

Freezing hope: Balancing realism and optimism in elective egg freezing

Hui Men Selina Chin¹ MRCOG, Hemashree Rajesh¹ FRCOG

The 2022 White Paper on Singapore Women's Development, which aimed at a fair and inclusive society where both women and men can pursue their aspirations fully, announced the option for elective egg freezing (EEF) and the age limit for EEF was planned to be set at 35 years.¹ The limit has been set at 37 years following recent review of success rates of EEF up to this age.² This was implemented on 1 July 2023, presenting a conundrum among health professionals and women alike. While this is an exciting long-overdue progress in women's reproductive autonomy, elective egg freezing needs adequate counselling and critical appraisal before a woman embarks on this journey. In this issue of the *Annals*, Ong et al.³ have presented a comprehensive overview on the key clinical aspects of EEF that a clinician should consider, while empowering women in this complicated decision-making. This review is a foundation for the consideration of EEF for young Singaporean women who intend to navigate newly charted waters in EEF in the context of a still rather conservative society.

The most common reason women cite for undergoing EEF is a "lack of a partner".⁴ In an equal society, women invest their time in rigorous schooling and robust careers. These may reduce their social opportunities to meet a suitable partner, while the biological clock ticks. EEF enables women to "freeze time" on their oocytes, allowing them to forestall age-related fertility and focus on simultaneous needs.

Age is a major determinant of the number and quality of oocytes. Increasing maternal age is associated with poorer oocyte quality, lower thaw survival, lower fertilisation, and increased aneuploidy risk.³ Thaw survival and fertilisation success rates are also influenced by the quality of the in vitro fertilisation (IVF) laboratory. Therefore, a complex algorithm is needed when analysing the ideal EEF cycle, especially in older women. Younger women undergoing EEF have a higher probability of live birth with the greatest impact in 30–35 age group (up to 70%), followed by 36–37 age group (51.6%). Models predict that at 34 and 37 years of age, a woman will need 10 and 20 mature oocytes, respectively for a 75% chance of a

live birth.⁴ In comparison, a 42-year-old healthy woman will need 61 mature oocytes!⁵ Older women have a lower egg reserve and need more cycles to maximise oocyte recovery. For women below 30 years of age, EEF confers minimal improvement in live birth rates (3%)⁶ due to higher chance of pregnancy without the cost of treatment and oocyte cryostorage. Above 37 years old, regardless of EEF, live birth rates are low.⁶

Apart from physical and emotional challenges, EEF is a huge financial burden. An EEF cycle costs SGD 10,000–14,000 (approx. USD 7472 in 2024) in various centres depending on package inclusions. There is a freezing fee according to the number of mature eggs collected, and patients with more eggs pay a higher fee. Annual storage fee for the oocytes is around SGD 500–600 per year, translating to a whopping SGD 5,000 for 10 years! Costs are also involved for subsequent IVF thaw cycles to use the stored oocytes and there are currently no IVF subsidies if a woman starts her first cycle over 40 years of age. In Singapore, EEF is self-funded. Some employers (e.g. certain multinational and US companies) provide monetary support for employees undergoing EEF. To combat low live birth rates, some countries offer subsidies for EEF for their citizens (e.g. South Korea). Cost is a definite barrier to entry and has been reported to be the main reason for women opting not to proceed in a study.⁷

With scientific advancement, EEF cycles may become more affordable in the future. The introduction of a new progestin-primed ovarian stimulation (PPOS) protocol has recently gained considerable popularity in the world of assisted reproductive technology for its advantages of oral administration, user convenience and low cost compared with conventional protocols that use gonadotropin hormone-releasing hormone (GnRH) analogue injections to prevent ovulation.⁸ Comparing PPOS with conventional protocol, clinical pregnancy rates and live birth rates have been shown to be similar.⁸ In terms of financial savings, this may eliminate GnRH analogues and reduce EEF costs.⁸

EEF is commonly likened to "buying insurance", yet this is a misconception. Unlike most insurances,

there is no guaranteed payout of a live birth. Corporate financial supports for EEF may tempt women to relegate fertility to a lower priority, lulling them into a false sense of security. While oocyte banking tides over a depleting egg reserve, there are several other factors that interfere with pregnancy as a woman ages. New-onset or worsening uterine pathologies, uterine receptivity, and medical and surgical problems may all interfere with subsequent conception. Pregnancies in older women are deemed high-risk pregnancies in view of the increased morbidity and mortality. Unfortunately, to our knowledge, there is no literature that quantifies how much women appreciate these nuances despite adequate counselling. One needs to be cautious against painting an overly optimistic future as even in a perfect scenario, EEF does not put an indefinite pause on a woman's fertility. Furthermore, sociological and cultural considerations of being an older parent still exist in society.

A key consideration about EEF is low utilisation rates due to a future natural conception or as women still believe that they are not ready for motherhood. Four factors influence one's readiness to conceive: social status of parents, economic preconditions, personal and relational readiness, and physical health and child costs.⁹ Western countries report low utilisation rates (up to 15%) with the exception of a study at a university-affiliated fertility centre in New York, US reporting a 38% utilisation rate.¹⁰ Real-world data on usage rate in Asian countries is limited. However, considering cultural beliefs in this region, one would expect an even lower utilisation. In Taiwan, which limits usage of frozen oocytes to heterosexual marriage, the utilisation rate is 8.4%, with highest cumulative live birth rates in the youngest group and highest cumulative cost per live birth in the oldest group.¹¹ This makes EEF less appealing from a scientific and economic perspective. However, the choice for EEF is rational due to the high-cost risks of age-related subfertility, regardless of probability.

A silver lining from EEF's low utilisation rates is the population of an oocyte bank available for donation, if the women are agreeable. International studies exploring the psychosocial determinants of oocyte disposition intentions revealed that 26% of women with oocytes in storage would "donate to others", with 31% unsure. Factors favouring donation include knowing a family member or friend in need, or an altruistic intention to help others create a family. Barriers against donation are due to fear of having a biological child they do not know about or who is raised by someone they know.¹² While there are ethical dilemmas with

oocyte donation, this reserve has huge potential to significantly benefit the community that is unable to conceive naturally.

The ideal EEF protocol aims to maximise oocyte yield while reducing downtime, health risk and financial burden. Individualised counselling on the predicted success rate, risks, costs and eventual usage rates needs to be undertaken. The likely EEF candidate in Singapore would be someone who is financially sound and in good health status without immediate plans for motherhood. The Singapore climate is still fairly conservative—reflected in the stringent safeguards ensuring that frozen oocytes are used only within the context of marriage and a traditional family structure. It takes great tenacity and grit for a young woman to embark on a journey that allows her more autonomy over her reproductive potential.

As physicians, we can use good quality evidence as counselling tools to help women make decisions on their reproductive health. Improving Singapore's fertility rate may lie in a societal shift that follows a greater awareness of age-related reproductive decline, with or without EEF. Women can be empowered with information about their fertility potential early through screening of their ovarian reserve (serum anti-Müllerian hormone) and reproductive organ structures (pelvic ultrasound). While the legalisation of EEF in Singapore is a definitive positive step, probably the first step should begin in primary care with a simple question, "Do you have any plans for a child?"

Disclosure

The authors declare no conflict of interest in relation to the authors or the organisations from the article.

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