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Opinion

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# Oocyte Cryopreservation during COVID-19 pandemic - Economic implications

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## Opinion

The novel infectious Coronavirus disease-2019 (COVID-19), which was declared a pandemic on March 11th, 2020 by the World Health Organization (WHO) is turning into a global health disaster and causing radical changes to daily life as well as healthcare assessments.

To respond to the pandemic, the European Society of Human Reproduction and Embryology (ESHRE) released a statement on March 19th, 2020 advocating a cautious approach concerning planning a pregnancy so long as the pandemic lasts [1]. This has raised the issue oocyte/embryo cryopreservation and the benefits it can offer as an instrument of Assisted Reproductive Technology (ART) treatments [2-3] in uncertain times or natural disasters, including pandemics.

There is a low if even non-existent risk of genetic material (i.e., gametes, embryos, tissue) becoming infected by COVID-19 in the ART laboratory due to the strict insistence on protocol and guidelines that regulate handling procedures, including repeated washing, freezing, and storage. These precautions are in place to prevent sample contamination or cross contamination by pathogens, thus leading to dilution of possible viral contaminants and rendering them ineffective. Despite the absence of current date, the ESHRE hypothesized that there was minimal risk of infection of gametes and embryos because of the absence of COVID-19 receptors [4].

Oocyte/embryo cryopreservation holds out the prospect of successful pregnancy post-pandemic for women who cannot become pregnant at present due to pre-existing medical conditions with heightened risk of Covid-19 infection (i.e., kidney or liver disease, diabetes mellitus, hypertension, cardiological problems, and immunocompromised conditions, including oncology patients under treatment or suffering from AIDS). It also offers promise to women of advanced age and/or reduced ovary production [5]. It could offer hope that if the pandemic persists for many months or even years, these women will still have a chance of producing offspring. Cryopreservation facilitates planning of future pregnancies when the pandemic has ended to avoid the possibly serious problems of pregnancies complicated by COVID-19 [6-7].

There is no data that currently documents a heightened risk of severe illness in pregnant women compared with the general population [6,8-9], yet COVID-19 infection has been known to cause severe maternal morbidity requiring premature delivery and its risks to the neonate [8-10]. The adverse long-term effects of COVID-19 on infant health, especially when the mother is exposed in the first months of pregnancy, is likewise unknown as yet, so that there is an increased emphasis on avoiding pregnancy during the pandemic because of these concerns [1].

If during normal times, there are multiples aspects and factors to be considered - social, ethical, political, psychological, and economic – when approaching the issue of oocyte/embryo cryopreservation, these are of even greater import during a health disaster. The discourse concerning the social benefits of oocyte/embryo/reproductive cell cryopreservation is crucial when weighing public funding for it.

The right to reproduce is generally regarded as a liberty-right rather than a claim-right [11]. In the case of 'non-medical 'cryopreservation', i.e., social oocyte cryopreservation, this suggests that although women may choose to cryopreserve their oocyte, they cannot make a claim on society to financially support their choice [12]. The questions this raises are whether in emergency situations, oocyte cryopreservation serves the public interest and

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whether elective oocyte cryopreservation should be covered by public healthcare (or considered mandatory in insurance coverage) and be state funded.

Since oocyte cryopreservation is a complex and costly process [13-17], this issue is becoming more pressing in the face of an imminent economic crisis, for both private and public health services.

Because policy makers are called upon to incorporate values that best reflect the public's preferences in policy decisions that concern clinical, licensing, and reimbursement considerations, they must understand how the public rates various aspects of health care treatments. Health care policy must be accordingly designed and assessed in order to enhance the effectiveness of health care procedures [18-20].

Economists have defined two approaches to measure preference: revealed and stated [21]; both are grounded on the same theoretical basis. Revealed preferences are derived from observing actual market activities and can be identified by intricate econometric methods. Stated preferences are derived from surveys which are designed to allow researchers to control how the preferences are evoked.

Methods to elicit fall into two categories:

Methods that directly elicit the value assigned to an intervention (these include contingent valuation or WTP and Willingness-to-Accept methods) [21-22] - intended to evaluate demand for a single good, or methods that employ rating, ranking, or choice (either individually or in combination) to quantify preferences for different attributes of an intervention (generally known as CA, discrete-choice experiments, or stated-choice) - designed to study trade-offs between various attributes of a product and its effect on preference. to assign a monetary value to health benefits relating to a specific healthcare intervention, When the purpose is to elicit the patients' values and preferences toward various healthcare interventions as well as gauge the general public's attitude, researchers usually use the WTP [23], and it is also typically used to enable measuring the respondents' perception of the benefits in an overall assessment [24-29].

Health care studies have witnessed an upswing in the application of CA studies [30-32]. Using the CA method, one can derive part-worth values for individual attributes from the total score given to a good or service that consists of two or more attributes, after ranking a set of values [33-36]. This method is particularly suited to quantifying preferences for commodities and services not traded on the market or when market choices are limited by legal constraints or regulatory mechanisms; this is relevant for health care services and products [37]. CA has been employed successfully to measure preferences for a broad range of health applications [20,32,38-42], although it may also be of use in many other fields other than health care. CA has come into increased use for learning people's preferences for health-related quality of life (health state) and to assess the outcomes of various health states reported by patients [43-44]. Licensing authorities have shown an interest in using CA to assess patients' willingness to take risks such as by undergoing pioneering treatments which offer improved efficacy [45]. CA offers a mechanism for facilitating decision making both for patient participation [46-47] and for shared decision making [48] as well as to understand clinical decision making [49] and how the various parties at interest valuate healthcare outcomes [50]. Besides valuating the relative importance of one or more attributes of a commodity or service, the CA method can be utilized to gauge how individuals tradeoff between the various attributes, i.e., to what extent the user is prepared to trade one unit of an attribute for another [51]. In a typical CA study, respondents are presented with scenarios comprised of the attributes of a commodity or service ranked at different levels of importance.

I suggest applying two techniques together to elicit preferences: WTP and CA. WTP is the maximum amount of money a person would be willing to spend or exchange for goods or a service, here, to improve their fertility chances [52]. WTP theory predicates that the amount of money a person is willing to spend for a particular benefit in healthcare indicates what value the person attributes to the benefit. CA is a useful tool in determining what value an individual assigns to specific benefits of a health product or service [37]. An analysis of how respondents specify their preferences for various components of the product or service can establish the utility, or implied value of particular attributes of the health treatment.

After the public utility and benefit from oocyte cryopreservation have been assessed, there should be an examination of the state authority's considerations with regard using the limited national medical budget to fund it. Based on the literature, medical interventions should be given state funding to the extent that the medical costs equal the social benefits they generate.

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