1. INTRODUCTION

The desire to have a child is natural, and most women plan for experiencing pregnancy and child birth at a certain point in their adult lives. Although conceiving a child may appear like the easiest thing in the world, it is actually not the case for many couples.

If this problem is overcome it will modify the lives of these infertile couples and will help them to have the fulfilment of their own baby without resorting to other means such as adoption.

Infertility is a condition with psychological, financial and medical implications resulting in trauma and stress particularly in a social set-up like ours, with a strong emphasis on child bearing. According to World Health Organization (WHO), infertility is defined as inability to conceive after one year of unprotected intercourse.¹, ²

1.1 Prevalence of Infertility

The WHO estimates that, worldwide 60 to 80 million couples suffer from infertility.³ The prevalence of Infertility varies across regions of the world and is estimated to affect 8 to 12 per cent of couples.⁴, ⁵ The WHO estimates the overall prevalence of primary infertility in India to be between 3.9 and 16.8 per cent.²

The prevalence of infertility varies widely among the Indian states from 3.7 per cent in Uttar Pradesh, Himachal Pradesh and Maharashtra⁶ to 5 per cent in Andhra Pradesh⁷, and 15 per cent in Kashmir.⁸
The prevalence of female infertility was 45.67% in Kanyakumari, 44.24% in Thirunelveli, and 41.91% in Thiruvananthapuram. Primary infertility is a common distressing problem in India as in other parts of the world. In South India, primary infertility was more common than secondary infertility as in other parts of the world.9

Male factor infertility contributes approximately 40-50% of all infertility cases and 2% of all men will exhibit suboptimal sperm parameters. In Indian couples, the male factor is the cause in approximately 23%. Nearly 50% of infertility is related to the reproductive anomalies or disorders in the male as per the report on the status of infertility in India.10

A diagnosis of infertility does not have to mean childlessness. It can often just mean that becoming pregnant is a challenge but one that can be aided by medical treatment.11

In addition to the routine infertility treatment by medication, newer avenues have opened for certain invasive techniques which are providing a much higher pregnancy rate. Several useful and highly successful techniques are widely used today, such as artificial insemination and In Vitro Fertilization (IVF). Assisted Reproductive Technology (ART) is a general term referring to methods used to achieve pregnancy by artificial or partially artificial means.12 ART has evolved immensely in India.
As a result of the advancement of ART, the pregnancy rate per stimulation cycle reaches almost 30% worldwide. This success rate, which is comparable to the chance of pregnancy with a single intercourse around the time of ovulation (25–30%)\(^{13,14}\), can be obtained by transferring more than one embryo.

Despite the technical developments in the last decades, there are still problems associated with the treatment protocol that needs to be solved. Earlier, increasing the number of transferred embryos has been the approach to increase pregnancy rates. But, this also increases the multiple pregnancy rates with associated increased medical risks, and cost to the patient and society.\(^{15}\)

In 2009, over 400,000 fresh *In Vitro* Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI) cycles were performed in Europe. One out of every five treated, resulted in a live birth. To achieve this birth rate, in 75% of the cycles more than one embryo were transferred. Twenty percent of the deliveries were multiple pregnancies.\(^{16}\)

In 2012, close to 100,000 fresh IVF/ICSI cycles were performed in the US. The average number of embryos transferred were between 1.9 and 2.9 (depending on the age of the patient). The implantation rate was 37.5% in the less than 35 yrs age group. In this same age group, a 40.7% live birth rate was achieved but almost 30% of the deliveries were twin deliveries.\(^{17}\) There are additional maternal and neonatal risks in multiple preganncies.\(^{18}\)
In order to prevent these unfavourable results brought about by ART, it is necessary to restrict the number of embryos for transfer. However, concerns have been raised that restricting the number of embryos for transfer might jeopardize the success rate of IVF treatment.

So in order to reduce multiple pregnancies and achieve a maximal rate of implantation, selection of most viable embryo for transfer has become a high priority in assisted reproduction. The success of ART depends primarily on the quality of the embryos transferred and endometrial receptivity. One of the main problems in ART today is selection of best embryos for transfer. Therefore, it is important to increase our knowledge on embryo selection.