CHAPTER - 8

INNOVATIONS AND BEST PRACTICES IN OBSTETRICS AND GYNECOLOGY NURSING: ADVANCING WOMEN'S AND MATERNAL CARE

Fertility, Reproductive Technology, and Nursing support

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Abstract

The ability to have children is commonly referred to as fertility. Fertility study was initiated once it was discovered that the fertility component was the main cause of population expansion in both industrialised and developing nations today. In the majority of countries, growth rates are mostly determined by fertility and death rates and are not significantly impacted by international migration. Given the persistently high fertility rates, the mortality rates in the majority of developing nations have decreased so sharply in recent years that development experts view the accelerating growth rate as a danger to economic and social development initiatives Assisted reproductive technologies, or ART, are used to help people who are having trouble getting pregnant conceive naturally. contemporary methods of assisted reproductive technology, such as suggested methods, common complications, indications for usage, and the value of a well-coordinated interprofessional team in the field of reproductive medicine.

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Key words: Assisted reproductive technologies, Fertility, Infertility

8.1 Introduction

Fertility refers to the ability to conceive and bear children, encompassing both the biological potential to produce offspring and the actual process of reproduction. In medical terms, infertility is defined as the inability to conceive after one year of unprotected intercourse. It reflects a difficulty in reproducing naturally, which affects many individuals and couples.

Assisted reproductive technologies (ART), as defined by the American Centers for Disease Control and Prevention (CDC), include any fertility-related treatments that involve the manipulation of eggs or embryos. Notably, procedures where only sperm are manipulated, such as intrauterine inseminations (IUI), are not considered part of ART. Additionally, ovarian stimulation procedures that do not involve egg retrieval are excluded from this definition.

The first successful in vitro fertilization (IVF) procedure was performed in 1978 in England. This breakthrough involved a woman undergoing an unstimulated menstrual cycle, during which a single oocyte was retrieved via laparoscopy. The egg was fertilized in vitro and subsequently transferred as an embryo into her uterus, leading to a successful pregnancy.

Since that time, IVF technology has evolved significantly, becoming the most commonly used ART procedure worldwide. This review will explore current ART techniques, focusing primarily on IVF and its associated methods, such as cryopreservation and intracytoplasmic sperm injection (ICSI), along with the indications and risks associated with these treatments.

8.2 Objectives of the study

- To Review indications and contraindications of assisted reproductive technology.
- To Identify the relevant female pelvic anatomy for assisted reproductive technology.

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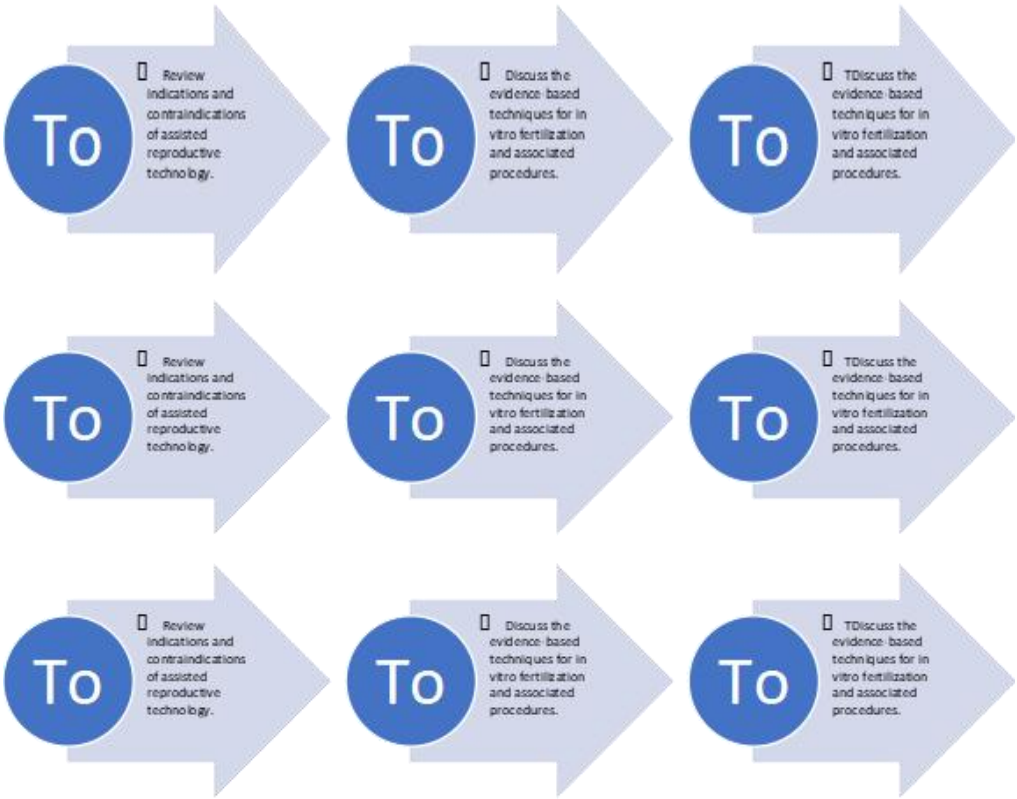
- To Discuss the evidence-based techniques for in vitro fertilization and associated procedures.
- To Outline complications of assisted reproductive technology and subsequent management.

Figure 1



8.3 Research Methodology

The study explains the conceptual research methods. The research design is based on personal reading, observation, and a focus on the conceptual framework of fertility, Assisted reproductive technology and Nursing support. Data Collection, the data for this study has been gathered from secondary sources including books, research papers, journal articles, internet reports, and newspaper articles.

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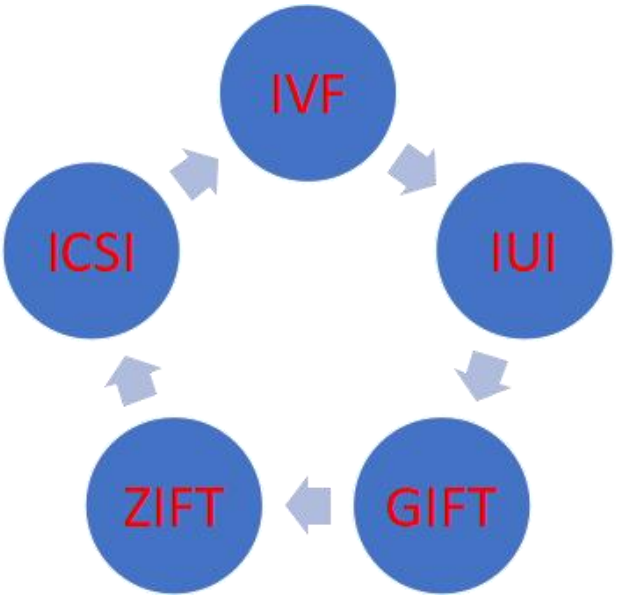
8.4 Fertility technique and treatment

Figure-2



ART METHODS

8.4.1 In vitro fertilization

In vitro fertilization is the most commonly utilized assisted reproductive technology. It involves the collection of oocytes from the ovary, followed by fertilization in vitro, and is completed with transferring the resulting embryo into a uterus. It involves various steps outlined below, including controlled ovarian stimulation, oocyte retrieval, fertilization, embryo culture, and embryo transfer. Additionally, preimplantation genetic testing and intracytoplasmic sperm injection may also be included in the process. Cryopreservation with vitrification is then used to freeze excess embryos or for fertility preservation of eggs or embryos.

8.4.2 intrauterine insemination (IUI)

During an intrauterine insemination IUI procedure the sperm is placed directly into the uterus using the small catheter. The main of this

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treatment is to improve the chances of fertilization by Increasing the number of healthy sperms that reach the fallopian tubes when the individual is most fertile.it can be helpful for couples experiencing infertility due to medical conditions (eg. endometriosis and low sperm count or quality and couples with unexplained infertility) IUI is a widely used treatment option because it is a less invasive, lower-cost alternative to in vitro fertilization.

8.4.3 Intra fallopian transfer

Intrafallopian transfer is a procedure that helps with infertility by placing eggs and sperm in the fallopian tubes it is two types of Intrafallopian transfer.

A. Gamete intrafallopian transfer (GIFT)
B. Zygote intrafallopian transfer (ZIFT)

A. Gamete intrafallopian transfer (GIFT)

A procedure that involves removing eggs from a women's ovaries and placing the fallopian tubes along with sperm from a man. The procedure involves superovulation by using medication to stimulate the ovaries to produce the multiple eggs collecting and placing the eggs and sperm into a catheter through laparoscopy surgical procedure.

B. Zygote intrafallopian transfer (ZIFT)

A procedure that involves using in vitro fertilization (IVF) to stimulate and collect the eggs, then mixing them with sperm in a lab. The fertilized egges are then injected into the fallopian tubes by using laparoscopy. This procedure is associated with risk and higher costs and they don't provide as much information about embryo development as IVF.Assissted reproductive technologies can also increase the risk of multiple births, which is high-risk for both the mother and Babies.

8.4.4 Intracytoplasmic sperm injection (ICSI)

Intracytoplasmic sperm injection (ICSI) is a fertility treatment that involves injecting a single sperm directly into an egg during in vitro

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fertilization (IVF). it's used to treat male infertility or when previous IVF attempts have failed to fertilize eggs, male partner has a low sperm count, abnormal shaped or don't move normally and vasectomy or other obstruction that prevent sperm release. ICSI has a higher fertilization rate than conventional IVF.

8.4.5 Donor eggs:

In this procedure donor eggs are extracted from another woman and fertilized with male partner sperm and the embryos formed are placed in the recipient woman 's body to carry a baby and give birth. Women who have anovulation, menopause before the age of 40, women who plan pregnancy after 40 years of age can be are benefiting women for this procedure. also, women's who plan pregnancy after 40 years of age can be benefitted. Donor sperms can be used in severe male factor infertility.

The impetus for developing a standardized practice guideline was based on evidence of limited training in embryo transfer in fellowships and varying IVF outcomes based on the provider performing the transfer.

The protocol guideline based on the survey and existing evidence is as follows:

1. One should prepare for the embryo transfer by reviewing prior mock/transfer notes
2. Patient preparation for the procedure should include analgesics for patient comfort. However, analgesics are not shown to improve pregnancy outcomes.
3. Checklist-based time out process to ensure appropriate patient and embryo identification
4. Transabdominal guidance to visualize the endometrial cavity and pelvic anatomy, as well as for ultrasound guidance of the transfer
5. Standard sterility preparation with hand-washing and sterile gloves
6. Placement of the speculum. Flushing of the vagina is recommended with either a cotton swab or gauze utilizing saline or media as the cleansing solution.

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7. Removal of mucus from the cervical-endocervical canal, with some evidence for improvement in clinical pregnancy rates.
8. Use a soft embryo transfer catheter to pass through the cervix into the endometrial cavity. The transfer may occur directly in which the catheter is loaded with the embryos before catheter placement, with a trial transfer followed by the actual transfer (empty catheter is passed through the cervix before loading the catheter with an embryo for transfer), or the afterload transfer (The catheter is passed through the cervix, after which the inner catheter is removed, with the outer catheter left in place in the canal. The inner catheter is then loaded with the embryo(s) and replaced for the placement of the embryo(s) into the uterus).
9. One should place the tip of the catheter in the upper or middle third of the endometrial cavity. There is some evidence this position improves pregnancy rates.
10. One should confirm the catheter does not have retained embryo(s)
11. There is no evidence for bed rest after embryo transfer.

Following the embryo transfer, the luteal phase is typically supported with progesterone and estrogen supplementation to promote implantation and pregnancy continuation.

8.4.6 Cryopreservation

Embryos not used in the current cycle can be cryopreserved. Cryopreservation is typically achieved with vitrification, a rapid freezing process. Vitrification is thought to prevent cryoinjury by decreasing the development of intracellular crystals.

All embryos can also be frozen in patients at risk for ovarian hyperstimulation syndrome . The embryos from these "freeze-all" cycles can then be used in a future cycle not associated with the controlled ovarian stimulation. Freeze-all cycles are also utilized in some clinics routinely, as frozen-thawed embryos have been associated with improved pregnancy rates and obstetric outcomes, such as a decreased risk of perinatal mortality and preterm birth.

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8.4.7 Surrogacy

Surrogacy is a one type of assisted reproductive technology which uses a surrogate woman's uterus for a pregnancy achieved by fertilisation of both male and female gametes .This type of procedure used by women whose uterus does not support and nurture a fertilized egg. the Assisted Reproductive Technology and Surrogacy Act was released in Jan 2022 to regulate assisted reproductive technology services across the country.

8.5 Benefits of assisted reproductive technology

1. Reduced risks of abortion: pre-implantation genetic testing in which genetic make-up of embryos is checked to reduce the rates of abortion in couples with known genetic syndromes and couples with recurrent miscarriages.
2. Better chances of a healthy child: With PGT, embryos can be tested for common genetic syndrome. cystic fibrosis increases chances of delivering a healthy baby.
3. Assissted reproductive technology helps people to plan and time their pregnancy according to their willing. using cryopreservation, they can also store their eggs or embryos for the future.

8.6 Nurses role in fertility and reproductive technology

Assisted reproductive technology (ART) fertility treatment that involves handling eggs and sperm to treat infertility. Nurses who work with ART clients often teach clients, provide therapeutic support and explain treatment options. They should have knowledge of anatomy and physiology, the menstrual cycle and diagnostic tests. They Should also have skills in patient teaching, counselling and physical assessment.

The fertility nurse helps to explain the IVF terminologies and have picked up while having a consultation with the fertility specialist or consultant and help you understand these terms.

1. Having an appointment consultation with couples/individuals in partnership with the fertility specialist/doctor. The nurse doesn't join the consultations as a bystander but serves to ensure each

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client receives adequate information during their consultation with the fertility specialist. Thus, monitors to see if the client understands what has been discussed spots out any detail that might have been missed out by the specialist during the discussion and also evaluates to see the client's individualized care needs in order to provide the same as the conversations go on.

2. Carrying out phlebotomy procedure: This involves taking your blood sample for baseline tests: The phlebotomy unit is a sensitive area as nobody enjoys the prick of a needle and so the fertility nurse takes caution to ensure this is done in a comfortable manner, clean environment and careful technique.
3. Mentally preparing clients for semen analysis.
4. Scientific counselling: helping you understand each step/process of your IVF journey.
5. Ensuring counselling support for couples and individuals: She ensures everyone gets to have a session with the counsellor at least once during their treatment cycle.
6. Planning the treatment cycle in partnership with the fertility specialist/consultant: The fertility nurse works in collaboration with the fertility specialist ensuring the selected treatment cycle is client-based to give you the best shot at achieving pregnancy.
7. Providing Patient-centered care, support and information in the follow-up of the treatment cycle. This means no client is left in the dark or lost along the way. Every client receives sufficient information at every phase of treatment and understands clearly the processes ahead.
8. Regular telephone calls, messages and emails as means of follow-up on each client. Like they say: "The magical thing about home is that it feels good to leave, and it feels even better to come back", this is the same for a fertility nurse. Your fertility nurse is that good friend called "home".
9. Introducing clients to their prescribed medications: This would entail a detailed explanation of all prescribed drugs: drug action,

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dosage, side effects, routes of administration, storage methods and a demonstration on how to administer these drugs.

10. Assisting in transvaginal scans: The fertility nurse provides emotional and physical support as some scans may come with some level of discomfort. Your nurse would be there by your side always to ensure you are comfortable, not in pain and won't fail to hold your hands in the reassurance of pledged support.
11. Assistance in egg retrieval: Just as your "guardian angel" or "fairy godmother", you would never be seen alone in theatre without a fertility nurse. Your nurse would be there to ensure the process goes smoothly and your dignity is preserved while the process is carried out in your conscious or unconscious state and that your safety is ensured and sustained. Don't be surprised to hear your nurse ask for your favourite brand of music or song artist as she just might be planning to play you some soothing albums as part of the diversional therapy we offer during theatre procedures. She monitors and documents your vitals and provides prompt and efficient intervention should anything go wrong, she also stays with you while you recover from the sedative after the procedure and gives you post-op care.
12. Assistance during embryo transfer/IUI procedures: As icing and sweet toppings are to a cake, so is the fertility nurse to the final stages of your cycle. The fertility nurse is not only concerned with the sterility of tools and equipment used during your transfer, she ensures you are emotionally and physically ready for this stage of the treatment and provides support in a comfortable theatre.
13. Conduct urine pregnancy tests at the end of the cycle and share results with the couple: peeing on a stick and waiting to see how many lines appear on it is one simple, yet frightening task to do 2 weeks after your embryo transfer/IUI procedure and so the fertility nurse is sure to support to help you conduct your pregnancy test when anxiety is at its peak.
14. Provide emotional support for couples with negative outcomes: Sometimes we need someone to simply be there. Not to fix

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anything or do anything in particular but just to let us feel we are supported and cared about. The fertility nurse provides hands to hold, an ear to listen, a heart that understands and shoulders to lean on.

15. Follow-up care for couples from pregnancy till delivery: It's not always easy growing a little life inside of you; the morning sickness, hormones, changes to the body, sleeplessness. Yet when it all gets too hard, just remember your fertility nurse will always be there to support you.

8.7 Enhancing Health care outcome

As highlighted throughout this review, assisted reproductive technologies require a cohesive interdisciplinary team that ranges from reproductive endocrinology and infertility physicians and nurses to the andrology/embryology team to psychiatric/mental health support. communication between these teams is vital to the success of Assisted reproductive technology and enhancing outcomes.

Conclusion

The field of fertility care is continuously evolving and continuing professional development activities are essential to ensure fertility professionals remain up to date and provide the evidence-based care. Identifying the challenges faced and educational needs of care teams is a first step towards improving quality of care and positively impacting outcome

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