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A STUDY ON FACTORS AFFECTING THE OUTCOME OF INTRAUTERINE INSEMINATION IN INFERTILE COUPLE

Dr. Pooja M C Assistant Professor, Dept. of OBG, Raichur Institute Of Medical Sciences, Raichur.

ABSTRACT **Background:** Intrauterine insemination with letrozole-induced ovulation is a widely utilized and cost-effective fertility treatment; however, its success rates vary significantly among couples. Identifying prognostic factors that influence IUI outcomes is crucial for optimizing patient selection and enhancing pregnancy rates.**Methods:** The Participants were included after providing informed consent and completing baseline investigations. Ovulation induction was initiated using oral letrozole at a dosage of 2.5 mg daily for five days, starting on cycle days 3 to 5, and this regimen could be followed for up to three cycles. Patients underwent serial follicular monitoring, and intrauterine insemination was performed at the appropriate time. The outcome of the pregnancy was assessed using a urine pregnancy test two weeks after insemination.**Results:**The outcomes of IUI depend up on factors such as female age, sperm quality, underlying infertility causes, the use of fertility drug, and the ovulation induction method, with reported pregnancy rates of approximately 10-20%. In the present study, a pregnancy rate of 30% was observed. Semen samples were collected after 24hours of abstinence and processed using double density gradient method. Different timings strategies of IUI (36-48 hours) following ovulation trigger with human chorionic gonadotropin (hCG) after confirming about follicle rupture on Ultrasonography (USG). Pregnancy outcomes were assessed two weeks after the procedure using a urine pregnancy test, which revealed that 30% of participants tested positive and 70% tested negative. This distribution illustrates the outcomes of fertility treatments provided to the participants in the study group.**Conclusion:** The study emphasizes that younger age, normal baseline investigations, and careful patient selection play a significant role in the success of intrauterine insemination (IUI). Most participants exhibited favorable reproductive parameters, which contributed to better treatment outcomes. Individualized administration of hCG and close monitoring of follicular development helped optimize the success of IUI. Our pregnancy rate of 30% is higher than the average, demonstrating the effectiveness of our methods and thoughtful participant selection. Overall, these findings highlight the importance of age, genetic factors, and personalized treatment in achieving successful IUI outcomes.

KEYWORDS : Pregnancy outcome, Intrauterine insemination, Human chorionic gonadotropin, Infertility, Ultrasonography

INTRODUCTION

Infertility is commonly defined as the inability to achieve conception after one year of regular, unprotected sexual intercourse [1]. Unexplained infertility is regarded as a diagnosis of exclusion and is made when routine clinical, hormonal, and radiological evaluations fail to identify a specific cause, and then prevalence of unexplained infertility has been reported to range from 10% to 30% among infertile couples [2-3]. The etiology of infertility is multifactorial, with ovulatory disorders accounting for approximately 27%, male factors for 25%, and tubal or uterine abnormalities for 22% of cases. Unexplained causes contribute to about 17%, while other factors, including cervical abnormalities and environmental influences, constitute nearly 9% [4-5].

Environmental exposures, particularly to endocrine-disrupting chemicals such as certain pharmaceuticals and agricultural pesticides, have also been implicated in impaired reproductive function [6-7]. Intrauterine insemination (IUI) is an assisted reproductive technique in which processed semen is introduced directly into the uterine cavity, thereby bypassing barriers to sperm transport. IUI is widely recommended as a first-line treatment for selected conditions, including cervical factor infertility, mild to moderate male factor infertility, unexplained infertility, immunological causes, and ejaculatory disorders [1,8].

Intrauterine insemination (IUI) continues to be widely practiced despite major advances in assisted reproductive technologies such as IVF and ICSI, mainly due to its simplicity, affordability, and minimally invasive nature [8, 9]. The procedure is typically performed on an outpatient basis, requires limited laboratory support, and is associated with a low risk of complications [8]. In appropriately selected couples, including those with mild male factor infertility, cervical factor infertility, or unexplained infertility, IUI offers acceptable pregnancy outcomes before proceeding to more advanced treatment options [10]. This study focuses on identifying the prognostic factors that affect the outcomes of intrauterine insemination (IUI) in couples experiencing infertility. While IUI is commonly used as a first-line treatment for certain infertility cases, pregnancy rates following this procedure can vary significantly. These variations are influenced by several clinical and demographic factors related to both partners, such as the female's age, the duration and type of infertility, ovarian response, semen parameters, tubal patency, and the timing of the ovulation trigger. Understanding the impact of these factors is crucial for selecting appropriate patients and optimizing treatment protocols.

Evaluating prognostic indicators can enable clinicians to counsel couples more effectively, improve success rates, and reduce the need for more invasive and costly assisted reproductive techniques. Therefore, this study aims to assess the key factors associated with successful pregnancy outcomes following IUI in infertile couples.

METHODS

Study Design

The study used a non-probability sampling technique (purposive convenience sampling) to recruit infertile couples undergoing intrauterine insemination.

Study Setting

A prospective study was conducted in the Department of Obstetrics and Gynecology at Shridevi Institute of Medical Sciences and Research Hospital between August 2022 to March 2023(18 months). The study was conducted in a tertiary centre that manages a large number of patients and is equipped with skilled staff and adequate diagnostic infrastructure, providing an appropriate environment to assess factors related to IUI success.

Study Population

The study population, couples who presented with infertility were enrolled in the study after excluding known causes such as uterine, ovulatory, tubal factors trough appropriates clinical and diagnostic assessments.

Study participants:

Couples seeking treatment for infertility at the Department of Obstetrics and Gynecology were recruited for the study after confirming that they fulfilled the required eligibility criteria.

Inclusion Criteria:

- Infertile couples within the age range of 18 to 40 years
- Female partner with a normal uterine cavity on evaluation
- Documented normal ovulatory function
- At least one open fallopian tube demonstrated by hysterosalpingography (HSG) or laparoscopy

Exclusion Criteria:

Women were excluded from the study if any of the following conditions were present:

- Uterine factors: Congenital uterine anomalies, leiomyomas (fibroids), or intrauterine adhesions (Asherman syndrome)
- Tubal factors: History of pelvic inflammatory disease, pelvic adhesions, impaired tubal function, or previous tubal surgery
- Lack of adequate ovarian response to ovulation induction with

letrozole
- Presence of severe endometriosis such as Dense adhesions of the ovary, Dense adhesions of the tube, Complete obliteration of cul de sac and Site and size of endometriotic tissue.

SAMPLE SIZE:
The sample size was determined based on a study conducted in India [11], which found a prevalence of 14.1%, along with another study [8] that reported a risk factor prevalence of 8.8%. This calculation was carried out using a 95% confidence level and an allowable absolute error of 8%. The sample size was estimated using the standard statistical formula based on anticipated prevalence rates (p1 and p2) of the factor of interest.

$$\text{Sample size (n)} = Z^2_{1-\alpha/2}\,\frac{\left[\frac{1-p_1}{p_1}+\frac{1-p_2}{p_2}\right]}{[\log_e(1-d_1)]^2}$$

Where,
p1 and p2 are anticipated prevalence rate of factor of interest
Anticiptated reltive risk factor=p_1/p_2
Value of the normal deviate at considered level of confidence=Z_(1-∞/2)^2
Relative allowable error=d_1
The minimum required sample size may be calculated as 50.10, which was rounded to 50.
Therefore, at least 50 suspected sample should be included in the study.

PROCEDURE
All patients who satisfied the eligibility criteria were enrolled in the study after obtaining informed consent. A detailed clinical evaluation and necessary laboratory investigations were performed before initiating treatment. Ovulation induction with 2.5 mg oral letrozole daily starting from cycle day 2 to 6 for 5 days for a maximum of 3 cycles given. A serial follicular scan will be done, and IUI will be done during the fertile period. Urine pregnancy will be done after 2 weeks, and a positive urine pregnancy test is considered a clinical pregnancy rate and an indicator of the success of IUI.

Semen Analysis Criteria: The semen parameters were assessed according to WHO 2020 guidelines, with the following reference limits:
- Semen volume:1.4 mL
- Sperm concentration:16 million/mL
- Total motility: 42%
- Progressive motility: 30%
- Viability: 54%
- Morphology: 4%

Ethical Considerations
The Institutional Ethics committee (IEC) approval (Ref No: SIMSRH/IEC/2022-23/160 dated on 26-07-2022) at Shridevi Institute of Medical Sciences and Research Hospital, Tumkur, Karnataka, India was obtained before the commencement of the study, and eligible participants signed informed written consent before the start of the study procedures.

Data analysis
Data analysis was conducted using statistical software such as SPSS. The analysis included both descriptive and inferential statistics to summarize the demographic characteristics of the participants. This involved calculating means, standard deviations, and frequencies. Chi-square tests were used for categorical variables, while t-tests or ANOVA were applied for continuous variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS
Age distribution of study participants
A total of 50 couples with a history of infertility were included in the study, as represented in Table 1 and Figure 1. The mean age of female study participants was 27.86±4.11 years, and the majority, 20 (40%), were in the age group of 26-30 years, followed by 16 (32%) who were between 20 and 25 years, and 14 (28%) who were between 31 and 35 years. Meanwhile, the mean age of male study participants was 33.30±4.46 years, and the majority, 17 (30.4%), were in the age groups of <30 and 31-35 years each, followed by 15 (30%) who were between 36 and 40 years, and 1 (2%) who was between 41 and 45 years.

Table-1 Age distribution of study participants

Gender	Age category (Years)	Frequency (n)	Percentage (%)	Mean ± SD
Female	20-25	16	32	27.86 ±
	26-30	20	40	
	31-35	14	28	
Male	<30	17	34	33.30 ±
	31-35	17	34	
	36-40	15	30	
	41-45	1	2	

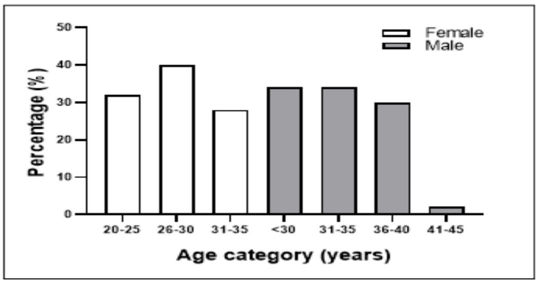


Figure-1: Age distribution of study participants

Distribution of Consanguineous marriage among study participants
Among the 50 participating couples, 74% were in non-consanguineous marriages, 24% were related by second-degree consanguinity, and 2% had third-degree consanguinity as shown in the table-2 and Figure-2.

Table-2 Distribution of Consanguineous marriage among study participants

Degree of Consanguineous	Frequency (n)	Percentage (%)
Non- Consanguineous	37	74
1st Degree	0	0
2nd Degree	12	24
3rd Degree	1	2
Total	50	100

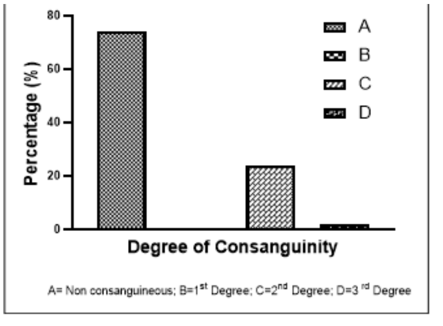


Figure.2. Distribution of Consanguineous marriage among study participants

Distribution of participant based on type of infertility, baseline USG, Semen Analysis and Tubal Patency
The distribution of participants based on the type of infertility, baseline USG, Semen Analysis, and Tubal Patency is shown in Table 3 and Figure 3. In terms of fertility, among 50 couples, 30 are primary infertile couples, and 20 are secondary infertile couples. The baseline ultrasonography report reveals that the majority, 82% had a normal scanning report, and 12% had bilateral PCOD, 4% had a right ovarian simple cyst, and 2% had a left ovarian cyst. Semen analysis was done among all male participants, and it was found that 76% had normal reports, 12% had oligospermia, 6% had Asthenozoospermia, 4% had Hypospermia, and 2% had oligo-asthenozoospermia. Among 50 females, tubal patency was checked; among them 90% had a normal report, 4% had a right-sided cornual block, and 6% had left left-sided tubal block.

Table.3 Distribution of Participants Based on Type of Infertility, Baseline USG Findings, Semen Analysis, and Tubal Patency

Characteristics	Category	Frequency (n=50)	Percentage (%)
Type of fertility	Primary	30	60
	Secondary	20	40
Baseline USG	Normal	41	82
	Bilateral PCOD	6	12
	Left ovarian cyst	1	2

	Right ovarian simple cyst	2	4
Semen Analysis	Normal	38	76
	Oligospermia	6	12
	Hypospermia	2	4
	Asthenozoospermia	3	6
	Oligo-asthenozoospermia	1	2
Tubal patency	Normal	45	90
	Left sided tubal block	3	6
	Right sided cornual block	2	4

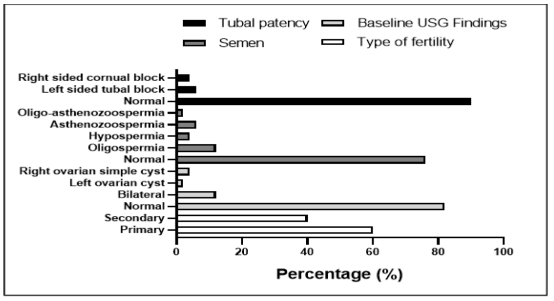


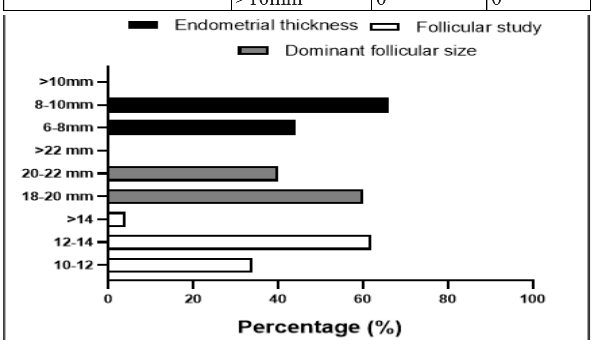
Figure.3. Distribution of Participants Based on Type of Infertility, Baseline USG Findings, Semen Analysis, and Tubal Patency

Distribution of Study Participants Undergoing Follicular Monitoring and Dominant Follicular Size and Endometrial thickness

The distribution of study participants undergoing follicular monitoring, size of dominant follicular and endometrial thickness is presented in Table 4 and Figure 4. Among 50 female participants, 34% underwent follicular study between the 10th and 12th days, 62% underwent it between the 12th and 14th days, and 4% underwent it after the 14th day. The dominant follicular size was measured, revealing that 60% had a follicle size ranging from 18 to 20 mm, and 40% had the follicle size between 20- and 22-mm. Endometrial thickness (ET) was measured during the follicular scan before ovulation induction. The result showed that 66% of participants had an ET of 8-10 mm, while 44% had an ET of 6-8 mm.

Table 4: Distribution of Study Participants Undergoing Follicular Monitoring, Dominant Follicular Size and Endometrial thickness

Characteristics	Category	Frequency (n=50)	Percentage (%)
Follicular study	10-12	17	34
	12-14	31	62
	>14	2	4
Dominant follicular size	18-20 mm	30	60
	20-22 mm	20	40
	>22 mm	0	0
Endometrial thickness	6-8mm	22	44
	8-10mm	28	66
	>10mm	0	0

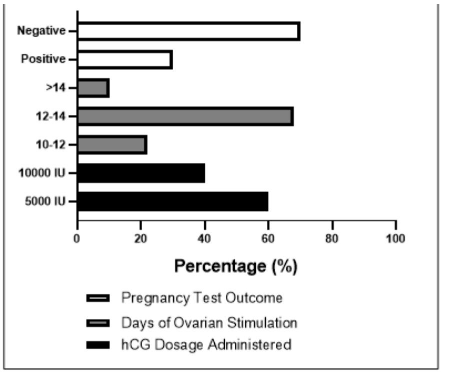


Distribution of Participants According to hCG Dosage Administered, Days of Ovarian Stimulation, and Pregnancy Outcome

The distribution of participants according to human chorionic gonadotropin (hCG) dosage administered, days of ovarian stimulation, and pregnancy test outcome is shown in table 5 and Figure 5. The human chorionic gonadotropin (hCG)) injection was administered to maintain the pregnancy, and 60% of participants received an hCG dose of 5000 IU, and 40% received an HCG dose of 10000 IU. HCG stimulation was done maximum between the 12th and 14th day among 34 (68%) participants, followed by the 10th-12th day among 11 (22%) of the study subjects and >14th day among 5 (10%) of the study subjects. A urine pregnancy test was conducted 2 weeks after IUI, and it was found that out of 50 female participants, 15 (30%) were positive and the remaining 35 (70%) were negative.

Table 5: Distribution of Study Participants according to hCG Dosage Administered, Days of Ovarian Stimulation and Pregnancy Test Outcome

Characteristics	Category	Frequency (n=50)	Percentage (%)
hCG Dosage Administered	5000 IU	30	60
	10000 IU	20	40
Days of Ovarian Stimulation	10-12	11	22
	12-14	34	68
	>14	5	10
Pregnancy Test Outcome	Positive	15	30
	Negative	35	70



Distribution of Participants According to hCG Dosage Administered, Days of Ovarian Stimulation, and Pregnancy Outcome

Factors Influencing Pregnancy Outcomes After Intrauterine Insemination (IUI)

The relationship between clinical factors that influence pregnancy outcomes following IUI is outlined in Table 6. Age plays a significant role as a primary indicator of fertility regarding pregnancy. In our study, the largest group of women, accounting for 40%, tested positive for pregnancy within the age range of 26-30 years, followed by 33.3% who were positive in the age group of 20-25 years, and 26.7% positive in the 31-35 years age category. This association was not found to be statistically significant, as the p-value was greater than 0.05.

Consanguineous marriage presents certain disadvantages concerning pregnancy outcomes. In our study, among the 15 women who tested positive for pregnancy, 12 (80%) were in non-consanguineous marriages while 3 (20%) were in second-degree consanguineous marriages. This relationship was also not statistically significant, with a p-value of 0.713.

In the baseline USG Report, the highest proportion of positive pregnancy results (86.7%) was observed among participants with normal baseline USG findings, compared to a negative pregnancy rate of 28%. A limited number of pregnancies were noted in women with bilateral PCOD, while no pregnancies were recorded in those with ovarian cysts. Nevertheless, the p-value (0.418) suggests that the relationship between USG findings and pregnancy outcomes is not statistically significant. Consequently, baseline USG status did not demonstrate a significant impact on pregnancy success in this study.

In terms of tubal patency, the majority of participants demonstrated normal tubal patency, with positive pregnancy outcomes observed in 86.7% and negative outcomes in 91.4% of this group. Women experiencing a blockage in one tube were still able to conceive, although their numbers were limited. The p-value of 0.308 indicates that the connection between tubal patency and pregnancy outcomes was not statistically significant. This implies that the state of the tubes did not significantly affect pregnancy rates in this study sample.

Most participants administered hCG between 12 and 14 days of stimulation (68%), and this group demonstrated the highest pregnancy rate at 73.3%. This suggests that optimal follicular maturity leads to better outcomes. Participants who administered hCG earlier, between 10 and 12 days, had a significantly lower pregnancy rate of 20%, likely due to immature follicles. Those administered hCG after 14 days experienced fewer cases and lower success rates, possibly because of delayed ovulation or post-mature follicles. The p-value of 0.832 indicates that the connection between stimulation with hCG and pregnancy outcomes was not statistically significant. Overall, the timing of the hCG trigger is crucial for improving the success of intrauterine insemination (IUI), with the 12 to 14-day window being the most favourable.

Table 6.: Factors Influencing Pregnancy Outcomes After Intrauterine Insemination (IUI)

Characteristics	category	Pregnancy positive test		Pregnancy negative test		Total		p-value
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Age group	20-25	5	33.3	11	31.4	16	32	0.987
	26-30	6	40	14	40	20	40	
	31-35	4	26.7	10	28.6	14	28	
Consanguinity	Non-Consanguineous	12	80	25	71.4	37	74	0.713
	1^{st} Degree	0	0	0	0	0	0	
	2^{nd} Degree	3	20	9	25.7	12	24	
	3^{rd} Degree	0	0	1	2	1	2	
USG Report	Normal	13	86.7	28	80	41	82	0.418
	Bilateral PCOD	2	11.4	4	6.7	6	10	
	Left ovarian cyst	0	0	1	2.9	1	2	
	Right ovarian simple cyst	0	0	2	4	2	4	
Tubal Patency	Normal	13	86.7	32	91.4	45	90	0.308
	Left sided tubal block	1	6.7	2	5.7	3	2	
	Right sided cornual block	1	2.9	1	6.7	2	4	
hCG Stimulation	10-12	3	20	8	22.9	11	22	0.832
	12-14	11	73.3	23	65.7	34	68	
	>14	4	11.4	1	6.7	5	10	

DISCUSSION

The present study shows that, the majority of female participants were aged 26–30 years (40%), followed by 20–25 years (32%), with a mean age of 27.86 ± 4.11 years. Women aged 31–35 years constituted 28% of the study population. This distribution indicates that most participants were within the younger reproductive age group, which is commonly considered optimal for fertility treatment. However, the absence of older age groups limits the generalizability of the findings to the wider infertile population. Maternal age is a well-recognized factor influencing the success of intrauterine insemination (IUI). Previous studies have consistently indicated that women under the age of 35 experience higher pregnancy rates and better outcomes compared to those over 35 [12]. The higher representation of younger women in the current study may, therefore, be linked to more favorable treatment results. An earlier study has shown that fertility decreases as maternal age increases, particularly after the age of 35 years. The study noted a significant drop in pregnancy rates after this age [13], with an even more notable decline after 40 years. These findings highlight the importance of early evaluation and treatment for couples facing infertility. An analysis of the male participants revealed that most were younger adults, with a mean average age of 33.30 (± 4.46 years. Approximately 34% were under 30 years old, another 34% were between 31 and 35, and 30% were aged between 36 and 40. Only 2% were in the 41 to 45 age group. This limited representation of older males may restrict the ability to draw conclusions about infertility patterns related to advanced paternal age. The impact of male age on the success of intrauterine insemination (IUI) remains a topic of debate. However, research indicates that increasing age is linked to a decline in semen quality. For instance [14], men over 40 years old usually have lower success rates with assisted reproductive technology (ART). Additionally, a study observed that as age increases, there is a reduction in semen volume, sperm motility, and the percentage of normally formed sperm [15]. Therefore, the predominance of younger male participants in this study may contribute to better semen quality, which could lead to improved outcomes for IUI.

In consanguineous marriages, the study found that 74% of participants were in non-consanguineous marriages, indicating a preference for partnerships outside close family relationships. No first-degree consanguineous marriages were observed, which suggests a strong cultural avoidance of very close familial unions. Second-degree consanguinity was found in 24% of couples, while 2% exhibited third-degree consanguinity, highlighting a moderate genetic risk within the study population. These patterns emphasize the importance of genetic counseling and screening in specific cases. The overall consanguinity rate of 26% reflects regional and cultural practices and is lower than rates reported in some areas of Asia and the Middle East. Consanguinity increases the risk of autosomal recessive genetic disorders, which can impact reproductive health [16-17]. However, previous studies indicate that consanguinity alone does not significantly reduce the success rate of intrauterine insemination (IUI) unless fertility-related genetic disorders are present [18]. Therefore, the lack of first-degree consanguinity in this study may diminish the risk of severe genetic complications.

In baseline ultrasonography (USG), the study offers valuable insights into the ovarian health of the participants. A significant majority, 82%, displayed normal USG findings, indicating no detectable ovarian abnormalities such as polycystic ovary syndrome (PCOS) or other pathologies. This suggests a generally healthy ovarian profile within the cohort. However, 12% of participants showed signs of ovarian conditions: 12% had bilateral polycystic ovarian disease (PCOD), characterized by multiple cysts in both ovaries. Additionally, 6% of participants had ovarian cysts, with 2% having a cyst on the left ovary and 4% on the right ovary. These findings underscore the clinical significance of baseline USG in diagnosing and managing ovarian health, facilitating appropriate interventions and follow-up care tailored to the specific conditions identified. They also highlight the relatively low prevalence of severe ovarian abnormalities in this population. PCOS is a common condition affecting women of reproductive age. Studies suggest that the prevalence of PCOS can vary widely, with estimates ranging from 5% to 20% depending on diagnostic criteria. The 12% prevalence observed in this study aligns with these figures, reflecting a typical occurrence rate. PCOS is associated with irregular ovulation or anovulation, which can lead to infertility. A study reported that simple ovarian cysts are common ultrasound findings and are usually benign [19].

The semen analysis report indicates that a significant majority of study participants, 76%, exhibited normal semen parameters, suggesting that most individuals in the study have normal fertility potential. However, various abnormalities were observed among the remaining participants. Oligospermia, characterized by a low sperm count, was identified in 12% of participants, which can impair fertility by decreasing the likelihood of successful fertilization. Hypospermia, found in 4% of participants, indicates a lower-than-normal semen volume, potentially affecting the quantity of sperm available for fertilization. Asthenozoospermia, seen in 6% of participants, refers to reduced sperm motility, which is essential for the sperm to reach and fertilize the egg. Additionally, 2% of participants had oligo-asthenozoospermia, a condition that combines low sperm count and reduced motility, posing a significant challenge to fertility. These findings emphasize the importance of semen analysis in identifying and addressing male fertility issues, which can be managed with appropriate medical interventions. Male factor infertility is a prevalent issue, contributing to approximately 30-40% of infertility cases [20]. The high rate of normal semen analysis (76%) in this study suggests that male factor infertility may be less common in this population compared to general estimates. Globally, secondary infertility is often more prevalent than primary infertility, particularly in regions with high rates of infectious diseases affecting reproductive organs, or in areas with increased maternal age and high rates of elective terminations [21].

Tubal patency was evaluated using hysterosalpingography (HSG) and diagnostic Hyster laparoscopy. Hysterosalpingography (HSG) is commonly recommended as the initial investigation to evaluate tubal patency and identify abnormalities in the uterine cavity during infertility assessments [1]. The results showed that most participants (90%) had normal findings, indicating patent fallopian tubes and a normal uterine cavity structure, which are conducive to conception. In

6% of cases, a left-sided tubal block was observed, which may interfere with the transport of the ovum. Additionally, 4% had a right cornual block, suggesting an obstruction at the uterotubal junction that can affect fertilization. These findings underline the importance of HSG in detecting tubal and uterine abnormalities during infertility evaluations. Tubal factors contribute to approximately one-quarter to one-third of infertility cases [22-23], and the relatively low prevalence of tubal blockage in this study indicates that tubal factor infertility was not a significant issue in this cohort. HSG remains a crucial first-line investigation for identifying occlusions related to infection, endometriosis, or previous pelvic procedures [1]. The high proportion of normal results is consistent with observations made in women experiencing unexplained infertility [2].

The follicular study report indicates that a significant majority of study participants (96%) had their assessments conducted within the typical ovulation monitoring window. Specifically, 34% of the participants were monitored between days 10 and 12, while the majority, 62%, were monitored between days 12 and 14 of their menstrual cycle. This timing is crucial for accurately assessing follicular development and predicting ovulation, which is essential for optimizing fertility treatments [1,23]. A small percentage of participants (4%) underwent their follicular studies after day 14, which may reflect individual variations in cycle length or ovulation timing. These findings highlight the importance of individualized monitoring for precise evaluation and management of ovulatory patterns, thereby enhancing the effectiveness of fertility interventions. The data indicates that all participants had dominant follicles within the optimal size range of 18-22 mm for ovulation, with 60% having follicles sized between 18-20 mm and 40% between 20-22 mm. This distribution suggests that the study population generally exhibits healthy follicular development, which is crucial for successful ovulation and fertility [8,10]. Additionally, the absence of follicles larger than 22 mm indicates that none of the participants experienced issues related to overstimulation or cyst formation during the monitoring period. Overall, the findings reflect healthy follicular development in the study population, which is a positive indicator for fertility outcomes. A study supports these findings, noting that ovulation rates are optimal when the dominant follicle reaches sizes between 18 and 22 mm before the HCG trigger. This range indicates mature oocytes ready for ovulation and suggests a high likelihood of successful conception [10-23].

The distribution of HCG dosages and timing in the fertility study emphasizes a personalized approach to treatment. Sixty percent of participants received 5000 IU of HCG, which is the standard dosage for effective ovulation induction [23]. This amount ensures the timely release of mature eggs, which is crucial for fertility interventions aimed at timed conception. The remaining 40% received 10,000 IU, a dosage tailored for cases that require stronger ovulation induction [10]. In terms of timing, 68% of participants received HCG between days 12 and 14 of their cycle, which corresponds with peak follicular development to optimize ovulation. Additionally, 22% received stimulation between days 10 and 12, adjusting for individual cycle dynamics, while 10% received it later, likely due to irregularities in their cycles. This approach highlights the importance of personalized fertility care, aimed at optimizing ovulatory function and enhancing the chances of successful conception based on individual patient needs and cycle characteristics. The duration of ovarian stimulation with HCG is critical when preparing for intrauterine insemination (IUI). Studies suggest that the timing of HCG administration is vital for maximizing follicular maturity and endometrial receptivity [24]. HCG is typically administered when at least one follicle reaches an adequate size, usually after 10 to 14 days of stimulation. The high percentage of participants in the 12 to 14-day range in this study aligns with this standard, which may contribute to the overall success rate [23]. However, the duration of stimulation alone is not the only predictor of success; proper timing is essential to ensure that ovulation is closely monitored and aligned with IUI. Another study found that careful monitoring and timing of HCG administration can improve IUI success rates by ensuring optimal follicle maturity [10,24].

CONCLUSION

The demographic analysis and clinical findings from this study offer important insights into the factors influencing the success rates of intrauterine insemination (IUI). The emphasis on younger women (under 35 years) and men (under 40 years) aligns with existing research that indicates higher fertility rates and better outcomes in these age groups. Although the study found a moderate prevalence of consanguinity, it underscores the importance of genetic counselling to address potential risks. Baseline ultrasonography, semen analysis, and hysterosalpingography indicated that a significant proportion of participants had normal reproductive health, suggesting favorable conditions for IUI success. The individualized approach to HCG administration and the careful monitoring of follicular development further enhanced treatment outcomes. The observed 30% pregnancy rate, which is higher than typical averages, highlights the effectiveness of the interventions and the well-chosen cohort. In conclusion, these results highlight the important role of roles of age, genetic factors, and tailored clinical interventions in achieving successful IUI outcomes.

CONFLICT OF INTEREST

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REFERENCES

1. Practice Committee of the American Society for Reproductive Medicine. (2021). Fertility evaluation of infertile women: A committee opinion. Fertility and Sterility, 116(5), 1255–1265.
2. Gelbaya, T. A., Potdar, N., Jeve, Y. B., & Nardo, L. G. (2014). Definition and epidemiology of unexplained infertility. Obstetrical & Gynecological Survey, 69(2), 109–115.
3. Isaksson, R., & Tiitinen, A. (2004). Present concept of unexplained infertility. Gynecological Endocrinology, 18(5), 278–290.
4. StatPearls Publishing. (2024). Female infertility. In StatPearls. National Center for Biotechnology Information.
5. Dhont, N., Van de Wijgert, J., Coene, G., Gasarabwe, A., & Temmerman, M. (2020). The causes of infertility in women presenting to gynaecology clinics: A cross-sectional study. Fertility Research and Practice, 6, Article 11.
6. Gore, A. C., Chappell, V. A., Fenton, S. E., Flaws, J. A., Nadal, A., Prins, G. S., Toppari, J., & Zoeller, R. T. (2015). EDC-2: The Endocrine Society's second scientific statement on endocrine-disrupting chemicals. Endocrine Reviews, 36(6), E1–E150.
7. Diamanti-Kandarakis, E., Bourguignon, J. P., Giudice, L. C., Hauser, R., Prins, G. S., Soto, A. M., Zoeller, R. T., & Gore, A. C. (2009). Endocrine-disrupting chemicals: An Endocrine Society scientific statement. Endocrine Reviews, 30(4), 293–342.
8. Allahbadia, G. N. (2017). Intrauterine insemination: Fundamentals revisited. Journal of Obstetrics and Gynaecology of India, 67(6), 385–392.
9. Practice Committee of the American Society for Reproductive Medicine. (2020). Evidence-based treatments for couples with unexplained infertility: A guideline. Fertility and Sterility, 113(2), 305–322.
10. Cohlen, B. J. (2005). Should we continue performing intrauterine insemination in the year 2004? Gynecologic and Obstetric Investigation, 59(1), 3–13.
11. Wadhwa, L., Fauzdar, A., & Wadhwa, S. N. (2018). An intrauterine insemination audit at a tertiary care hospital: A 4½-year retrospective analysis of 800 intrauterine insemination cycles. Journal of Human Reproductive Sciences, 11(3), 279–285.
12. Kamath, M. S., Bhattacharya, S., Demirtas, S., Gibreel, A., & Sunkara, S. K. (2010). Female age and assisted reproductive technology outcomes: A systematic review and meta-analysis. Human Reproduction Update, 16(6), 561–578.
13. Toner, J. P., & Flood, J. T. (2006). Age and reproductive potential: Influence on assisted reproductive outcomes. Fertility and Sterility, 86(4), 870–877.
14. Beguería, R., García, D., Obradors, A., Poisot, F., Vassena, R., & Vernaeve, V. (2014). Paternal age and assisted reproductive outcomes in ICSI donor oocytes: Is there an effect of older fathers? Human Reproduction, 29(10), 2114–2122.
15. Eskenazi, B., Wyrobek, A. J., Sloter, E., Kidd, S. A., Moore, L., Young, S., & Moore, D. (2003). The association of age and semen quality in healthy men. Human Reproduction, 18(2), 447–454.
16. Bittles, A. H. (2012). Consanguinity in context. Human Heredity, 74(3–4), 129–136. https://doi.org/10.1159/000343768
17. Hamamy, H., Antonarakis, S. E., Cavalli-Sforza, L. L., Temtamy, S., Romeo, G., ten Kate, L. P., Bennett, R. L., Shaw, A., Megarbane, A., van Duijn, C., & Bittles, A. H. (2011). Consanguineous marriages, pearls and perils: Geneva International Consanguinity Workshop Report. Genetics in Medicine, 13(9), 841–847. https://doi.org/10.1097/GIM.0b013e318217477f
18. Al-Arrayed, S., Hamamy, H., & Al-Gazali, L. (2001). Consanguinity and reproductive health among Arabs. Human Heredity, 51(1–2), 60–65.https://doi.org/10.1159 /000022964
19. Pavlik, E. J., Ueland, F. R., Miller, R. W., Ubellacker, J. M., DeSimone, C. P., Elder, J., Hoff, J., Baldwin, L., Kryscio, R. J., & van Nagell, J. R., Jr. (2009). Frequency and disposition of ovarian abnormalities followed with serial transvaginal ultrasonography. Obstetrics & Gynecology, 113(6), 1199–1206.
20. Agarwal, A., Mulgund, A., Hamada, A., & Chyatte, M. R. (2015). A unique view on male infertility around the globe. Reproductive Biology and Endocrinology, 13, Article 37. https://doi.org/10.1186/s12958-015-0032-1
21. Mascarenhas, M. N., Flaxman, S. R., Boerma, T., Vanderpoel, S., & Stevens, G. A. (2012). National, regional, and global trends in infertility prevalence since 1990: A systematic analysis of 277 health surveys. PLoS Medicine, 9(12), e1001356.https:/ /doi.org/10.1371/journal.pmed.1001356
22. Evers, J. L. H. (2002). Female subfertility. The Lancet, 360(9327), 151–159. https://doi.org/10.1016/S0140-6736(02)09417-5
23. Fritz, M. A., & Speroff, L. (2011). Clinical gynecologic endocrinology and infertility (8th ed.). Lippincott Williams & Wilkins.
24. Cantineau, A. E. P., Cohlen, B. J., Klip, H., & Heineman, M. J. (2007). Ovarian stimulation protocols (anti-oestrogens, gonadotrophins with and without GnRH agonists/antagonists) for intrauterine insemination (IUI) in women with subfertility. Cochrane Database of Systematic Reviews, (2), CD005356.