Access and Barriers to Elective Oocyte Cryopreservation in the United States: How Attainable is Fertility Preservation?

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Abstract

Elective oocyte cryopreservation is an underutilized medical resource among women of reproductive age. Countless barriers preclude many women from accessing egg freezing within the optimal timeframe for success, <35 years of age. Only twenty U.S. states have laws mandating insurance companies to offer some type of infertility coverage, but only eleven states include language regarding fertility preservation, which specifies medically indicated preservation and not elective preservation. Companies offering their own healthcare plans are exempt from these state laws, but some larger companies now offer infertility benefits including elective fertility preservation and the number of businesses doing this is growing. Given the disparities in insurance coverage, financial concern regarding elective egg freezing remains one of the most significant barriers for women. Education and awareness surrounding age-related fertility decline and options for fertility preservation need improvement among the general population and physicians to enhance dissemination of this time-sensitive information. Notably, female physicians themselves are one group in particular with infertility rates higher than the national average that may benefit from elective oocyte cryopreservation early in their careers.

Abbreviations

ACOG = American College of Obstetricians and Gynecologists
ART = assisted reproductive technology
ASRM = American Society for Reproductive Medicine
DOR = diminished ovarian reserve
IVF = in vitro fertilization
OB/GYN = obstetrician-gynecologist
POI = primary ovarian insufficiency
SART = Society for Assisted Reproductive Technology
TESE = testicular sperm extraction
TESA = testicular sperm aspiration

Background

Since the birth of the first baby from in vitro fertilization (IVF) in 1978[1] to the birth of the first baby from oocyte cryopreservation in 1986[2] to now, the scope of assisted reproductive technologies (ART) has expanded dramatically. Fertility treatments are no longer available just for the approximately 15% of couples diagnosed with infertility[3] – the inability to achieve pregnancy after having regular, unprotected sexual intercourse for at least one year in patients under 35 years old or for at least six months in patients over 35 years old.[3] In the 1990s, fertility preservation by way of oocyte cryopreservation became an option for women diagnosed with cancer planning to undergo chemotherapy before their childbearing years or before they wished to discontinue childbearing.[4] It was not until early 2013 that the American Society for Reproductive Medicine (ASRM) and the Society for Assisted Reproductive Technology (SART) announced in a joint practice guideline that they were lifting the label of "experimental" from the process of oocyte cryopreservation, though they cautioned against the use of the process for prevention against age-related decline in fertility due to lack of evidence regarding efficacy, safety, cost effectiveness, and emotional risks.[5–7] Then, in 2014 the American College of Obstetricians and Gynecologists (ACOG) endorsed the ASRM-SART joint guideline.[7] Additionally in 2014, the FDA approved "social egg freezing", or elective oocyte cryopreservation, for women without a medical indication for fertility treatments.[5]

Traditionally, medical indications for oocyte cryopreservation include diagnoses such as onco-fertility; genetic diseases such as primary ovarian insufficiency (POI), Turner Syndrome, Fragile X, etc.; non-malignant conditions such as endometriosis, diminished ovarian reserve (DOR), auto-immune diseases necessitating associated planned gonadotoxic treatment; and inability to obtain fresh sperm on the day of the retrieval for reasons such as azoospermia, failure

to extract sperm via testicular sperm extraction/aspiration (TESE/TESA) procedure, ejaculatory dysfunction, or unavailability of partner on oocyte retrieval day.[8] On the other hand, non-medical reasons for oocyte cryopreservation include planned/elective oocyte or embryo cryopreservation for anticipation of age-related fertility decline; egg banking for donor oocyte purposes; planned female-to-male transition; or response to traumatic injury or unforeseen personal circumstances such as divorce, remarriage, or loss of a child.[8]

Medical ethicists and philosophers have argued a case for elective egg freezing, most notable is the idea of "egg insurance" against future infertility that can allow women equal employment participation, time to find a compatible partner without the pressure of a specific age-related timeline, and the opportunity to wait until they are psychologically and emotionally ready for children.[9] Fertility decline in women has been well-established in the literature and begins around age 35.[10,11] With this in mind, more and more people are choosing to undergo oocyte cryopreservation for a variety of reasons, such as continuing on to higher education and/or focusing on one's career. In one particular study of female graduate students, 63% said their primary reason for delaying childbearing was professional goals and 54% of them believed that freezing their eggs would allow them to focus more on their career for the next several years.[12]

In addition to the personal and social reasons for undergoing elective oocyte cryopreservation, there are medical benefits, as well, particularly when it comes to pregnancy rates. Use of younger oocytes can decrease the risk of miscarriage and aneuploidies that is associated with older oocytes.[9] Additionally, elective egg freezing at a younger age may increase pregnancy rates compared to waiting to undergo IVF at an older age.[13]

Literature Search

PubMed search was conducted for this literature review using the following search terms: "access to elective egg freezing", "elective egg freezing", "social egg freezing", "elective oocyte cryopreservation", "social oocyte cryopreservation", "elective egg freezing coverage", "insurance coverage egg freezing". Insurance coverage information in the United States was gathered from Resolve: The National Infertility Association and the American Society for Reproductive Medicine (ASRM). News articles and press releases were used for information regarding pertinent events referenced in this paper.

Insurance Barriers to Infertility and Fertility Preservation in the United States

Insurance coverage for infertility treatments in general is highly variable throughout the United States. Each state independently can pass mandates for insurance companies to cover some or all of the following: infertility consult and testing, appointments, procedures, medications, and additional associated costs. As of June 2022, only twenty states have passed laws mandating insurance coverage of some aspect of infertility care and some of these laws have yet to take effect.[14] These states are Arkansas, California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Louisiana, Maine, Maryland, Massachusetts, Montana, New Hampshire, New Jersey, New York, Ohio, Rhode Island, Texas, Utah, and West Virginia.[14,15] However, it is important to note that according to the Employment Retirement Income and Security Act of 1974, companies that self-insure their employees are exempt from state regulation.[15] Out of the twenty states with these infertility coverage mandates in place, only eleven of them have language regarding fertility preservation.[15] These states are California, Colorado, Connecticut, Delaware, Illinois, Maine, Maryland, New Hampshire, New Jersey, New York and Rhode

Island.[15] These laws regarding fertility preservation address oocyte cryopreservation strictly for certain medical indications and do not mandate coverage for any non-medical/elective reasons.[15]

Insurance Coverage for Fertility Preservation by Employers

Oocyte cryopreservation coverage is typically not included by most companies that offer infertility benefits to their employees today, but the landscape is slowly changing. Looking back to 2014, Facebook and Apple made headlines when they announced that they would begin offering coverage for elective egg freezing for their employees.[16] They were some of the first large companies to offer such benefits and since then, other major companies, namely Fortune 500 companies, have begun to follow suit.

Recently, efforts to identify and understand trends in fertility benefits through individual employers have gained traction. Most notably, RESOLVE: The National Infertility Organization commissioned a large study yielding the 2021 Survey on Fertility Benefits, which set out to compare their results to a similar study they published in 2006. Out of the 459 employers that responded in the 2021 study, 254 provided some level of infertility coverage in their healthcare plan and 205 did not provide any coverage.[17] While more and more companies are providing this coverage, the number of companies providing benefits for fertility preservation are not nearly as high. Larger companies seem to represent the majority of those that are adding fertility preservation benefits to their employees' healthcare plans. Among employers with 500 or more employees, 5% provided coverage for elective egg freezing in 2015 and this increased to 11% in 2020.[17] Comparatively, among employers with 20,000 or more employees, 6% provided coverage for elective egg freezing in 2015 and then this increased to 19% in 2020.[17] Interestingly, one of the industries making up a significant portion of those that offer egg freezing benefits is high-tech industries, such as Facebook, Apple, Google. 27% of high-tech

companies with 500 or more employees in this survey provided coverage for egg freezing, perhaps as a way to attract and retain female employees[17]. Among the companies that offered some type of infertility benefits, the top three reasons cited were to "ensure employees have access to quality, cost-effective care", "stay competitive to recruit and retain top talent", and "be recognized as a "family friendly" employer".[17] Notably, of the companies in this study that did not currently cover egg freezing, 12% said they were likely to cover it within the next two years.[17]

Regardless of the employer motivation for providing these benefits, the vast majority of these companies did not experience financial drawbacks. 97% of companies reported that they did not experience significant cost increases by offering infertility coverage, including coverage for IVF.[17] Comparing this to the 91% that gave this same response in the 2006 survey, it seems that it is becoming less expensive over time for employers to add this coverage for their employees.[17] This is promising for the future of infertility and egg freezing coverage for employees of large companies considering more than half (55%) of the companies that do not currently offer any infertility coverage cited their main reason as concerns about potentially increasing costs.[17]

Financial Barriers to Fertility Preservation

One of the major barriers to fertility preservation cited throughout the literature regarding women's attitudes and opinions on oocyte cryopreservation is financial burden.[12,18,19] Egg freezing without insurance coverage can cost anywhere between $10,000-$20,000 depending on location and many other factors and includes the cost of initial consult and fertility workup, monitoring appointments and bloodwork, medication regimen, anesthesia costs for the vaginal

oocyte retrieval procedure, etc. In addition to the cost of the actual cycle, annual storage fees for the frozen eggs can range from $400-$800 per year. For a variety of reasons, a woman may need to undergo more than one cycle which only compounds the costs listed above in order to feel more secure about her reproductive future.

Education and Awareness as Barriers to Fertility Preservation

Though public conversation regarding infertility and fertility preservation has increased over the years, inevitably due to factors such as social media and advertising, elective egg freezing seems to remain underutilized within its most effective and recommended timeframe (age <35). This is due to a variety of reasons, including financial barriers discussed above, but lack of familiarity and education surrounding this topic may also play a substantial role. In a large 2017 study assessing reproductive choices of one thousand reproductive-aged women, 87.2% of the sample population was aware of egg freezing as a means of fertility preservation.[20] However, just 25% of them would consider the process as a realistic option and only 29.8% were familiar with what the cryopreservation process entailed.[20] After being informed of the process, about 30% more women changed their consideration level towards pursuing egg freezing.[20]

Despite the well-accepted recommendation that oocyte cryopreservation should ideally be utilized prior to the age-related decline in fertility that begins, on average, around age 35, data from the 2010s suggested that the demographic of women most often seeking egg freezing were over 35 years old, single, well-educated, professional women.[21-25] One recently published study provided data from fifteen years of oocyte data leading up to year-end 2020 from a large university-based fertility center and found that the median age of first cryopreservation was 38.2.[26] Conversely, another study examining nearly 30,000 oocyte cryopreservation cycles

across the United States between 2012 and 2016 found that patients were most likely to be under age 35 in all racial and ethnic backgrounds except Asian/Pacific Islander patients, who were most commonly ages 35-37.[27] However, it is important to note that this study included women freezing their eggs for both medical and non-medical reasons, so these numbers may not accurately reflect the age when women choose to electively undergo treatment.

Medical providers play an important role in educating their patients about fertility preservation, but it seems there is much room for improvement in disseminating information on this topic. In 2018, a survey was emailed by the American College of Obstetricians and Gynecologists (ACOG) to five thousand ACOG fellows and was completed by seven hundred and eighty-four physicians. In this study, 82.8% of physicians agreed that counseling regarding reproductive aging should take place with patients who desire children in the future and are delaying childbearing for social reasons.[28] However, only 27.6% of physicians frequently counsel on such topics with patients between 18-34 years old.[28] Interestingly enough, 75.8% of physicians reported counseling patients aged 35-44 on this topic.[28] Limited time and limited knowledge were cited as the most frequent barriers to discussing reproductive aging (75.8%, 41.4%) and elective fertility preservation (75%, 59.9%), respectively.[28]

Other Barriers to Fertility Preservation

Geography plays a crucial role in access to fertility preservation. According to a 2017 study, 38.1 million reproductive age women (60.4% of the U.S. reproductive-age female population) had access to multiple assisted reproductive technology clinics (ART) in their region.[29] About 7 million (10.8% of the U.S. reproductive-age female population) had access to a single ART clinic and 18 million (28.8%) lived in a region without a local ART clinic.[29] Not only is travel time to and from a fertility clinic a potential barrier to care, but the time of the care

itself could present a roadblock for women, especially those with traditional working hours. After initial consult and workup appointments are completed, patients require multiple appointments in an approximately 8-14 day span while undergoing the egg freezing cycle. These appointments are not all scheduled up front; rather, results from each appointment dictate the timing of the next. This demanding and unpredictable schedule could pose serious difficulties for patients needing to manage work, transportation, etc.

Though racial and sexual identity differences leading to disparities in access and outcomes in IVF have been studied more heavily, data on this topic regarding elective egg freezing is still lacking. Considering these disparities are well documented in the literature, it is reasonable to suspect that these may affect access to fertility preservation, as well.

Not only did the COVID-19 pandemic affect physical access to ART, but also studies suggest many women reported that COVID-19 affected their childbearing plans and about 72% of those women had deliberately postponed pregnancy.[30] This has the potential to introduce a large cohort of women who may have attempted pregnancy prior to age 35 that could now benefit from elective egg freezing while postponing their childbearing plans.

Additional considerations and hesitations that women have about fertility preservation include potential side effects, effect on future fertility, efficacy of treatment, health of future children conceived with cryopreserved oocytes, and concerns about unused oocytes.[21,23,31,32]

Who Could Benefit from Elective Egg Freezing?: Highlighting Infertility Among Female Physicians

As outlined previously in this paper, many different populations of women could potentially benefit from elective egg freezing. Notably, the many women who choose to delay childbearing due to pursuit of higher education and/or career goals would fall into this

category. Among this population, female physicians are a commonly studied group. Female physicians on average delay childbirth compared to nonphysicians, as evidenced in the literature, citing the median age of first childbirth as 32 in physicians compared to 27 in nonphysicians.[33] Approximately 25% of female physicians report infertility[34] compared to the national average of around 19% (of heterosexual women aged 15-49 with no prior births).[35]

Ideally, female physicians in training could have access to fertility preservation in fellowship, residency, and even earlier, such as in medical school. A 2022 study found that fourteen U.S. medical schools offered benefits for fertility evaluation, thirteen offered some treatment coverage, but only one provided coverage for elective fertility preservation.[36] Half of the schools were in states with fertility benefit mandates.[36] Even in programs aimed to train physicians in the physiology and management of infertility, insurance coverage is lacking. A 2020 study examined insurance policies of 24 U.S. and Canadian andrology or reproductive endocrinology and infertility (REI) programs and found that only about 60% of the programs offered coverage for diagnosis and/or treatment of infertility.[37]

Not only is infertility and fertility preservation coverage lacking for female physicians, but education on the topic also seems to need improvement, as well. A 2022 study showed that resident physicians, regardless of which specialty they are being trained (including OB/GYN) have limited knowledge of natural age-related decline in fertility and the opportunity to freeze eggs.[38] The only area of the survey in which OBGYN residents statistically differed from residents in other specialties was in feeling they would be “somewhat supported” or “very supported” by their program to work toward family planning goals.[38]

Discussion

Significant barriers exist for women not only accessing elective fertility preservation, but also for infertility treatments as a whole. Less than half of the states in the United States have laws mandating insurance coverage of some aspects of infertility workup and/or treatment. Of the twenty states with laws in place, only eleven of them mention fertility preservation, with language only recognizing medically indicated fertility preservation. In order to allow more women access to elective fertility preservation, much advocacy work needs to be done across the country in order to help enact laws that can provide at least some insurance coverage for the associated workups, treatments, and procedures.

Fortunately, some large companies, namely Fortune 500 companies, have begun including elective egg freezing benefits in their employee health plans. Facebook and Apple were some of the first to offer this, announcing this benefit in 2014 shortly after the FDA approved "social egg freezing" for women without a medical indication. The number of companies offering this benefit has been slowly increasing over the years. The overwhelming majority of companies report little change to their insurance costs after adding these benefits, which bodes well for women at companies that are looking into adding this benefit in the future. There is some debate in the literature about whether these benefits are altruistic or coercive on the part of the employer. Looking to the future, it would be useful to see the data on how many women in these large companies are utilizing this coverage and how it affects their childbearing behaviors and careers.

Financial burden is often cited as the major barrier to fertility preservation among women, which is exacerbated by the lack of insurance coverage mentioned above and throughout the paper. The process of egg freezing is expensive and varies greatly across the country. Costs

involved include initial consult and workup, appointments and bloodwork, medication, anesthesia for the retrieval procedure, and laboratory storage fees for the oocytes. For a variety of reasons, a women may need to undergo more than one cycle, which increases overall cost of this process. With better insurance coverage of these processes, financial burden can hopefully be reduced for women in the near future.

Improving education among women about natural age-related fertility decline and their options for fertility preservation is paramount in order to provide women with the reproductive autonomy that they deserve. Social media has certainly brought more awareness to infertility and egg freezing, but physicians have a responsibility here, as well. While most physicians feel that counseling regarding their female patients' reproductive aging and childbearing goals should take place, most of them only have these conversations after their patients are over age 35. Limited time and knowledge were cited as the most common reasons for lack of these important conversations. More attention and emphasis must be placed on these topics for residents and established physicians who care for women of reproductive age. Additionally, given the lack of understanding about reproductive aging and oocyte cryopreservation options among resident physicians of all specialties, including OB/GYN, more emphasis should be placed on this topic in medical school teaching and training. Female physicians are a particular group that could benefit from fertility preservation early in their careers as the infertility rate among this group is reported to be higher than the national average. A better understanding within this group and within their training program faculty could potentiate advocacy in the future for including this type of coverage in their employee health benefits.

Other barriers include geographical limitations to fertility clinics around the country. Approximately 25 million women in the United States have limited or no access to

clinics in their region. In addition to travel time and transportation barriers, the process itself is time-consuming with an unpredictable schedule for appointments even for those living near a clinic. The schedule for egg freezing is regimented for a reason, but improving employer coverage of this process could allow for more understanding and approved time off for women needing to attend their appointments.

Racial and identity disparities exist in infertility access and treatment outcomes, but more studies are needed to fully assess this in elective cryopreservation. A simple retrospective study using patient data from elective egg freezing cycles across the country would provide much needed insight into other barriers that exist that have not been clearly and directly addressed.

Finally, the COVID-19 pandemic has affected the healthcare landscape in countless ways, including childbearing choices among women and couples of reproductive age. These changes will continue to have an effect for years to come, but studies suggest many couples purposefully delayed childbearing because of COVID-19. Future studies will hopefully be able to inform whether this led to increased elective egg freezing once clinics were open again, increased infertility diagnoses, increased average age of first pregnancy, and/or decreased pregnancy rates.

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