



SOCIAL EGG FREEZING IN INDIA: AN UNCONVENTIONAL CONDUIT TO CONVENTIONAL MOTHERHOOD

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ABSTRACT

Rapid encroachment in the field of prognosis and preserving technologies under the ambit of reproductive medical world has made this flexibility of reproductive choice a reality. Socio-demographic changes in modern society have led to an amplified number of women who conceive in older age than earlier. "Social egg freezing" is the term used when eggs or ovarian tissue are frozen for non-medical purpose and used afterward in life perspectives of patients and providers. Highlighting the decision to undergo this process is complex and individual patient ideals play a significant role. Social egg freezing by single women had increased by 25% in India in past years. However, little research data is available about social egg freezing and ART in our country. Social egg freezing preferred during the pandemic in India also like US, UK, and Australia for many of the reasons although for many Indian women, egg freezing is also a response to the family and societal pressure to marry and have children, in a country where unmarried mothers are still a taboo. So future research on usage rate, live birth rate, pregnancy outcomes and long-term follow-up of children conceived using frozen-thawed oocytes is necessary.

KEYWORDS: Social egg freezing, IVF, Infertility, Age, women health, life style, motherhood.

INTRODUCTION

Reproduction is a distinctive feature of all living beings and is necessary for continued existence and decisiveness. The sole purpose of procreation may be similar in both males and females. However, a significant difference is present in the reproductive organ anatomy and functional regulation. In the male reproductive system, the testes are the primary sex organ, playing both gametogenic and endocrine roles and the accessory organs such as the seminal vesicle, prostate gland, urethra, and penis.^[1,2] The reproductive system of a female includes a pair of ovaries that act as a key sex organ. The ovaries produce ovum via a complex mechanism and secrete estrogen and progesterone hormones. The female reproductive system includes the mammary glands and other accessory organs such as the fallopian tube, uterus, cervix, vagina, labia majora, labia minora and clitoris.^[1] For centuries only women have had to bear the load of reproduction that comprises of producing viable offspring that can successfully procreate further. The existence is depending upon so many factors like gaps between two reproductive cycles, timing of first progeny, and growth size of child at the time of birth and caring by the parents after birth. According to WHO, 60 to 80 million couples worldwide currently suffer from infertility/sub-fertility.^[3] Among

them 30 % of infertility cases are due to male factors. The percent Infertility /subfertility fluctuate state to state within the same country. In India infertility varies from 3.7% in Uttar Pradesh, Himachal Pradesh, and Maharashtra state, to 5% in Andhra Pradesh, and 15% in Kashmir. Moreover, the prevalence of primary infertility has also been shown to vary across the tribes and castes within the same region in India. Infertility varies across the regions it is estimated to affect 8 to 12 percent of couples worldwide.^[4,5]

Living being involves the growth by ageing via complex biological changes in body over entire life span. In humans, advanced maternal or paternal age is associated with fertility or sub-fertility. Cellular and organic senescence is also hypothesized to add the age-related turn down in reproduction. Lifestyle changes have led to an increased number of women who decides to conceive in their late 30s, which resulting in an overall higher pregnancy age than previously. There is no research supportive national data available on using egg freezing in India, although assisted reproductive technology specialists have said there has been a 25 percent rise in the number of single women freezing their eggs over the past year. Social egg freezing also picked up during the pandemic in developed as well as in developing

countries for many of the same reasons as in India. In India women, egg freezing is still a taboo, and also a response to the family and societal pressure to marry and have children. According to Nelson et al., women who conceive at an older age have a higher risk of preterm birth and pregnancy-induced hypertension syndrome.^[6] Intentionally delayed childbearing is a trend among professional couples in these days.^[7] In the United States since 1980, the birth rate in women older than age 35 years increased by nearly 60%, whereas the birth rate for women aged 20 to 34 years increased by only 10%.^[8] This trend, in addition to an age-related decline in fertility has led to an increased need for advanced reproductive technology for couples.^[9-11]

The worldwide inclination for parenthood at an older age has also been seen in men as well as in women. Since 1980, the fertility rate for men in their 30s and 40 years has increased by 21% to 30% respectively. However, the fertility rate in younger men below the age of 30 years has decreased by 15%.^[8] A couple's per cycle fecundity is the most crucial component for reproductive positive outcomes; the age of the male and the female ovarian reserve has furthermore significant impact on fecundity. Beyond the fact that older men tend to have older female partners, increasing male age is associated with increased time to conception and this reflects the age-related increase in acquired medical conditions; reduce in sperm functions, semen quality and DNA damaged spermatozoa is seen. There is an association between the age of the male partner and the incidence of birth defects and chromosomal abnormalities. A study by Janeczko et al. clearly states the link between advanced paternal age at the age of conception with increased frequency of mental health disorders, such as bipolar disease, schizophrenia, autism, or even a lower IQ level of the offspring. Advanced paternal age also has serious implications for genetic disorders, congenital defects, prenatal complications, or even carcinogenesis.^[12] A new techno-medical innovation was commercialized for non-medical reasons to healthy, apparently fertile women, who wished to push back motherhood for different reasons such as educational or career demands, or because they had not yet found a partner or they won't to marry for any other reason. As an outcome, these women may be exaggerated by age-related infertility when they decide to conceive.

What is egg freezing?

Social egg-freezing technology came a long way just like cosmetic surgery which helps people to enhance their looks and personality. Similarly, egg freezing gives women a chance for motherhood. Today a woman role emerges from homemaker to a breadwinner. In society, egg freezing gives a woman freedom so that they don't have to compromise only because their biological clock is ticking. This technology gives a woman immense time to chase. It's like an insurance policy. It doesn't mean that they will need it but if any case they do. The term used egg freezing has been controversial most of the

female preferably used elective egg freezing. Egg freezing is a procedure to harvest a woman's eggs and use them to get pregnant in the future it is also known as Oocyte cryopreservation. In this procedure, the woman's eggs (oocyte) are extracted, frozen, and harvested to preserve the reproductive potential of the woman. In the process of egg freezing, medications are used to stimulate the eggs to develop. Those eggs are then harvested from the ovaries and frozen for storage. At a later date, the eggs can be thawed and combined with sperm to create an embryo. The embryo can then be implanted into the uterus during the embryo transfer cycle.

Steps involved in Egg freezing

Counseling: This is generally the initiating step wherein the lady decides to undertake this procedure. She is helped in this decision-making and journey by the information provided by the Fertility centers. The female would also undergo tests to determine her reserve and also to ensure her fitness to undergo the procedure.

Controlled ovarian stimulation: After proper counseling, gonadotropin injections are administered to facilitate multiple egg growth & development. The aim is to get adequate egg numbers to compensate attrition rate in IVF cycles.

Ovum picks up: Once the eggs are ready and deemed to be mature, they are retrieved by a surgical process called Ovum Pick up. This is done through the vaginal route under ultrasound guidance with the patient under short anesthesia.

Cryopreservation: Once the Ovum picks up is complete, the eggs are assessed and processed for cryopreservation. They are exposed to a meticulous protocol of cryoprotectants before resting in liquid nitrogen.

Thawing and Intracytoplasmic Sperm Injection

(ICSI): When the time is suitable for motherhood, the uterus is prepared for getting the embryos, and in synchrony with this, the frozen eggs are brought out of cryo-storage, again through another process called thawing. The thawed oocytes are inseminated by the process of ICSI. Further, the fertilized oocytes are cultured in the IVF laboratory till the stage of transfer and then the resultant embryos are either transferred or cryopreserved.

Embryo transfer: This procedure is the pinnacle of the entire treatment protocol where the embryos are transferred into the receptive uterus under ultrasound guidance. The process of implantation is supported with the help of exogenous medicines.

Social egg freezing: Risk and Benefits?

With the first cryopreservation of sperm and embryos in 1953, these techniques have become a routine. The

world's first pregnancy was reported in 1986 using formerly frozen oocytes by Chen.^[13] The first pregnancy and birth in India after the transfer of embryos generated from frozen-thawed oocytes was reported by Selvaraj *et al.*, in 2009.^[14] in a 29-year-old woman, with a previous bad obstetric history and an abnormal karyotype, which necessitating for a donor oocyte program. Social egg freezing, followed by in vitro fertilization (IVF) and embryo transfer, offers two important benefits to women who anticipate becoming pregnant at an advanced age: it provides them with the possibility of becoming a genetic parent using their frozen-thawed eggs, and it reduces the risk of having children with chromosomal abnormalities associated with ovarian aneuploidy.^[15] For women who do not have a partner or for women who have moral concerns about the status of a developing embryo, egg freezing may be a preferable alternative to embryo freezing. In addition to the harms associated with premature birth and low birth weight, there is evidence of "a slight increase in the risk of congenital structural abnormalities" with IVF, and some research suggests that there may be a small but increased risk of cancer and structural cardiac anomalies for these children.^[16] Further research is needed to confirm the risks to children born of IVF and to determine whether there are risks specifically associated with births from frozen eggs. Women who attempt to achieve a pregnancy using their frozen-thawed eggs will be subjected to the risks of IVF. These risks include multiple pregnancies, pregnancy-related high blood pressure, premature delivery, operative delivery, and infants with low birth weight.^[17,18]

Potential benefits of social egg-freezing

With the brisk advancement in the field of analysis and cryobiology under the field of reproductive medicine has made this suppleness of reproductive choice a reality. Initially used exclusively for the field of Oncofertility (preserving the fertility potential in cancer patients), this technology has made inroads into the social fabric of reproductive planning. Better diagnostic tests and more penetrative scan machines help us identify those at-risk couples who are destined to have a rapid plummet into sub-fertility. The Indian sub-continent women are associated with a very traditionally conservative household role which makes this ascent into professionalism even steeper. As a fallout, the provision of flexibility becomes more difficult, more challenging, and more behest with impediments. Existing studies also yielded that public attitudes depend on the specific settings of its use: the duration of oocyte preservation^[19] or women's motives for cryopreservation.^[20] Moreover, the attitudes correlate with the socio-demographic characteristics of individuals. In particular, older and more religious individuals show lower acceptance of cryopreservation without medical indications.^[21] Immense literature has been published covering the different aspects of oocyte cryopreservation whereas; social egg freezing is a perceptive practice bearing an intricate psychological and social bang on patients.

Several researchers have evaluated the aspect of women's experiences about egg banking and to the process including building decisions and lament scales, and have concluded that there is an urgent need for proper counseling regarding the benefits, risks, alternative reproductive options and emotional support throughout the egg freezing process.^[22,23,24] One of the latest studies has also explored the perspectives of patients and providers about social egg freezing that there is a gap between the service providers and the patients in navigation to decision making.^[25]

The financial costs of social egg-freezing

The cost of egg freezing varies depending on a variety of factors, including the clinic, location, and number of cycles needed. It is important to research and understand the costs involved before deciding to undergo the procedure. In India, the cost of egg freezing is cheaper than in other countries. The fertility world charges egg freezing ranging from Rs.10k per month to Rs.1.20 lakhs yearly. The cost from the table is inclusive of the charges of IVF protocol such as medicines and injections given for ovarian stimulation and the charges for the procedure of egg retrieval and subsequent freezing.

CONCLUSION

Social egg freezing reinforces assumptions about the importance of having genetically related children, which may not be of equal magnitude to all women. It is important to outline the relative potential benefits and risks of all options for family-making. One of the purposes of medicine in health policies is the recognition of the different health needs of men and women because of their differences in order to define gender equity, which should be guaranteed to everyone. Cryopreservation of oocytes for later use as a form to prevent age-related infertility is now seen as a viable technology that can extend the window opportunity of pregnancy for those women who defer motherhood for social reasons. Future research on usage rate, live birth rate, pregnancy outcomes, and long-term follow-up of children conceived using frozen-thawed oocytes is necessary.

Contribution Detail

The first author contributed in creating concept, designing the manuscript, literature search, data analysis and statistical analysis. The Corresponding author provides infertile patients demographic and other required data and information, Manuscript editing and manuscript review.

Ethical Consideration

Ethical approval was not applicable as it was a non-experimental study.

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