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Article

Social egg freezing under public health perspective: Just a medical reality or a women's right? An ethical case analysis

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Significance for public health

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, that we can define gender equity, which should be guaranteed. Social egg freezing means to preserve and store a woman's oocytes for non-medical purposes. This paper discusses how social freezing may be advertised to harmonise these incompatibilities and, if oocyte cryopreservation is an accepted procedure to counter infertility and if fertility treatment is covered by public healthcare, the consequence may be that it may also be covered by public national healthcare system or we have to admit that there is a distinction between assisted reproductive technologies for medical reasons and assisted reproductive technologies with oocytes previously stored for non-medical reasons.

Abstract

In recent years, a social trend toward delaying childbearing has been observed in women of reproductive age. A novel technological innovation was commercialized for non-medical reasons to healthy, ostensibly fertile women, who wished to postpone motherhood for various reasons such as educational or career demands, or because they had not yet found a partner. As a consequence, these women may be affected by age-related infertility when they decide to conceive, and fertility preservation techniques can be obtained through the so-called *social egg freezing*. This paper examines, from an ethical point of view, the impact of social egg freezing under some aspects that can involve policy making and resources allocation in public health. Due to the increasing demand for this procedure, some debated issues regard if it is reasonable to include social egg freezing in Public Healthcare System and consequently how to manage the storage of cryopreserved oocytes also from individual donors, how to support these egg banks and how to face, in the future, with the possibility that egg freezing will play a role in enabling childbearing for gays, lesbians, and unmarried persons. Social freezing may be advertised to harmonise gender differences, but we wonder if it is the proper solution to the problem or if it could also create further challenges. An ethical argumentation on these topics should address some questions that will be discussed.

Introduction

Fertility preservation is an emerging field that provides the opportunity to maintain reproductive health to all those patients who either have to receive medical treatments or want to preserve

their gametes to postpone childbearing (age-related fertility preservation). The majority of patients who can benefit from fertility preservation techniques are cancer patients: in fact, chemo- and radiotherapy given in some cancer therapies have detrimental consequences on male and female gonads that may lead to infertility.¹⁻³ Other disorders, such as autoimmune diseases and myelodysplastic syndromes, require medical treatment that can also impair reproductive cells and tissues. In medical situations, fertility preservation is also indicated in other circumstances where germ cell degeneration is observed, in particular women affected by premature ovarian failure (POF) based on idiopathic or genetic origin as in Turner syndrome mosaicism, X trisomy, and X-fragile syndrome, may also benefit from fertility preservation.⁴

Social egg freezing means to preserve and store a woman's oocytes for non-medical purposes.

The fact that female fecundity decreases with increasing age was recognised in several demographic and epidemiological studies that consistently demonstrated a decline in fertility beginning as early as the middle of the third decade.^{5,6} The incontrovertible effect of ageing on female reproductive function is most notable in the decline in ovarian function. Ovarian ageing causes a progressive loss of the finite pool of primordial follicles, ultimately resulting in menopause, and apart from this quantitative decline, an age-dependent decline in the quality of oocytes mainly as a result of increased chromosomal aneuploidy.

Today, a social trend toward delaying childbearing has been observed in women of reproductive age. This delay is due to different factors related to lifestyle such as development of a professional career or absence of the right partner. As a consequence, these women may be affected by age-related infertility when they decide to conceive, and fertility preservation techniques is proposed as a solution for these women.

Recent studies in literature indicate significantly more success with the technique of oocyte vitrification, that means to transform a substance into glass to render it stable through very rapid cooling to about -100°C, where molecular activity stopped.⁷ This technique is undoubtedly useful in clinical applications, that are represented first of all by patients who may have fertility impairment as consequence of diseases or therapies; furthermore, elective cryopreservation of oocytes may be a possible clinical application as a form of prevention in age-related decline in women fertility, if we consider this decline as an age-related women's disease, rather than a manifestation of physiological changes.⁸

On social and non-medical

The advent of successful oocyte freezing techniques has

opened the doors to a new medical and societal phenomenon of oocyte freezing to avoid age-related subfertility.⁹

Social freezing means egg storing of a healthy, fertile woman, in order to have a pregnancy later in her life, *i.e.* at the age of 45 to 50,¹⁰ it should ideally be performed on women around 25 years of age in order to increase their chances of a future pregnancy, but, in reality, it is mostly performed after the age of 35. While the option for cancer patients to freeze oocytes, in the face of treatments that may render them infertile, is generally considered in a positive light, offering the same option to healthy women, for the previously indicated reasons, is met with new ethical challenges.

Until recently egg freezing was offered only for medical reasons, to women facing cancer treatments, or other fertility-impairing conditions, who had no other options for fertility preservation, this medical innovation is being widely promoted by private fertility centres and the lay press throughout the world, to healthy, ostensibly fertile women, who wished to postpone motherhood for various reasons such as educational or career demands, or because they had not yet found a partner. Furthermore, in 2014, Facebook and Apple made headlines by offering to give female employees \$20,000 of egg-freezing benefits as a nudge policy to encourage people to make healthier choices.^{11,12} Public reaction to the meaning of this opportunity was mixed: some viewed the development positively as a forward-thinking practice that would give greater flexibility and peace of mind to young female employees to avoid the pressure because of their declining ovarian reserve, while others were sceptical that women would be the true beneficiaries, arguing that it would create implicit pressure to partake in egg freezing and delay motherhood in order to demonstrate seriousness and dedication to the workplace.^{13,14}

The association of the term *social* to a certain treatment commonly indicates the absence of a medical indication, for the fact that it refers to medical treatments performed purely based on the desire of a person. Social egg freezing is by no means a *social* activity as there are no other people involved apart from the woman herself. This treatment is not part of the social notion of solidarity in the altruistic sense either, given that the oocytes will be used by the woman herself, and considering that egg donors undertake these risks to save someone else's life like organ donation, but to enable other women to raise a child. The act would only be social if the woman determines that she does not need her frozen oocytes and decides to donate them to another woman to use them. Unfortunately, at the moment, the average age of the women who perform oocyte banking is too old to be considered suitable for oocyte donation: it should ideally be performed on women around 25 years of age (in order to increase their chances of a future pregnancy) but, it is mostly performed after the age of 35 and these oocytes are too old for being considered for donation.^{15,16} Although societal changes have led to an overall postponement of motherhood, it is the prevention of age-related infertility that motivates women to store their gametes. Who is in favour of oocyte freezing supports the concept that, also if it is a deliberate choice, it is impossible to judge to what extent a woman's timing to become a mother could be a deliberate choice, or an inherent need, to proceed to methods to optimize future reproductive chances. The indication for oocyte cryopreservation makes this procedure a preventive medical treatment rather than a *non-medical* treatment. Therefore, the term *social freezing* sounds judgemental to those women who undertake preventive action by implicitly inferring that these women chose to postpone motherhood. Moreover, considering that fertility preservation in oncological patients is never considered *non-medical*, in the same way, women that take preventive actions to protect themselves against iatrogenic gonadal damage, by treatments such as chemotherapy,

are therefore also protecting themselves against ovarian ageing. In other words, it is not because treatments are described as non-medical that they are to be considered *social*, and treatments are not necessarily non-medical because they have no immediate curative nature. The focus of oocyte cryopreservation lies on the preventive aspect of subfertility with a possibly curative function in the future. Some may argue that conditions relating to ageing do not need to be prevented, as they are *natural*.¹⁷

At this point the question that could arise is if we can define maternal age as a disease and only in this view social freezing could be a solution for age related fertility decline considered as a medical problem which should be prevented by this relatively new technology.¹⁸ In other words, social egg freezing seems to be a preventive measure regarding the women fertility.

Social egg freezing and assisted reproductive technology

The procedure of oocyte cryopreservation finds its completion in the application of Assisted Reproductive Technology (ART), given that the collection and storage of oocytes can be justified from the perspective of their use at a later date by an appeal to ART.

In fact, elective oocyte freezing consists of two separate steps that are clearly distinct in time: first, ovarian stimulation, oocyte retrieval, cryopreservation and storage that we identify in the oocyte banking; and second, even several years later, thawing and fertilization of the cryopreserved oocytes. At the time of the first step, women who request social freezing are healthy persons who ask for a procedure that results in stored oocytes that may or may not be used, depending on the further course of their lives. From a medical point of view, we have to consider the balance between the risks of the procedures (ovarian hyper stimulation, oocyte pick up and pregnancy) and the benefits, for the mother and the child. In bioethical terms the balance between the respect of the woman autonomy (including the reproductive autonomy) and the beneficence both for the mother and the child.

Every medical intervention has its inherent risks: here there exists for the mother many health risks due to the In Vitro Fertilization by Intracytoplasmic Sperm Injection (IVF-ICSI) treatment, especially in woman over 45 years of age: with increasing age, pre-pregnancy chronic medical conditions and obstetrical risks and adverse birth outcomes rise; even though maternal mortality rates are very low in Europe, they are increasing with increasing age. Other concerns are the possibility to create high and potentially false hopes and introducing medical processes to primary fertile women. Furthermore, in an ethical perspective, we should also consider the risks for the future child: due to advanced maternal age and pregnancy complications, neonatal complications are also increased, comprising prematurity and lower mean birth weights among infants of women older than 50 years old compared with younger women.

In case of assisted reproductive techniques, the pregnancy rate per embryo transfer for women receiving IVF treatment using their own fresh eggs drops between the ages of 35 and 45 from 38.2% to 2.2%. If a woman freezes her eggs before her fertility starts to decline, IVF using her own frozen eggs will be more likely to work into her late 30s and 40s. For women freezing their eggs in their mid-20s to mid-30s, there is a clinical pregnancy rate per thawed oocyte of between 4.5% and 12%. Although not identical, pregnancy rates for IVF using frozen oocytes are now broadly comparable with pregnancy rates using fresh oocytes, so that a woman who

froze her eggs at the age of 35 could benefit from an IVF success rate closer to 38% than 2% well into her 40s. The optimum time to freeze one's eggs, from a clinical point of view, would be during a woman's teens or 20s.¹⁶

Should countries with publicly funded ART extend coverage to social freezing?

If oocyte cryopreservation is an accepted procedure to counter infertility and if fertility treatment is covered by public healthcare, should the logical consequence then be that social freezing is also covered by public national healthcare system (or mandated insurance coverage) or it should be admitted that there is a relevant distinction between ART and ART with oocytes previously stored for non-medical reasons?

The term "elective freezing", that is also found in literature as a synonymous for social freezing, puts the focus on the idea that oocyte cryopreservation by healthy women resembles other instances of elective medical interventions - such as cosmetic surgery - that generally have no therapeutic benefit unless psychological. This sparks the sentiment that there is no reason why society should finance such desires of women who want to have it all.

A likely objection to full coverage is that this could be a sub-optimal allocation of scarce funds: healthcare budgets are strained and several countries are already struggling to accommodate the requests for ART. At the same time, the added costs might not be overwhelming: ovarian stimulation and oocyte retrieval are uncomfortable procedures that women will only undertake if they are convinced that they will actually benefit from the procedure.¹⁹

Today, Israel is one of the first countries in which egg freezing for non-medical reasons has been regulated and authorised for public support, with the justification of "permitting egg freezing to prevent both disease- and age-related fertility decline ... so women are then free to exercise their reproductive autonomy and decide for themselves whether or not the technology is beneficial to them". This choice is based on conviction that social egg freezing is grounded in liberal ideology promoting the individual autonomy exercised through informed consent, supporting that a relational approach to autonomy may be a more suitable model for considering women's choices about egg freezing, also for non-medical purposes.²⁰

Social and ethical consideration on women's reproductive autonomy regarding the choice of social freezing should take into account the possible pressures to which women are already confronted when trying to realise both their professional aspirations and motherhood. It has to be considered that pregnancy, delivery and raising children does not ever really fit into a woman's career plan, independently of mother age. There is no "ideal time" and it is always complicated to organise child care whatever the age of the mother, *e.g.* before and after school, in the case of childhood illness, during the weeks and months of school holidays and so on. In addition, reports in the lay press on more or less famous women giving birth to a child at around the age of 50 are presenting a distorted picture of reality. Furthermore, studies around the world have shown that young people are not aware of the natural limits of human fertility,^{21,22} consequently, young women should be informed by doctors of the decreasing chances of pregnancy with increasing maternal age, as well as the increasing risks of miscarriage and obstetrical/neonatal complications due to the women's fertility decline in order to allow women to plan their reproductive choices more realistically, thus reducing the chance of involuntary childlessness.²³ On the other hand, the information should be accu-

rate in order to avoid the risk that women would consider the possibility to access to social egg freezing as a commercialized reproductive insurance policy that encourages them to freeze their eggs in case they need to use them in the future.¹⁴

Social egg freezing and egg banking

As an alternative to embryo cryopreservation, that may not be an option for all couples, because of personal religious or moral objections, or restrictive legislation in certain countries, oocyte donation has become an integral part of ART. In recent years, the demand for oocyte donation has increased, as it has become a treatment option for large numbers of women experiencing age-related infertility. Oocyte cryopreservation has led to the development of donor oocyte banks, which allow recipients to review a list of donors, and minimize waiting times.⁸ As well as cryopreserved oocytes from individual donors, surplus oocytes from infertile couples may be cryopreserved and subsequently donated.

We expect women to be less reluctant to donate oocytes to other patients when spare oocytes are already in storage - a number of oocytes during the course of an ART treatment can remain unused due to a myriad of reasons: women may have completed their family through natural conception or in vitro fertilization with other oocytes, may have passed away or break up with their partner or may have abandoned their desire to have children - than when a woman has to undergo the stimulation and retrieval procedures specifically for the purpose of donation or when donation implies a decrease in the woman's own chance of conceiving (such as in oocyte sharing). We have to take into account that potential donors need to overcome a double threshold: the first with regard to the physically demanding procedures of ovarian stimulation and oocyte retrieval; secondly, with regard to the psychological burden of becoming the genetic parent of a child that one does not know. However, the psychological threshold remains largely intact: many, if not most, women find the idea of having a genetic child grow up in an unknown family emotionally troubling, and therefore, even if the physical burden is lifted, it is unlikely that large numbers of women with spare oocytes will be donating them for reproductive purposes. In fact, at present, it seems that women are keen to come forward as donors unless when directed (or cross-) donation to a friend or family member is concerned, or when donors receive a personal benefit, either cash or in kind (in oocyte-sharing schemes).¹⁵ Nevertheless, there are a number of practical benefits from the use of the donor egg bank: it simplifies the logistics of ART cycles as there is no need for menstrual cycle synchronization between donor and recipient; it allows for the testing of donors for infectious diseases during quarantine; and it potentially reduces cost through the efficient allocation of oocytes from a pool of donors to many recipient such as recipients can make their own choice from a large donor pool without waiting long for an appropriate match. Also, donors can programme their donation cycle to easily fit their schedule and not be dependent on the recipient. Egg banking also provides the possibility to quarantine oocytes for 6 months or longer to retest donors for safer donation, as is the criteria established for semen banks. Additionally, egg banking provides the possibility of distributing oocytes among two or more recipients, without facing any difficulties of endometrial synchronization, which can also make the treatment more economical and so more affordable. The storage of oocytes for donation shows a positive impact on the management of an oocyte donation programme, becoming easier and much more efficient at achieving excellent clinical results, in fact as high as obtained with fresh donor oocytes.⁸

Future perspectives in technology

Finally, social egg freezing and egg banking can play a role in fertility treatment enabling childbearing for gays, lesbians, and unmarried persons. For example, a gay male couple could procure a frozen donor egg and the services of a surrogate mother in order to complete assisted reproduction procedures. A lesbian couple might freeze their eggs while searching for donor sperm. As society moves closer to accepting a universal human interest in reproducing that is not confined to a heterosexual norm, it becomes more difficult to justify the denial of access to assisted reproductive technologies on the basis of sexual orientation and/or marital status.

In a 2013 statement by its ethics committee, the American Society for Reproductive Medicine (ASRM) called for programs providing fertility services to “treat all requests for assisted reproduction equally without regard to marital/partner status or sexual orientation.” They supported their recommendation with research that suggests children are not harmed in their development by being raised by same-sex parents. They also noted that claims of physician autonomy or religious freedom are not legitimate bases for discrimination on the basis of sexual orientation.²⁴

To attempt to delineate the non-medical reasons for egg freezing is already to begin an ethical analysis of what counts as a valid reason for egg freezing. Discussing how egg freezing is paid for similarly complicates our common understandings of health and illness, necessity and choice. The deeper ethical questions raised by social or nonmedical egg freezing do not yield to easy answers. Does non-medical egg freezing promote sex equality or undermine it? Does it enhance human health and well-being, or does it encourage a harmful artificiality? Answering these questions depends largely on one’s prior normative frameworks, including how one understands the nature and origin of sexual inequality and the purpose and limits of medical technology. The objective in the field of biomedicine and health planning in the context of both local and global scale is the recognition of the different health needs of men and women because of their differences, that we can define gender equity, which should be guaranteed in public health policies.²⁵

Conclusions

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.

We can conclude that, while a possible argument in favour of social freezing could be to avoid discrimination between men and women, we wonder if equality between men and women should be achieved by erasing biological differences between them, or if social freezing is the embodiment of the trend in society to accept less and less the finiteness and unavailability of the human life.

In the same vein, must equality in the job market go hand in hand with further medicalisation of reproduction? Will egg freezing ease the pressure of finding a partner, or might it strengthen the illusion that no compromises should be made, and women can wait forever to find “prince charming”? Consequently, individual fertility assessment and counselling on egg freezing for fertility preservation for age related fertility decline, should be offered to women of reproductive age?

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, that we can define gender equity, which should be guaranteed.

Whatever strategy is put in place, starting from a condition of equality in gender diversity, an achievable goal in medicine is to ensure that both men and women are able to maximize their health potential with respect to their biological diversity. In this context strategies to achieve a state of gender equity should take into account their different health needs.

Social freezing may be advertised to harmonise these incompatibilities, but we wonder if it is the proper solution to the problem or if it could also create further challenges.

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