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8th Green ART News Bulletin



Team- 8 Team Leader



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From the President's Desk..



Dr. Prof.(Col) Pankaj Talwar VSM





When we heal the Earth, we heal ourselves **Enhance fertility with Green initiatives!**

In the realm of reproductive health, in vitro fertilization (IVF) has emerged as a beacon of hope for couples facing infertility. However, as the demand for fertility treatments escalates, so also the need to address the environmental impact of these practices. This initiative explores the concept of Green IVF—an innovative approach that prioritizes sustainability without compromising the quality of patient care.

By examining the environmental challenges associated with traditional IVF and presenting actionable solutions, this project aims to inspire a shift toward more ecofriendly reproductive technologies. Traditional IVF practice is largely resourceintensive, that results in a considerable carbon footprint and contributes to environmental degradation. To recognize these grey areas and bring about a paradigm shift in how we introduce green changes in our IVF setup, is of paramount importance.

Green IVF represents a significant evolution in the landscape of reproductive medicine. As we continue to innovate and refine the IVF techniques, the dual goals of enhancing patient outcomes and reducing environmental impact can be achieved; at the same time contributing to lower operational costs, making fertility services more accessible in the long run.

Thus, the Green IVF Initiative aims to catalyze dialogue among healthcare professionals, researchers, and patients, inspiring collaborative efforts to embrace sustainability in IVF practices. By initiating the Green IVF Project in India, Indian Fertility Society (IFS) strives to pave the way for a more responsible, compassionate approach to reproductive health that honors the well-being of future generations.



Dr. Prof. Shweta Mittal Gupta Secretary General, IFS



Our environment is the foundation which plays a pivotal role in ensuring our health, economy and well-being. Climate change, resource depletion, and pollution affect every facet of life. There is an urgent need to shift toward sustainable practices which is felt by everyone, including industries like healthcare and assisted reproductive technologies (ART). In a world where IVF and other ART procedures are becoming more common, especially as people turn to these treatments to build families, it is vital that we consider the environmental implications of these technologies. The green world is not just an abstract concept, it's about ensuring a healthy future for all of us, both in terms of the planet's ecosystem and the next generation. There is an urgent need to tie this idea of a "green world" directly to ART and inculcate the habit of sustainable living.

By integrating green technologies and sustainability into ART, we intend not only to minimize harm but also to pave the way for future innovations that will benefit everyone. Countries like India, with growing IVF markets, can pioneer "Made in India" green IVF technologies that can reduce the global carbon footprint. Afterall, green world matters to us all, and by making the IVF process greener, more efficient, and more eco-friendly, we're contributing to a 'healthy' future where both people and the planet can thrive

This innovative step taken by Indian Fertility Society aims at sensitizing ART clinicians, embryologists and stake holders who will collectively work towards the goal of green, sustainable IVF and put India on the global green map.





Pearls of Wisdom



Dr. Sonia Malik Mentor, Green IVF Initiative Chief Clinical Mentor, Nova IVF & Fertility, INDIA



Green Revolution by White Coat, Leading from despair to Hope!

In the 1960's, a global clarion call of 'Green Revolution' was given to increase the agricultural yield in order to meet the increasing food demands of a rapidly rising population. This new mantra indeed proved successful worldwide and also drove India towards becoming a more powerful self-sufficient and economically strong nation. Recently, a new term has started coming up in the field of reproduction – Green IVF! Interestingly, both terms pertain to reproduction: one in the field of plants and the other in animals / humans... dealing with the seed and soil!

The Green Revolution involved the introduction of high-yielding variety (HYV) seeds, advanced irrigation techniques, and chemical fertilizers to boost agricultural productivity Similarly, Green IVF utilizes innovative techniques such as natural cycle IVF, which minimizes hormonal medication and focuses on using advanced imaging and selection technologies for embryo quality assessment. Both movements aim to increase production efficiency. The Green Revolution aimed to alleviate hunger and improve food security whereas Green IVF addresses infertility issues, providing effective sustainable health solutions for couples struggling to conceive.

The biggest challenge with the green revolution has been the change in the genetics and epigenetics profile due to use of insecticides, pesticides and genetically engineered varieties of seeds. Fortunately, in contrast, Green IVF emphasizes a more holistic, innovative and sustainable approach by reducing medication use and environmental impact associated with traditional IVF methods.

I congratulate the present team of IFS led by Col.(Dr) Talwar and ably supported by Dr Shweta Mittal for taking up this very topical subject as the theme of this year. I am sure with the well thought of program, and committed team members, we shall see a change in ART practice in the country very soon.

I wish IFS a thumping success





The IFS Green Brigade



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Dr. Bindu Chimote



Dr. Meenu Agarwal



Green Teams

IFS Green Initiative proposes to touch every aspect of the IVF field so as to improve sustainability in routine ART practice. Accordingly, a task-force of 9 specialized 'Green Teams' has been formed to investigate and evaluate problem areas where green alternatives can be applied. Phase-wise implementation of novel ideas is envisaged, facilitating a dynamic shift to environmentally friendly techniques in the near future.

1.Understanding green sustainable IVF

- 2. Designing sustainable ART clinics
 - 3. Clinician perspective towards reducing carbon footprint
 - 4 .Low cost IVF to reduce environmental load
 - 5. Bio medical waste disposal and recycling of products
 - 6. Embryology initiatives to reduce environmental carbon load
 - 7. Cryobiology and greenhouse emissions
 - 8. Made in India initiative to reduce GHG emissions
- 9. Novel ideas and net zero by 2045



Team 8 Bulletin

MAKE IN INDIA INITIATIVE TO REDUCE GHG EMISSIONS

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MAKE IN INDIA INITIATIVE TO REDUCE GHG EMISSIONS

INTRODUCTION

Infertility presents a significant global health challenge, affecting approximately 15% of reproductive-aged couples worldwide. Advanced technology and superior machinery have improved the conception rate through IVF in infertile couples. This increasing demand for IVF requires a constant supply of resources like energy resources, consumables, drugs and waste management. Environment friendly practices which can be collated under the umbrella of 'Green IVF' are the need of the hour to prevent environmental degradation and protect the future of generations to come. ¹³

BACKGROUND

The Growing Environmental Footprint of the Healthcare Sector

On an average, the Greenhouse Gas (GHG) emissions from healthcare account for a significant 4.4% of worldwide emissions, with this figure rising to as much as 10% in some high-income countries. Indian health sector too presents a similar figure of 5% of the nation's GHG emissions, that stem primarily from extensive energy consumption, the procurement and use of medical equipment, and the inadequate management of biomedical waste.

In 2020, Indian healthcare facilities generated a staggering amount of approximately 800 tons of biomedical waste daily, which is equivalent to about 100 truckloads per day.³ Alarmingly, over 15% of this waste remains untreated, leading to profound environmental pollution.³

IVF laboratories themselves can be sources of internal pollutants such as VOCs from materials, which can negatively influence air quality within the controlled environment. ¹² Since IVF is a resource-intensive medical discipline, it needs targeted and impactful sustainability interventions.

Defining Green IVF: Principles and Goals

Green IVF represents a conscious effort towards developing and maintaining environment friendly and sustainable practices by IVF pharmaceutical industry and ART laboratories and clinics. ⁴

The core objectives include a dedicated effort to minimize carbon emissions, reduce energy consumption and decrease waste generation. ⁶ This translates into principles to minimize use of single use plastics, shift towards using renewable energy sources for ART lab and clinics, reduce transportation associated GHG emissions by optimizing supply chains and modifying laboratory infrastructure suitable to green ecofriendly design. ⁴

The definition of 'Green IVF' extends beyond environmental compass to encompass a holistic approach that links ethical responsibility (first do no harm) with clinical efficacy. ¹⁴

The 'Make in India' initiative was launched by the Prime Minister of India in 2014 with an aim to transform India into a global manufacturing hub. ⁶. The main objective is to reduce India's dependence on import and promote domestic as well as foreign investment in the country. ⁶.

Domestic production of medical equipments also provides an opportunity to incorporate appropriate changes towards sustainable and green practices from inception of design and manufacturing. Homegrown industries also provide an opportunity to develop environment friendly sustainable IWF products.



In related sectors, India has made rapid developments in efficient utilization of resources while at the same time minimizing waste and recycling the waste and reducing emissions. This has been possible due to use of bio degradable products and also efficient use of local supply chains. Awareness and prerequisite for industries to obtain green certifications such as ISO 14001 etc, is reinforcing the drive towards environmentally friendly and sustainable production.¹⁶

Steps of Execution of 'Make in India'

- 1. Introducing Government Policies which are manufacturer friendly and encouraging
- 2. Creating Infrastructure (Manufacturing Units, plants, etc)
- 3. Raw Material Procurement wherever required
- 4. Promoting domestic manufacturing
- 5. Strict Quality Control
- 6. Maintaining Storage standards
- 7. Reducing Transportation
- 8. Establish R & D cell and Funding
- 9. Trust building in IVF Specialists and Embryologists Pan India for using the indigenous product.
- 10. Quality Assurance and Honest Feedback Systems for Improvement
- 11. During manufacturing, Storage and Transportation, low GHG emission needs to be kept in mind.

Current Status and Challenges

- 1. increased the cost with Custom duties, taxes etc owing to few manufacturers.
- 2. Most of media and incubators are imported, although some domestic manufacturing has started
- 3. Hormonal Drugs are mostly packaged in India
- 4. Consumables of IVF Grade are mostly imported. Some were tried in India but QC issues were there in past. Ovum pickup needles, ET Catheters, etc are mostly imported

SOLUTION: Based on this review, the following recommendations are put forth:

1. Policy and Regulatory Recommendations:

Incentivize domestic production: Incentives in the form of tax benefits and subsidies for manufacturing eco-friendly medical devices and consumables that are energy efficient and reusable should be given. Low interest loans should be offered to encourage investment in research and development of indigenous IVF technologies.

Establish Standards for equipment and consumables: These should only be procured from sources that meet the requirements of eco friendly standards. There should be a strict check using eco-labelling. Indigenous production and procurement should be encouraged. **Price control:** There should be regulations on pricing of drugs and consumables to make

Price control: There should be regulations on pricing of drugs and consumables to make it more affordable for patients.

Insurance coverage: more Insurance companies should be encouraged to include IVF treatment to reduce financial burden on patients.

Concept of Circular Economy: Industries and production houses that work on the principle of circular economy like reuse, reprocess and recycle should be incentivized.¹⁷

2. Recommendations for manufacturing Industry:

Promoting Research and Development by different ways:

- a) Providing Research funds: dedicated funds for research and development of innovative IVF technologies.
- **b) Skill development** and training of workforce including international exposure
- **c)** Encouraging collaborations between research institutes, government hospitals and private companies

Adopt Renewable Energy: Renewable sources of energy like solar and wind energy should be encouraged for ART laboratories, clinics and medical equipment manufacturing industries to reduce their carbon footprint.

Collaboration between academic research and manufacturing industries: Collaboration between pharmaceutical companies, medical device manufacturing industries and academic research institutions should be encouraged to promote the development and adoption of green technologies and sustainable practices.

3. Recommendations for ART Clinic:

Energy conservation: All ART laboratories should conduct regular checks and make an effort to reduce energy consumption and also shift to ecofriendly energy sources like wind and solar energy.

Waste management: All the options for waste recycling and reuse should be explored. Alternatives for single use plastics should be developed.

Equipment Procurement: indigenously developed, ecofriendly, green medical equipment and consumables should be promoted.

Green Laboratory: New facilities should adhere to guidelines for eco-friendly and sustainable infrastructure.

Research and Development Recommendations:

Conduct detailed LCAs (Life Cycle Assessments) focused on IVF treatments in the Indian setting. These assessments should cover every stage—from making the materials used to disposing of waste—to measure the environmental impact accurately. This information will help identify key problem areas and suggest where improvements are most needed.

More research is necessary to understand how long-term, low-level exposure to environmental pollutants—both from the surroundings and inside clinics—affects the quality of eggs and sperm, embryo development, and pregnancy success in IVF. This will strengthen the case for the clinical benefits of adopting "Green IVF" practices.

CONCLUSIONS

The above analysis demonstrates that India's national policies, centred around the "Make in India" theme, is actually an idea that fosters self-reliance or Atma Nirbharta. By combining the goals of the "Make in India" initiative with the growing "Green IVF" movement, India can work towards becoming self-sufficient in medical production while also becoming a leader in eco-friendly reproductive healthcare—protecting both people and the environment for the future.



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Review of Work (ROW)

Quarter- II, III & IV, 2024



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