study would have given more accurate results and a better chance of contacting couples for follow up information (pregnancy status). Also, the present study was conducted in a single center and it is recommended that future studies be carried out in multiple centers**.**

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