Journal for Re Attach Therapy and Developmental Diversities
eISSN: 2589-7799
2024 march; 7 (3): 6-10

Exploring Determinants of Infertility Among Women Aged 30-40 Years In South Asia: A Systemic Review

Sonal Gupta[1], Sanskruti Kakad[2], Pugazhandhi Bakthavachalam[*]

[1]Undergraduate student at American International College of Arts and Sciences (AICASA), American University of Antigua, University Park, Jabberwock, Coolidge, Antigua.
[2]Undergraduate student at American University of Antigua School of Medicine, University Park, Jabberwock, Coolidge, Antigua.

***Corresponding Author:** Dr. Pugazhandhi Bakthavatchalam
*Assistant Professor of Anatomy and Physiology, American University of Antigua, University Park, Jabberwock, Coolidge, Antigua.

Abstract:

This article focuses on the diagnosis and treatment of numerous underlying reasons for female infertility, as well as how age influences the outcomes of IVF and ICSI cycles. An analysis of 2511 cycles completed between January 1995 and June 1991 revealed that the participants' average age was 34 years. Interestingly, 45.9% of the population was between 30 and 35, 24.5% was between 36 and 39, and 7.1% was over 39. Follicle-stimulating hormone (FSH) blood concentrations on day 3 were less than 20 IU/l in all patients aged 40 and up. The stimulation treatments included the use of human menopausal gonadotropin (hMG), FSH, clomiphene citrate (CC), and gonadotropin-releasing hormone agonists (GnRHa). The study revealed a considerable correlation between age, rates of stimulation, and fertilisation failure. Due to this clinical pregnancy and embryo implantation rates fell to 12.8%, and 7.4%, respectively, among women over the age of 40. The rate of spontaneous abortion increased by 33.2% as people became older. Although clinical pregnancy rates per transfer were optimistic, 'take-home baby' rates in women 40 years of age and older fell to roughly 7% per cycle due to stimulation discontinuance and spontaneous abortions. The study shows that maternal age has a considerable impact on IVF and ICSI outcomes.

Keywords: Infertility, Assisted Reproductive Technologies (ART), In vitro fertilisation (IVF), Gamete Intrafallopian Transfer (GIFT), Intrauterine Insemination (IUI), Patient Selection

Introduction:

Women's reproductive potential peaks between the ages of 18 and 24, then begins to fall after 27, and declines even faster after 35. Infertile women aged 30 to 40 face a complex challenge influenced by a variety of factors, such as lifestyle choices, age-related concerns, and previous reproductive health issues. This narrative review aims to provide readers with a complete understanding of the aspects impacting infertility in this age range by investigating both the causes and potential therapies. Age-related variables such as ovarian reserve reduction and hormonal profile changes may have a significant impact on the menstrual cycle and fertility. Women's ovarian reserve reduces as they age, making it more difficult to conceive. Advanced maternal age is an important factor since it is associated with an increased risk of chromosomal abnormalities and infertility. The history of reproductive health is crucial; past pelvic operations, infections, or a history of repeated miscarriages can all contribute to fertility issues. While infections can cause damage to fallopian tubes, preventing the egg from passing normally, surgical operations can leave scars that jeopardise reproductive organ integrity. Environmental factors and lifestyle decisions add to the complexities of infertility. Tobacco use, binge drinking, and bad dietary habits can all have a negative impact on fertility. Pollutants and toxins from the environment have the ability to disrupt the delicate hormonal balance necessary for conception. Lifestyle factors that contribute to diseases such as obesity or underweight also have an impact on fertility. Within the specified age range, ovulatory disorders such as polycystic ovarian syndrome (PCOS) and hormonal imbalances that interfere with regular ovulation are among the causes of infertility. Anomalies in the structure, such as fibroids or polyps in the uterus, can hinder fertilised eggs from implanting. Endometriosis, which is characterised by the presence of endometrial tissue outside the uterus, can reduce fertility by causing inflammation, adhesions, and scarring. The likelihood of a successful conception is reduced by decreased ovarian reserve, which is caused by age-related decline and a drop in egg number and quality. Furthermore, conditions such as diabetes, autoimmune disorders, and thyroid difficulties can disrupt hormonal balance, influencing ovulation and the menstrual cycle. Certain ovulatory issues may be treated by altering behavioural habits. Both underweight and overweight

people are at risk for fertility issues, including reduced success rates with reproductive procedures, so maintaining a healthy weight is crucial. Infertility is a couple's inability to conceive after a year of unprotected sexual activity (Devroey, 2009). This problem, with various causes and frequencies depending on geography and socioeconomic status, is a global topic that affects people in a number of countries. Infertility affects an estimated 60–80 million couples each year, with 15-20 million instances reported in India alone (Pasi 2011). A recent study reveals that disparities in unfavourable mental health illnesses and outcomes may be influenced by social factors such as race, ethnicity, socioeconomic status, and geographical location. Furthermore, they suggest that these social differences may have a negative impact on the availability of mental health resources, treatment options, and recovery paths (Cross-Sudworth 2006).This puts a considerable strain on society, particularly given India's current population statistics. Although infertility is a medical condition, it also affects couples, making childlessness a shared concern (Kumar, 2007). It also addresses societal unfairness and inequalities. Infertility is caused by a number of medical conditions, the most frequent of which are fallopian tube disorders, ovulation interference, and hormone problems. Up to 90% of anovulation cases are caused by PCOS, or polycystic ovarian syndrome, which is usually hereditary, linked to insulin resistance, and frequently related to obesity (Dahlgren 1992). Ovulation can be influenced by hormonal diseases such as hyperthyroidism, hypothyroidism, and hyperprolactinemia (Legro, 2007). Endometriosis is a common and severe disorder that affects 6–10% of all women, particularly those who are in pain or infertile (Giudice, 2004). The goal of this research paper is to give a complete review of the complicated circumstances that contribute to infertility in women aged 30 to 40, providing insights into potential treatment approaches as well as underlying causes.

Methodology:

The phrase "Assisted Reproductive Technology" (ART) refers to techniques for manipulating oocytes outside of the body; the most frequent approach is in vitro fertilisation (IVF). Because embryos develop in the uterus and oocytes mature primarily in the ovary, the term "in vitro" refers to procedures performed outside of a living creature. In the case of IVF, this technique involves fertilising eggs in a laboratory dish. In July 1978, Robert Edwards, Ph.D., and Patrick Steptoe, MD, announced the first live birth achieved using in vitro fertilisation (IVF) in England. Dr. Edwards received the Nobel Prize in Medicine in 2010 (Zhao 2011). Reproductive endocrinology/infertility (REI) has improved rapidly since this ground breaking success in infertility therapy, with IVF now accounting for 1.6% of live births in the United States and 4.5% in Europe (Sunderam 2018) IVF was originally developed to treat irreversible tubal disease, but it is now widely used to treat infertility caused by a range of illnesses, including endometriosis, male factor issues, and unexplained infertility. If a woman suffers from age-related decline or primary ovarian insufficiency (POI), she may be unable to conceive normally. In certain circumstances, donor oocytes can help women become pregnant through IVF (Choe 2023). Ricardo Asch created the GIFT (Gamete Intrafallopian Transfer) approach, which was first described by Steptoe and Edwards, to provide a novel way of assisted reproduction (Asch 1984). To encourage fertilisation within the woman's body, GIFT involves precisely placing the ovum and sperm inside the fallopian tube. Typically, the GIFT procedure takes four to six weeks. The initial stage in the process is to After careful observation, human chorionic gonadotropin (hCG) stimulates the formation of mature ovarian follicles. Following that, the removed egg and sperm are combined and reintroduced into the fallopian tube via laparoscopy, creating an environment conducive to fertilisation. The GIFT approach is defined by a few key components. Notably, the success of the surgery is contingent on the presence of at least one functional fallopian tube (Edward 2001). Gifts are used when a woman is unable to make eggs but can still undergo fertilisation and become pregnant. It can also be used to treat mild male infertility. Fertilisation occurs inside the fallopian tube, which distinguishes GIFT from in-vitro fertilisation (IVF). Because GIFT is a semi-invasive procedure, laparoscopy is essential to ensure exact egg implantation. The typical GIFT success rate ranges between 25% and 30%, depending on the couple's age and the quality of their sperm and ovum. However, fewer people are adopting the GIFT therapy now that less invasive in-vitro fertilisation (IVF) has become more prevalent due to its success. Other assisted reproduction techniques include intracytoplasmic sperm injection (ICSI), embryo transfer (ET), zygote intrafallopian transfer (ZIFT), and intrauterine insemination (IUI) (Toner 2002). Despite significant advances in assisted reproductive techniques such as IVF, ICSI, and subzonal insemination (SUZI), intrauterine insemination (IUI) remains a low-cost, minimally invasive, and effective first treatment for certain cases, including cervical factor, moderate male factor, unexplained infertility, immunological infertility, and infertility caused by ejaculatory disorders. IUI is also being used to treat endometriosis, ovarian dysfunction, and tubal infertility issues. Although the basic procedure for IUI has not altered, advances in stimulation protocols, gonadotropins, sperm preparation technologies, and ultrasound monitoring have enabled promising success rates. Careful patient selection based on personal qualities, age, and the cause of infertility, as well as tailored stimulation regimes, are critical components of effective treatment. Strict adherence to the cycle cancellation strategy improves overall pregnancy outcomes while decreasing complications such as ovarian hyperstimulation syndrome (OHSS) and multiple pregnancies. It is normally recommended to try IUI for three to six cycles before contemplating

other options. Individuals who meet specific requirements, such as severe endometriosis, severe tubal issues, severe male factor infertility, or advanced maternal age, may be referred directly to IVF/ICSI (Branigan 1999). The success of an IUI programme is heavily reliant on a number of semen parameters, including the length of time it takes to process semen, the processed total motile sperm count, the rapid progressive motility after processing, the morphology of the sperm before and after processing, the inseminating motile sperm count (IMSC), the IUI insemination time, and 24-hour sperm survival (Yavas 2004).

Results:

The study looked at the diagnosis and treatment of female infertility, focusing on how age affects the outcomes of intracytoplasmic sperm injection (ICSI) and in vitro fertilisation (IVF) cycles. A comprehensive assessment of 2511 cycles conducted between January 1995 and June 1991 revealed that the average participant age was 34 years. Interestingly, 45.9% of respondents were between the ages of 30 and 35, 24.5% were between the ages of 36 and 39, and 7.1% were over the age of 39. Follicle-stimulating hormone (FSH) blood concentrations on day three were consistently less than 20 IU/l in people aged 40 and older. The stimulation methods employed were human menopausal gonadotropin (hMG), FSH, clomiphene citrate (CC), and gonadotropin-releasing hormone agonists (GnRHa). Age and stimulation rates were discovered to have a significant correlation, increasing the risk of fertilisation failure. Clinical pregnancy and embryo implantation rates among women over 40 have declined dramatically, to 12.8% and 7.4%, respectively. With increasing age, the rate of spontaneous abortion increased by 33.2%. Despite promising clinical pregnancy rates per transfer, women aged 40 and up had 'take-home baby' rates of about 7% every cycle due to stimulation discontinuance and increased rates of spontaneous abortion. These data emphasise the necessity of considering age when planning IVF and ICSI cycles. They also highlight the importance of cautious management tactics and individualised approaches, particularly for women over 40.

Discussion:

This study's findings show the importance of age in determining the outcome of in vitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI) cycles for infertile women. The repercussions of observed age-related changes will be examined, as well as their significance in steering professional practice and patient counselling. First, the distribution of study participants indicates that the prevalence of infertility increases with age. The fact that 45.9% of the population was between the ages of 30 and 35 highlights the significance of age in deciding whether or not to pursue reproductive treatment. Furthermore, the proportion of adults over 39 (7.1%) emphasises the importance of investigating fertility issues in older age groups. Follicle-stimulating hormone (FSH) concentrations in adults aged 40 and up were found to decline on day three, indicating age-related changes in ovarian function. This finding is consistent with prior research indicating that ovarian reserve decreases with age, emphasising the importance of considering ovarian function when developing a treatment approach. Age-related changes in stimulation rates have been associated with a variety of stimulation strategies, including clomiphene citrate (CC), FSH, gonadotropin-releasing hormone agonists (GnRHa), and human menopausal gonadotropin (hMG). The usefulness of these operations in older adults is questioned, as is the increased risk of infertility failure as a result of the negative relationship between age and stimulation rate. This underlines the importance of tailoring age-based stimulation strategies to enhance therapeutic effectiveness. One major finding is that clinical pregnancy and embryo implantation rates have dropped dramatically among women over the age of 40. It emphasises the importance of fair expectations and well-informed decision-making in clinical discussions with patients, as well as the challenges of achieving a safe pregnancy at this age. The confirmed increase in spontaneous abortion rates as people age highlights how difficult reproductive outcomes can be for elderly people. This finding is consistent with the well-documented increase in chromosomal abnormalities and pregnancy difficulties associated with older moms. Despite excellent clinical pregnancy rates per transfer, the 'take-home baby' rates of approximately 7% per cycle for women 40 years of age and older emphasise the considerable impact of stimulation withdrawal and rising rates of spontaneous abortion on total live birth outcomes. This puts into doubt the notion that, particularly in older age groups, establishing clinical pregnancy always ends in a successful live birth. In the context of female infertility, this study concludes by emphasising the complex relationship between age and the outcomes of ICSI and IVF cycles. The findings emphasise the need to consider age when designing treatment programmes and offering therapy. Tailored approaches, prudent management tactics, and realistic expectations are critical for increasing the likelihood of a successful live birth, particularly for women over 40.

Conclusion:

In conclusion, since the extraordinary achievement of the first in vitro fertilisation (IVF) live birth in 1978, the disciplines of reproductive endocrinology and infertility (REI) and assisted reproductive technologies (ART) have undergone dramatic change. Robert Edwards and Patrick Steptoe's innovative work marked a watershed moment, paving the way for a plethora of approaches to the complex difficulties underlying infertility. ART, particularly IVF, has been a cornerstone of infertility therapy over time, significantly boosting the number of live births in both Europe and the United States.
The evolution of ART capabilities can be seen in the transition from IVF to cutting-edge procedures such as Ricardo Asch's Gamete Intrafallopian Transfer (GIFT). Although the semi-invasive GIFT treatment has demonstrated success, its lesser usage in comparison to less invasive procedures like IVF demonstrates the sector's dynamic nature. Despite these advancements, intrauterine insemination (IUI) remains a viable, minimally invasive first-line therapeutic choice for certain infertile people.
IUI's continued success is attributed to its suitability for a variety of circumstances, including endometriosis, immunological infertility, cervical factor, moderate male factor, ejaculatory difficulties, tubal factor infertility, ovarian dysfunction, and unexplained infertility. Careful patient screening, individualised stimulation regimens, and a measured approach to cycle cancellation to prevent risks like multiple pregnancies and ovarian hyperstimulation syndrome are important to the success of IUI.
Essentially, this extensive investigation illustrates the complicated interplay between cutting-edge and traditional ART procedures, emphasising the importance of tailoring care to a variety of patient needs. It is critical to continue looking for advances in infertility therapies since they hold the key to improved patient outcomes and the achievement of reproductive goals. This field's dynamic nature highlights the constant commitment to innovation, ensuring that patients suffering from infertility receive the most tailored and effective treatment available.

Acknowledgement:

I would like to convey my heartfelt appreciation to Dr .Jorge A Moreno, Ph.D., Dean, AICASA for providing a vibrant learning environment and invaluable resources that were critical to completing this research project. Teachers, staff, and fellow students have provided invaluable aid in shaping my academic path. I would also like to thank Dr.Pugazhandhi Bakthavachalam, Dept. of Anatomy and Physiology, American University of Antigua (AUA), for all of their assistance and mentoring in improving the quality and scope of this study. The well-equipped research facilities and library have enabled us to conduct comprehensive literature investigations. The collaborative nature of friends and peers has considerably assisted in the overall construction of this work. I am grateful to American International College of Arts and Sciences (AICASA) and American University of Antigua(AUA) for fostering an environment that made this research effort rewarding and enlightening.

Conflicts of Interest: Authors declare no competing interest.

Authors Contribution:
Study Design: Pugazhandhi Bakthavachalam, Sonal Gupta

Manuscript Writing: Pugazhandhi Bakthavachalam, Sonal Gupta

Literature Search: Pugazhandhi Bakthavachalam, Sonal Gupta, Sanskruti kakad,

References

1. Asch RH, Ellsworth LR, Balmaceda JP, Wong PC (November 1984). "Pregnancy after translaparoscopic gamete intrafallopian transfer". Lancet.
2. Branigan EF, Estes MA, Muller CH. Advanced semen analysis: a simple screening test to predict intrauterine insemination success. Fertil Steril. 1999.
3. Choe, Jennifer. “In Vitro Fertilization.” *StatPearls - NCBI Bookshelf*, 4 Sept. 2023, www.ncbi.nlm.nih.gov/books/NBK562266.
4. Dahlgren E, Johansson S, Lindstedt G, Knutsson F, Oden A, JansonPO, et al., 1992. Women with polycystic ovary syndrome wedge resected in 1956 to1965: a long-term follow up focusing on natural history and circulating hormones. Fertil Steril.

5. Devroey P, Fauser BC, Diedrich K 2009. Evian Annual Reproduction (EVAR) Workshop Group 2008. Approaches to improve the diagnosis and management of infertility. Hum Reprod.
6. Edwards RG (October 2001). "The bumpy road to human in vitro fertilization". Nature Medicine.
7. Giudice LC, Kao LC 2004. Endometriosis and Infertility.
8. Infertility Issues for South Asian Women - ProQuest. www.proquest.com/doc.
9. Kumar D 2007. Prevalence of female infertility and its socio-economic factors in tribal communities of Central India. Rural and Remote Health.
10. Legro RS 2007. A 27-Year-Old Woman with a Diagnosis of Polycystic Ovary Syndrome JAMA.
11. M. Szamatowicz & D. Grochowski (1998) Fertility and infertility in aging women, Gynecological
12. Pasi AL, Hanchate M S, Pasha MA 2011. Infertility and domestic violence: Cause, consequence and management in Indian scenario. Biomedical Research. 22(2): 255-258.
13. Sunderam S, Kissin DM, Crawford SB, Folger SG, Boulet SL, Warner L, Barfield WD. Assisted Reproductive Technology Surveillance - United States, 2015. MMWR Surveill Summ. 2018 Feburary [PMC free article] [PubMed]
14. Toner JP (November 2002). "Progress we can be proud of: U.S. trends in assisted reproduction over the first 20 years". Fertility and Sterility.
15. Yavas Y, Selub MR. Intrauterine insemination (IUI) pregnancy outcome is enhanced by shorter intervals from semen collection to sperm wash, from sperm wash to IUI time, and from semen collection to IUI time. Fertil Steril. 2004
16. Zhao Y, Brezina P, Hsu CC, Garcia J, Brinsden PR, Wallach E. In vitro fertilization: four decades of reflections and promises. Biochim Biophys Acta. 2011 September [PubMed]