



Abrahamic traditions and egg freezing: Religious Women's experiences in local moral worlds



Marcia C. Inhorn^{a,*}, Daphna Birenbaum-Carmeli^b, Mira D. Vale^c, Pasquale Patrizio^d

^a Department of Anthropology, Yale University, 10 Sachem Street, New Haven, CT, 06511, USA

^b Department of Nursing, University of Haifa, 3498838, Haifa, Israel

^c Department of Sociology, University of Michigan, 500 S. State Street, Ann Arbor, MI, 48019, USA

^d Yale Fertility Center, 150 Sargent Drive, New Haven, CT, 06511, USA

ARTICLE INFO

Keywords:

Elective egg freezing
Fertility preservation
Religion
Judaism
Islam
Christianity
United States
Israel

ABSTRACT

In this article, we elucidate how elective egg freezing (EEF) has been received within the three Abrahamic traditions—Judaism, Christianity, and Islam—and how these religion-specific standpoints have affected the EEF experiences of women who self-identify as religiously observant. Through an analysis of religious women's narratives, the study explores the “local moral worlds” of religious women who chose to freeze their eggs for non-medical reasons. It draws on ethnographic interviews with 14 women in the United States and Israel who had completed at least one EEF cycle, and who were part of a large, binational study that interviewed, between 2014 and 2016, 150 women who pursued EEF. These religious women, who were all highly educated, faced a particular challenge in finding appropriate marriage partners. Feeling pressured but still hopeful to marry and create large families, the women used EEF to extend their reproductive timelines and reduce their anxieties. As the study showed, the women reinterpreted or reconciled religious restrictions on the use of EEF in various ways, believing that their ultimate pursuit of religiously sanctioned reproduction justified the means. This study, which is the first to compare Jewish, Christian, and Muslim women's experiences of EEF, illustrates how this novel technology is now shaping the local moral worlds of religious women.

1. Introduction

Around the world today, healthy women are increasingly turning to oocyte cryopreservation (i.e., egg freezing) as a form of fertility preservation. Oocyte cryopreservation was initially offered on an experimental basis, primarily to young women facing fertility-threatening medical treatments, such as radiation or chemotherapy for cancer. By the year 2012, professional medical organizations, including the American Society for Reproductive Medicine (ASRM) and the European Society for Human Reproduction and Embryology (ESHRE), lifted the experimental label. Since then, so-called “elective egg freezing” (EEF) has been undertaken for fertility preservation by thousands of healthy women in a growing number of countries around the world (Inhorn et al., 2018a, 2018b; Potdar et al., 2014; Schon et al., 2017), ranging from Brazil (Santo et al., 2017) to India (Allahbadia, 2016) to Turkey (Göçmen and Kılıç, 2018; Kılıç and Göçmen, 2018). Israel and the United States were two of the earliest adopters, with the experimental label being lifted in January 2011 and October 2012, respectively.

Neither of these countries subsidizes EEF, meaning that Israeli women pay anywhere from US \$3,700–6,000 per cycle, and American women even higher prices, which can range from US \$7,500–15,000 per cycle, depending upon the clinic and locality.

Numerous reviews suggest that women are turning to EEF to defer, delay, or postpone their reproduction for the purposes of educational and career advancement, protection against age-related fertility decline, or maintenance of reproductive autonomy (American Society for Reproductive Medicine, 2018; Argyle et al., 2016; Baldwin et al., 2014; Cobo and García-Velasco, 2016; Donnez and Dolmans, 2017; Goldman and Grifo, 2016; Gunnala and Schattman, 2017). However, empirical studies emerging from around the globe, including in the United States (Greenwood et al., 2018; Hodes-Wertz et al., 2013), Belgium (Stoop et al., 2015), Australia (Hammarberg et al., 2017; Pritchard et al., 2017), the United Kingdom (Gürtin et al., 2019), the Netherlands (Balkenende et al., 2018), and Korea (Kim et al., 2018), suggest that the primary reason healthy women are turning to EEF is because they lack a male partner with whom to conceive (Hammarberg et al., 2017; Hodes-

* Corresponding author. Department of Anthropology, Yale University, 10 Sachem Street, New Haven, CT, 06520, USA.

E-mail addresses: marcia.inhorn@yale.edu (M.C. Inhorn), daphna@research.haifa.ac.il (D. Birenbaum-Carmeli), miravale@umich.edu (M.D. Vale), pasquale.patrizio@yale.edu (P. Patrizio).

<https://doi.org/10.1016/j.socscimed.2020.112976>

Received 21 December 2019; Received in revised form 31 March 2020; Accepted 1 April 2020

Available online 06 April 2020

0277-9536/ © 2020 Elsevier Ltd. All rights reserved.

Wertz et al., 2013; Pritchard et al., 2017; Stoop et al., 2015).

A growing number of qualitative, interview-based studies in the United States (Brown and Patrick, 2018; Carroll and Kroløkke, 2018; Inhorn et al., 2018a, 2018b), the United Kingdom (Baldwin, 2017, 2018, 2019; Baldwin et al., 2015, 2019; Waldbly, 2015, 2019), and Turkey (Göçmen and Kılıç, 2018; Kılıç and Göçmen, 2018) also support this key finding. For example, in the UK, Baldwin et al. found that 84% of 23 British women interviewed were single at the time of EEF, although most had hoped to be in a committed heterosexual relationship (Baldwin et al., 2019).

To date, only one of these studies, conducted among educated professional women in Turkey, has specifically asked about religious affiliation and how religious beliefs might influence women's EEF decisions and experiences (Göçmen and Kılıç, 2018; Kılıç and Göçmen, 2018). The authors found that Turkish women pursuing EEF used religion (i.e., Islam) as a source of solace and meaning-making, given that they had not yet achieved culturally valorized marriage and motherhood statuses by the end of their reproductive lifespans. Indeed, of the 21 Turkish women interviewed, 100% were single, and all were pursuing EEF at an advanced mean age of 40. As religiously observant women, several of these women were still virgins. This focus on virginity before marriage proved critical in another study of fertility preservation among young cancer patients in Lebanon, where religiously observant parents feared disrupting their daughters' hymens through vaginal ultrasound and oocyte retrieval (Khalife et al., 2019).

Given the limited evidence so far on the role of religion in EEF, it seems important to understand how religion might shape attitudes, motivations, and experiences of EEF among women who are religiously observant. What is at stake for religiously observant women who are hoping to preserve their fertility in order to achieve future motherhood? How do religions provide guidance in this regard? Indeed, ever since the inception of assisted reproduction in 1978—with the birth of the world's first “test-tube” baby, Louise Brown, in England—religious authorities have engaged in vigorous debates on the assisted reproductive technologies (ARTs), sometimes issuing formal religious decrees in this regard (Birenbaum-Carmeli, 2016; Inhorn, 2003; Inhorn and Tremayne, 2012; Kahn, 2000; Zanini, 2019).

In this article, we explore how EEF has or has not been adopted within the three Abrahamic traditions—Judaism, Christianity, and Islam—and how this has affected EEF users who self-identify as religiously observant. As we will argue, there is an emerging “religious turn” toward EEF, with most, if not all, of these faith traditions granting permission for their women followers. Given this religious backing, we analyze religious women's narratives of EEF, exploring how they understand the tenets of their faith traditions within their own “local moral worlds.” Local moral worlds, says medical anthropologist Arthur Kleinman, are the “particular local patterns of recreating *what is most at stake* for us, what we most fear, what we most aspire to” (Kleinman, 1992, p. 129, italics in original). As Kleinman (2007) has delineated in his book *What Really Matters*, local moral worlds reflect the often difficult decision making surrounding life and death issues, including those decisions made in clinical settings, where moral worlds are often brought into stark relief.

To understand what is at stake for religious women as they turn to EEF, we begin with a brief introduction to each Abrahamic faith—Judaism, Christianity, and Islam. These three monotheistic traditions all originated in the ancient Semitic world, deeming the biblical figure of Abraham to be a prophet. Jews, Christians, and Muslims are considered “peoples of the book” because their holy books (the Torah, Bible, and Qur'an, respectively) are deemed to be the word of God by believers. Furthermore, the Abrahamic faiths share adherence to Old Testament narratives that place heterosexual marriage and reproduction as central to their origin stories. The centrality of marital procreation has since been codified within these traditions in ways that are important for those who are pious.

In the introduction, we examine the approaches of the three

Abrahamic faith traditions toward reproduction and ARTs, noting where specific religious rulings have been issued regarding EEF. We then describe our binational study, including our ethnographic research methods, the overall study population, and the subsample of single EEF users who self-identified as religiously observant. We explore the experiences and challenges faced by these Jewish, Christian, and Muslim women, as they turned to EEF to preserve their fertility in the absence of marriage partners. In the discussion, we examine the similarities between religiously observant women from the different faith traditions, and their commonalities with secular women who have turned to this fertility preservation option. Although religious women and secular women face many of the same dilemmas regarding marriageability, the inability to find a partner and found a family is particularly distressing for religiously observant women, who deem motherhood to be of central importance to their religious self-identities. In such cases, EEF may take on an added urgency for religious women when compared to their secular counterparts. Finally, we also reflect upon the different levels of support for EEF among the Abrahamic traditions, showing how religion may also create challenges for single women as they navigate fertility preservation on their own.

2. Abrahamic traditions and egg freezing

Ever since ARTs became available in the late 1970s, they have prompted social, legal, and bioethical debates (Clarke, 2009; Inhorn, 2003; Kahn, 2000; Kanaaneh, 2002). Religious authorities from the three Abrahamic traditions have been heavily involved in these discussions. Within each religious tradition, clerical authorities have offered authoritative opinions on key ART-related issues. These religious opinions have sometimes been translated into official religious law, while in other cases, they have served as a more general backdrop to the moral decisions and quandaries that individual religiously observant ART users face (Traina et al., 2008).

2.1. Judaism

In Judaism, the Biblical commandment to “be fruitful and multiply” underlies much of the religion's pronatalist rhetoric and stance regarding ART. Cultural expectations and aspirations for children, as well as broad endorsement of science and medicine, yield wide acceptance of ARTs in the Jewish faith, with the Jewish rabbinate permitting virtually all forms of ART, including third party-reproductive assistance (i.e., egg and sperm donation, gestational surrogacy) (Birenbaum-Carmeli and Carmeli, 2010; Birenbaum-Carmeli, 2016). Given this religious support, Israel is a country that is sometimes dubbed the “capital” of IVF for its nearly unlimited state funding of fertility treatments and its world record rates of IVF usage (Birenbaum-Carmeli, 2016). All Israeli women between the ages of 18 and 45 are entitled to government-funded IVF until they have achieved two live births with their current partner, regardless of sexual orientation or marital status.

This extensive state support also enacts a specific, local pronatalist vision that emphasizes biogenetic kinship, which may be viewed as part of the Zionist effort to substantiate a claim to the land of the forefathers (Birenbaum-Carmeli, 2009). Furthermore, religious identity in Judaism is typically determined matrilineally (Kahn, 2000; Teman, 2010), thus reinforcing Jewish women's desires to reproduce using their own eggs. Although rabbinical views on ARTs can vary, particularly among Orthodox, Conservative, and Reformed rabbis (Sallam and Sallam, 2016), there has been widespread endorsement of these technologies overall among the religious establishment both in Israel and in diasporic Jewish communities outside the country. Even the use of donor gametes (egg and sperm) has been allowed within Israel—and among the Orthodox Jewish communities elsewhere that follow the Israeli rabbinical decisions closely (Kahn, 2000, 2006). However, egg donors may be difficult to access, especially within Israel. This means that single Jewish women facing the threat of age-related fertility decline may be

encouraged to pursue EEF to preserve their own gametes.

Judaism's focus on pronatalism and maternity, along with the difficulty of accessing donor eggs for age-related fertility decline, provide powerful incentives for EEF as a fertility preservation option in Israel. There, the PUAH Institute has gained a position over the past three decades as the central authority on infertility procedures performed in accordance with Jewish law, or *halacha*. PUAH has supported EEF for single women, even encouraging its use among reproductive-aged Orthodox women who find themselves without partners. In its formal statement, PUAH regards the procedure as clinically safe, and offers to accompany religiously observant Israeli women to and from the clinic throughout the egg freezing procedure (PUAH Institute, 2018). PUAH's support for egg freezing in Israel has been a major boon to the Orthodox Jewish community in the US as well. Orthodox rabbis from several different religious communities in the US have encouraged women to freeze their eggs if they have reached their late thirties without marriage (James, 2012).

2.2. Christianity

Unlike Judaism, which permits many forms of ART-assisted procreation, including EEF for single women, different branches of Christianity have expressed varying orientations toward ARTs. Catholicism is the most restrictive in this regard, forbidding all forms of reproductive technology—from birth control pills to abortion to ARTs—because all of these technologies are deemed “unnatural,” whether they are intended to prevent or assist in human procreation (Inhorn et al., 2010). Furthermore, Catholicism views procreation within marriage as a divine process; thus, the Catholic Church does not ratify ARTs, because these technologies serve to separate reproduction from the conjugal sex act (Czarnecki, 2015). Egg freezing, too, is forbidden based on intention: Namely, if a woman freezes her eggs, it is because she is intending to use them later in IVF, a technology that is morally unacceptable (Cioffi, n.d.). Furthermore, eggs preserved through EEF are intended for eventual fertilization as embryos. The Catholic Church considers embryos to be human life, making embryo disposal a particular moral concern. Overall, the Church sees the ARTs as disrespectful of human life, dignity, and divine intention (Czarnecki, 2015; United States Conference of Catholic Bishops, 2009).

As with Catholicism, the Eastern Orthodox Church and most Protestant Christian denominations place fundamental emphasis on the heterosexual marital relationship and childbearing within the bounds of marriage (Traina et al., 2008). Also like Catholicism, the Orthodox Church and some Protestant denominations regard human life as beginning at the moment of conception. Thus, embryos created through ARTs may be deemed human life, leading to concerns surrounding fertilized embryos and their disposition or destruction (Cromer, 2018, 2019; Evans and Hudson, 2007). However, unlike Catholicism, all other Christian denominations—from Anglicans to Baptists to Evangelicals to Mormons—have been broadly supportive of the ARTs, allowing technologies such as IVF for infertile married couples who are using their own gametes (Office of Technology Assessment, 1988; Traina et al., 2008). Furthermore, despite early opposition, the Eastern Orthodox Church has come to the same view on ARTs, allowing IVF for married couples (Andruchow, 2010). Such support for ARTs in the Eastern Orthodox Church can be seen, for example, among Copts in Egypt (Inhorn, 2003) and Greek Orthodox in Lebanon (Inhorn, 2012), who are active users of these infertility technologies.

As of this writing, no Orthodox or Protestant Christian denomination has ruled either for or against egg freezing specifically. However, egg freezing does fall within the general remit of the ARTs, and thus should be expected to receive the same kind of Christian support. Because human eggs are not equivalent to embryos as human life forms, their freezing and subsequent disposal do not pose the same kind of moral threat. Still, some commentators on Protestant evangelical blog posts argue that egg freezing interferes with God's divine plan (e.g.,

Broadway, 2012; Clark, 2015; Parler, 2014). Thus, on these active sites, Evangelical Christians are being discouraged from pursuing EEF in the name of God.

2.3. Islam

Compared to Catholicism and Protestant Evangelicalism, Islam has been much more permissive regarding ARTs. In 1980, the first pro-IVF *fatwa*, or authoritative religious decree, was issued by the Grand Shaykh of Egypt's famed religious university, Al Azhar. Since then, ARTs have been practiced across the Muslim world, reflecting both Islamic pronatalism (i.e., the creation of an Islamic “multitude”) and explicit encouragement of medical and scientific advancements (Inhorn, 1996, 2003). Nonetheless, third-party reproductive donation in the Muslim world has been the subject of significant bioethical debate and sectarian division (Inhorn and Tremayne, 2012). To wit, majoritarian Sunni Islamic perspectives allow ARTs, but prohibit all forms of third-party reproductive assistance (i.e., egg, sperm, and embryo donation, or any form of gestational surrogacy) (Inhorn et al., 2017). In contrast, ayatollahs in Shia-dominant Iran have endorsed third-party reproductive assistance, prioritizing the preservation of marital relationships over the preservation of biogenetic lineage (Inhorn et al., 2010; Larijani and Zahedi, 2007; Tremayne and Akhondi, 2016). Still, both branches of Islam prioritize reproduction within the bounds of marriage, meaning that single women and men are not encouraged to become parents out of wedlock. Within this Islamic moral world, single women facing the threat of permanent childlessness because of age-related fertility decline may be encouraged to preserve their fertility through EEF.

Egypt's Dar Al-Ifta, one of the main *fatwa*-issuing bodies in the Sunni Islamic world, first allowed married Muslim women to freeze their eggs, especially if they were facing fertility-threatening medical treatments, such as cancer chemotherapy. However, in September 2019, in response to a widely circulated Facebook post by an unmarried Egyptian woman who had decided to freeze her eggs, the Dar Al-Ifta issued a *fatwa* declaring that egg freezing among single women is “permissible” if carried out under four conditions, including: 1) prevention of any damage to the eggs, which might pose a risk to future offspring; 2) safe control over the frozen eggs to prevent intentional or unintentional mixing with other frozen eggs; 3) no donation of frozen eggs to other women; and 4) fertilization of the frozen eggs with a husband's sperm during the course of marriage, with no use of frozen eggs or fertilized embryos following divorce or death of the husband (Alawi, 2019). As noted by Sarah Alawi of Harvard Law School, the Dar Al-Ifta *fatwa* “goes to the heart of the general premise in Islam that assisted reproductive technology is permissible, and maybe even encouraged, so long as the sperm and egg come from the married couple and no other party is involved” (Alawi, 2019).

Not surprisingly then, Sunni-majority countries across the Middle East, including Jordan, Kuwait, Morocco, Saudi Arabia, Tunisia, Turkey, and the United Arab Emirates, have allowed the practice of EEF. Similarly, EEF for unmarried women is also being practiced in Shia-majority countries, such as Bahrain, Iran, and Lebanon. Although the Sunni Muslim-majority country of Malaysia has issued a *fatwa* banning egg freezing for unmarried women, this may be more reflective of EEF bans in neighboring Asian countries (e.g., Singapore, China) than on the moral dictates of Islam itself.

To summarize, as of this writing, only Catholicism explicitly forbids EEF, as part of its broader restriction on all forms of reproductive technology, including ARTs. Judaism and Islam, on the other hand, have been very supportive of EEF for single women who are facing the pressures of age-related fertility decline, but still hope to experience future biological motherhood. Biological motherhood, after all, is encouraged in Judaism, Islam, and Christianity, always within the bounds of marriage. Given that the lack of an acceptable marriage partner is the main reason why women around the world are turning to EEF, it makes

sense that religiously observant women, too, would attempt to make use of this new fertility preservation option. The goal of this study, then, is to explore the local moral worlds of religiously observant single women from all three Abrahamic traditions, who chose EEF in hopes of future motherhood.

3. Methodology

3.1. Ethnographic research design, methods, and data analysis

This paper is based on a binational ethnographic study of EEF in the US and Israel. Between June 2014 and August 2016, women who had completed at least one cycle of EEF were recruited from seven IVF clinics, four in the US (two academic, two private) and three in Israel (one academic, two private). In the US, recruitment of women who had used EEF occurred primarily by flyers sent by email or given directly to women by the four participating clinics. Women who volunteered for the study then contacted the first author directly. In Israel, IVF clinic staff phoned women EEF users directly, inviting them to take part in the study. Women who volunteered to participate were then contacted by the second author, who set a time and place for the interview. Each participant signed a written informed consent form, agreeing to a confidential, audio-recorded interview in a private setting. Interviews were conducted in person in the clinics, homes, and offices, as well as in cafes, libraries, and other settings chosen by the participants. In the US, where women volunteering for the study lived in a variety of cities, some interviews took place by phone or skype. Interviews in both countries generally lasted about 1 h, but ranged from one-half to 2 h.

In both countries, interviews were carried out following an identical semi-structured, open-ended interview guide, which was translated into Hebrew in Israel. In the initial semi-structured portion, all women were asked a brief series of socio-demographic questions (i.e., age, place of birth, current residence, education completed, current employment, marital status, ethnicity, religion), as well as relevant details of their reproductive history (i.e., age at menarche, contraceptive use, any known reproductive problems). Following these semi-structured questions, women were asked a series of open-ended questions focusing on their life circumstances at the time of EEF, their primary motivations for undertaking the procedure, and their experiences of the actual procedure.

Women often “led” the interviews, detailing their EEF “stories.” The ethnographic approach of this study was thus person-centered and experiential (Hollan, 2001), with women encouraged to speak freely and share their experiences. These semi-structured interviews were conducted exclusively by the first and second authors, who are medical anthropologists with years of experience interviewing assisted reproduction patients in a variety of research settings. Completed interviews were then transcribed verbatim by trained research assistants. In Israel, interview transcripts were translated from Hebrew into English by a professional bilingual translator.

Following transcription and translation, all interview transcripts were uploaded into a qualitative data analysis software program (Dedoose) for thematic content analysis, using a coding scheme co-developed by the two medical anthropologist investigators. Socio-demographic information was transferred into Excel files for descriptive statistical analysis. As is usual for ethnographic research, the main analytic strategy was to systematically search for and examine themes and patterns emerging from the interview materials. Throughout these processes, the researchers compared similarities and differences between the US and Israeli data, as well as among women who self-identified as belonging to or practicing a specific religion. The research materials were shared between the two medical anthropologists. The research protocol was approved by Institutional Review Boards at the authors’ universities and by the ethics committees of each collaborating IVF clinic.

3.2. Study participants

A total of 150 women—114 in the US and 36 in Israel—who had undertaken at least one cycle of EEF volunteered to participate in the study. All of these women were asked about their religious affiliation. In Israel, all of the women were Jewish. In the US, more than half of the women had been raised as Christians (54%), including 33 Catholics (29%) and 28 Protestants (25%). In addition, there were 19 Jewish women in the study (17%), 6 Unitarian/Buddhists (5%, a category that overlapped), 5 Muslims (4%), and 4 Hindus (3%). Another 19 women had not been raised religiously, so reported no religious affiliation (17%).

However, it is important to emphasize that the vast majority of these 150 women—both American and Israeli—emphasized that they were not religious. Terms such as “secular,” “non-practicing,” “agnostic,” “atheist,” “mystical,” “spiritual,” and “spiritual but not religious” were used by women to describe themselves.

A relatively small number of women in the study self-identified as “religious,” “observant,” or “practicing.” They emphasized that their religion was important to them, they took part in regular religious rituals (e.g., prayer, communal gatherings), observed religious restrictions (e.g., foodstuffs, sexual prohibitions), and sometimes sought spiritual guidance from their religious clergy. All hoped to marry and found a family with a man from their religious community who was equally observant. Eleven American women—five Catholics, three Protestant Christians, two Muslims, and one Orthodox Jew—identified themselves in this way, as did three Israeli Jewish women. Altogether, out of the total of 150 women who completed at least one cycle of EEF, 14 women (9%) were religiously observant.

Table 1 shows the sociodemographic profiles of these 14 women. The average age was 36.7 at the time of EEF, meaning that most women were facing age-related fertility decline. As with their secular counterparts, these religiously observant women tended to be highly educated professionals, eleven with post-graduate degrees. All three Israeli women worked as psychotherapists, while the American women were employed as physicians, architects, businesswomen, and computer or IT experts.

All but two of these religious women were single at the time of EEF. Three of the American women (two Catholics and one Muslim) were single because they had been through difficult divorces. By the time of the ethnographic interview, nine of the eleven American women were still single, whereas two of the three Israeli women had gone onto marry.

4. Results

Important motifs ran throughout these religious women's interviews, including the religious requirement for conservative, often chaste premarital lifestyles; the religious emphasis on early marriage; and the focus on the family, with large family norms. Finding a marriage partner was a priority for all of these religious women. However, finding a partner with a similar level of religiosity and education proved difficult across all the faith traditions.

4.1. Jewish women's moral worlds

In general terms, religiously observant Jewish women face a marriage conundrum: On the one hand, they are supposed to marry early—ideally, before the age of 25. But they are also expected to seek higher education and enter the labor force, while their male peers continue their religious studies. As a result, Orthodox Jewish women in both the US and Israel have significantly higher levels of college education than their male peers (Birger, 2015). This leads to disparities in educational experience and marital expectations—a “gender gap” in the Orthodox Jewish community, which was described by Esther (all names are pseudonyms), a 35-year-old American Orthodox Jewish computer

Table 1
Sociodemographic profile of religious EEF users in Israel and the US.

Nation	Religion	Pseudonym	Age at EEF	Age at Interview	Highest Degree	Profession	Relationship Status at EEF	Relationship Status at Interview
Israel	Jewish	Miriam	37	41	MA	Art therapist	Single	Single
Israel	Jewish	Leah	36	41	MA	Social worker	Single	Married with child; using IVF for second child
Israel	Jewish	Devorah	37	40	BSW	Social worker	Single	Married and pregnant
US	Jewish	Esther	34	35	MA	Computer programmer	Single	Single
US	Catholic	Kristi	38	40	MBA	Venture capitalist	Partnered	Partnered
US	Catholic	Christine	37	39	MD	Physician	Seeking annulment	Partnered
US	Catholic	Sandra	37	37	MS	Biomedical regulator	Divorced	Single
US	Catholic	Gretchen	39	42	MD	Physician	Single	Single
US	Catholic	Claire	37	39	MA	Account executive	Single	Single
US	Protestant (evangelical)	Patti	37	37	BS	Non-profit consultant	Partnered	Single
US	Protestant (non-denominational)	Susan	36	36	MA	Architect	Single	Single
US	Mormon	Melissa	36	38	BA	Executive assistant	Single	Single
US	Muslim	Nahla	35	35	MD	Physician	Single	Single
US	Muslim	Suriyah	38	41	MD	Physician	Divorced	Single

programmer, in this way:

A lot of men, they stay studying religious texts for a lot longer. Which is fine. That just means that they're getting, you know, if they're planning to get a career, they're getting a later start in life on a career. And meanwhile the girl's been working since she was 20. And he's just starting at the age of 30. That 10 years makes a huge difference in terms of, not in terms of the ability to start a family, but the mentality of a person. Like they're not necessarily on the same wavelength of understanding, you know, the world around them and to acting with people in the same way. Not to say that it can't work. But, it just sometimes becomes a little bit more difficult when the girl has been out in the world and the boy hasn't ... It's very much easier to marry off young and dumb. When you have two early 20-year-olds marry each other, they're young and dumb and they grow up together.

Esther went onto explain that Orthodox Jewish women become educated to find good jobs and support the growth of their large future families. But then “they outsmart the men and sometimes the men can't handle it or sometimes the girl doesn't feel like she's on the same wavelength as the guy.” In Esther's case, with her master's degree in computer science, she had reached the age of 34 without finding an appropriate partner. Thus, with the support of her older sister—a nurse and mother of 13 children—Esther pursued EEF in the hope that she could follow her sister's lead. Esther's dream of ten children was no longer realistic. But she was grateful for EEF because it had taken some pressure off—“not in terms of getting married, but it's sort of like, you know, if I was going to go through this, I'd rather take care of half of it now, because it sort of jump starts the process. That when I do get married, and if we do have a problem [of infertility], I already have half of it taken care of.”

In Israel, EEF is fully endorsed by the Jewish rabbinate for both secular and religious women. The three Israeli women who were religiously observant in this study emphasized their rabbis' support, one of them calling EEF “a great solution for religious women” seeking to do something about age-related fertility decline. Still, the actual practice of EEF raised religious concerns for these women. For example, EEF requires gynecological procedures with vaginal ultrasounds, which, for religious women who are virgins, can serve as a major deterrent. As one woman explained, undertaking EEF “was the first time that someone examined [my] body.” Another woman worried that she might have “to do the procedure on a Saturday and how to handle it with the Sabbath.” However, a rabbi reassured her that if postponing the EEF cycle might risk her health, then completing it on a Saturday was religiously legitimate. In the end, the woman's physician helped her to time the procedure to avoid a Saturday office visit.

Among religiously observant Israeli women, the very act of undertaking EEF was imbued with religious significance. When considering EEF, Jewish women often emphasized their relationships with God and the importance of the divine-human interaction. As one woman explained, “To begin with, you can really think about how you're going to get things right, [but] in retrospect, it's only God's will. The Almighty will decide how it'll end. But I said: ‘At least the Almighty has something to work with.’”

One woman, Devorah, a 40-year-old social worker, described herself as being “in the process of *Tshuva*”—namely, becoming more religiously observant. She highlighted the religious dictate of “making an effort” (*Hishtadlut*), in which humans should do whatever they can to advance their interests. “There was the effort thing,” Devorah explained, “and there are also the things in life which are beyond your control. So I went for it [EEF], thinking I'm only going to do it once and that's it. I'm making my effort, and the Almighty will decide how it'll end.” When physicians retrieved 14 eggs from Devorah's ovaries, but were able to freeze only seven good-quality eggs, they asked her to consider undergoing a second EEF cycle. But Devorah explained, “I said, ‘Seven is a good number, thank you very much ... I said: ‘Come on, I've made my

effort, and this one time is enough for me.' I was really happy it was behind me."

The emphasis on human agency was highly important for these religiously observant Jewish women. One of them, Leah, a 41-year-old social worker, went on to organize a high-profile EEF event, which was well attended by other religious women and received extensive media coverage. Leah explained why she became an EEF activist for religious women like herself:

Women, because they're single, ignore the fact that there are younger singles and older singles, and that, in life, every woman needs to do something for her fertility, if it matters to her. [Therefore] it was very important for me to break [the taboo]. I had to bring this topic out of the closet ... to create social change, then bring it about.

Using her own "sorrow" at being single as a basis for action, Leah undertook extensive outreach in her community to "recruit people who are afraid of the topic." The free, educational evening event was attended by many Orthodox women, who "started to think about [EEF]" as an option. According to Leah, "I know at least 20 women who were in that evening who later had EEF." She added, "There's something [about] taking responsibility for your fertility, for your destiny as a woman."

An ultra-Orthodox woman, Miriam, a 41-year-old art therapist, was one of those who underwent EEF following the gathering. She was extremely discreet about the procedure, relying on a Jewish saying that "only that which is distant from the eye is blessed." Not wanting to reveal to the ethnographer the number of cycles or eggs retrieved, she nonetheless emphasized the profundity of her EEF decision:

[EEF] was an extremely empowering experience, it boosted my confidence so much ... I had this fear, because I am very conservative and very religious, but at some stage, I opened up, because my age was advancing, because I started to become anxious, and friends brought up this option, including one friend who is a very, very religious woman, and I understood that this was the right thing to do and that this was the time to do it. [EEF] was very empowering, very positive, constructive ... It upgraded my chance, my ability to feel fertile. I started feeling better about myself, I took action! If anyone now tries to attack me about [my] age, then I've extended the time! The fact that I did something, without knowing the statistics (I am not interested in the statistics), but the whole encounter with my femininity, my fertility ... my body responded very well, and this, too, was empowering. I felt that I don't have to be ashamed of my age, that I have something ... that God has granted me in His creation, something that can help a bit an aging woman in my situation, who has not found couplehood. This is a tremendous contribution of medicine; it eases a bit the suffering of women who reach this age and can do nothing about it.

From these accounts, EEF emerges not only as a vehicle for the preservation of fertility, but as a highly significant means for religiously observant Jewish women to express their femininity and their agency. For these women who are single in their thirties—but who hold out hope of becoming mothers in the future—"making an effort" to undertake EEF becomes a way to fulfill a religious dictate to plan a reproductive path.

4.2. Christian women's moral worlds

The eight religiously observant Christian women in this study were all American and highly educated professionals, all but two with postgraduate degrees. But like their observant Jewish counterparts in both the US and Israel, these Christian women faced difficulties in finding educated male partners who were also religiously observant. In almost all cases, they had turned to online dating applications. Yet, describing themselves as "religious" on these dating sites had proven

problematic, generating unwelcome responses. For example, a 40-year-old Catholic venture capitalist, Kristi, living in California, explained, "People [here] are pretty private about religion ... probably more private about that than egg freezing." Thus, when she checked the box "religion is really important," she received messages from a "crazy-religious" engineer, as well as three or four men "all [of] the same prototype."

A 36-year-old Protestant architect, Susan, described her online self-presentation qualms in this regard: "You don't want to be too overly Christian in [your] profiles, because it may scare some people away who misinterpret it. So, it's kind of that marketing yourself and trying to get out there without being too desperate or needy." At age 36, Susan was feeling pressure "to have a chance at life now." But she found online dating to be "torture." She lamented:

It's hard to find quality, and, back to religion, it's hard to find someone who has the same set of values ... And I think that because my religion is important to me, I'm not just going to sleep around with someone. I need a little bit of, actually, commitment. So, at least some comfort that they're not cheating on me (laughing). And that takes time. And not all guys are willing to be patient about that.

Once these Christian women had made the decision to pursue EEF, some of them sought support and advice from their religious communities. However, unlike in Israel, none of the American women reported receiving direct support or intervention on the part of clergy or clinical staff. Instead, religious support was more diffuse. For example, Kristi attended weekly masses and frequent church functions, while also practicing yoga and meditation, which she viewed as "scientifically proven to help." Another Catholic woman, Sandra, a 37-year-old biomedical regulator working for the government, received considerable support from her older brother, a priest, who eased her guilt over a "toxic" divorce, then showed "great enthusiasm" for EEF along with her parents. "They saw how miserable I was," she explained, "and so, you know, they've been supportive." Patti, a 37-year-old non-profit consultant who was an Evangelical Christian, sought support from her church group:

They're like six to twelve people that meet up one evening a week usually, and just, you know, just try to build community and work on fellowship together. And I didn't talk to my whole small group about it, but there are probably five people in my group who have been really close to me, who I've been in the group with for five years, and who I really feel like personally close to. And so I asked them, like, "What do you think of this, from an ethical perspective, you know?" And like, "Pray for me during the process."

Not all of the Christian women in the study received such community support. A 37-year-old Mormon executive assistant, Melissa, explained, "I have this huge thing going on in my life, but I'm doing it all by myself." Although Melissa was able to freeze a significant number of eggs—18 in a single cycle—it did not bring her complete psychic relief:

I thought that I would feel all kinds of freedom. You know, 'I can now have kids until I'm 50!' But I'm feeling older (laughing). You know, no matter what my eggs are ... you age and you get tired and you think, 'Do I want to be dealing with a newborn when I'm 45 years old?' [Still, EEF] does help as far as taking that worry off the table a little bit.

Indeed, Melissa had been actively encouraging other single Mormon women to pursue EEF, because "most women kind of have this desperate desire" to become mothers. The Mormon religion—officially called The Church of Jesus Christ of Latter-day Saints (or the LDS Church), with its demographic epicenter in the US state of Utah—encourages early marriage and prohibits premarital sex. But the age of marriage is steadily increasing among US Mormons as women seek higher education, including at Brigham Young University in Provo, Utah, which is owned by the LDS Church. Significantly outperforming their male peers

in higher education, many Mormon women such as Melissa have been unable to find educated partners—an education gap in the Mormon community that has been well documented (Birger, 2015). As a result, EEF has generated considerable interest among Mormon women. Today, Mormon websites and blogposts are filled with discussions of EEF, a technology that has been approved by the LDS leadership. As Melissa explained:

Some religions have ethical reactions or ethical issues with a lot of this. But Mormons really don't with embryo creation and so forth. While they are still sensitive about it, you know—[we] don't want to just haphazardly create embryos [because] we still view it as life—there are other Christian religions that are much more strict about all of that. So I actually think the Mormon population is a great population to do this.

Catholic women in this study were less sanguine, given the Catholic Church's strict prohibition on EEF and other ARTs. Not surprisingly, religiously observant Catholic women in this study expressed the most concerns about EEF. For example, Christine, a 39-year-old physician scientist who undertook EEF following a “short, difficult marriage,” had applied for an annulment from the Catholic Church to ease her feelings of guilt about her divorce. But EEF, too, made her feel guilty. “Getting involved with the whole reproductive process, right. It's very taboo. For Catholics, right, they just don't want any intervention in that area at all.”

Other women argued against the Catholic EEF prohibition on moral grounds. They argued that egg freezing and embryo freezing are fundamentally different processes and so should be judged accordingly. As one woman explained, “It's an unfertilized egg, so there's no Catholic association or anything. It's potential for life, but it's not life.” Another woman reasoned, “[Eggs are] still not alive; it's just a part of me, my tissue, my part of the body.” “I'm good with egg freezing,” a third woman offered. “But if you get into the religious stuff, I'm not sure about the embryo freezing. [But] egg freezing is like, ‘Well, these are just going to die anyway.’” At least one Catholic woman, Gretchen, a 39-year-old first-generation Irish-American physician, decided to freeze *both* eggs and embryos upon her physician's advice. But she struggled over the decision to use donor sperm, as well as the moral implications of creating human embryos and then bringing them to life without a known biological father:

One thing I did have a lot of conflict with, and it probably is my background in Catholicism ... was doing the fertilization. But [the doctor] really kind of encouraged me, in case I didn't have a partner, to do some eggs fertilized, which I really wasn't prepared for, and that was an emotional decision. I did it, but I was kind of conflicted about it ... That was something I wasn't prepared for until he suggested it, and then I still had a lot of difficulty with it ... it just kind of felt like a failure. Like, my baby, or whatever it is, is not going to have a dad? I love my dad! How could I not provide ... I'm not providing a father!

Another woman, 39-year-old account executive Claire, described how her Catholic friend decided to become a single mother via donor insemination. Claire ended her own account by suggesting that she, too, might eventually make this decision, using her frozen eggs:

My friend, she's also religious and she was also Catholic. Now she's not. But, you know, she was struggling with that. But, you know, now she has Nina [her daughter] and she does not [care] at all, like, everything is out the door. All her fears of what people think and she has a kid. She's great, you know? So, and I know egg donation and that is - I mean, the fact that she is at age 49, you know? I'm 37, going on 38. I have some time. [But] if needed, I could do that.

Other Catholic women considered donating their frozen eggs in the future. “If the egg is going to be used to give someone else a child,” one woman offered, “then there is, for me, some motivation.” Another

Catholic woman hoped to donate her leftover eggs to research: “If at least one egg will [help] discover something and it will help the medicine, then hey! Then they'll do the research then destroy them.”

Despite their various moral quandaries, the practicing Catholic women in this study were uniformly grateful for the existence of EEF. In the words of Catholic physician Gretchen: “[EEF] is the best decision I ever made! Turning 40 was hard enough, but knowing that I had frozen my eggs was this huge relief off my shoulders.” While cognizant of the Church's opposition to EEF, Catholic women in this study could ultimately justify their EEF decisions on moral grounds. As they explained, EEF kept alive their desire for children, and having children is one of the main tenets of the Catholic religion.

4.3. Muslim Women's moral worlds

Of the five American Muslim women who volunteered for this study of EEF, two considered themselves to be religiously observant. Both were physicians of South Asian ancestry who faced the same problem as their Jewish and Christian counterparts—namely, they could not find an educated, religious partner to marry. One of them, Suriyah, had already married a Muslim physician, but then quickly divorced. She explained:

I think we married the idea of each other. I think that I had always thought that there was a specific type of person I should end up with, somebody who was educated and also Muslim like I am. And I think I got married based on that. [But] we had very, very different value systems ... and so while I was married to this person, I mean it was just a really bad situation. And I found out that he was, like, looking to marry someone else. And so it was just a very bad situation, that I was able to get out of.

The other Muslim physician, Nahla, considered her chances of finding a Muslim husband with the same value system “pretty bad.” As she described it:

The thing is, I think that being a “good Muslim man,” a lot of those men who also really wanted to be, you know, like chaste and just really good and doing things the right way, they got married a little bit earlier, you know? They just got married earlier. And so it's hard to find those ones there [who] were also just like me, just kind of like career oriented for a while but happened to be really good guys and happened to find themselves, you know, single at a later age. And so they're there, don't get me wrong. They're there, but it's really hard to find them ... [It's] very slim, slim pickings to find a good guy.

Nahla also pointed out that her current age, 35, would be considered a major deterrent to prospective marital partners:

They have no problem telling me that it's about, you know, it's about fertility. And, oh, like they want to start a family. They don't use the word “fertility” necessarily, but they're like, “Oh, we want to take our time in having families and we want to have large families.” ... They're very like, open about that, you know. And I just don't like that! (laughing).

Given her own desire to have at least three children, Nahla decided to freeze her eggs, a decision that both her mother and sisters supported. “Yeah. All the women in the family were totally aware, and they were checking up on me, and they were like, very good.” Nahla's mother was particularly relieved that she had decided to undergo EEF. “She was happy about it ... I mean, I think it was bittersweet in some ways, because she was sad that I was in a position that I needed to do that. But she was happy that I was being proactive and doing it. You know what I mean?”

Still a virgin, Nahla underwent the various EEF transvaginal procedures, justifying her decision in this way:

I do think 'medical is medical.' So, I don't care about, like, my hymen or whatever being broken. I think that's like kind of old school. Like, it can probably bleed by riding or you know what I mean? I don't really, I don't care that much. Maybe for other people it would be. I don't. Not for me. And in fact, to be honest, it's kind of—this is kind of like TMI [too much information]—but I was happy that they did it so I knew that there was no problem (laughing). If that makes sense? Because I was like, 'Oh, okay. Everything works here. Everything's good.' You know?

As with the Jewish and Christian women described above, both Nahla and Suriyah felt a tremendous sense of relief following their EEF procedures. But unlike the Christian women, they suffered no religious guilt, instead describing this religiously permitted procedure as extremely "empowering." Nahla was the most expansive in this regard:

I don't have this sense of anxiety, of like feeling like I need to get married yesterday. I mean, I want to get married, and I want to get married sooner rather than later. But I don't, I don't feel like it needs to happen yesterday, because my clock is ticking ... It's kind of funny. I have this like magical thing in my back pocket that I can pull out, and you know, it's like it extends my fertility for all these years. I don't have to think about this clock at all. And so, yeah, it just puts me [at ease], it makes me very relieved, and it makes me feel like I potentially might not miss out on the things that I wanted, which like I said, were ideally like three kids or more. I really want more than just two kids. I mean, if God blesses me with one, I'll be happy. But like, if I can plan to have more than one or two, I would want that, you know?

5. Discussion

Exploring EEF through the lens of religion offers a novel view into the use of an emergent reproductive technology. As leaders of the three Abrahamic faith traditions have contemplated and ruled upon EEF, so, too, have religious women accommodated EEF into their local moral worlds and reproductive practices.

The accounts of these religiously identified women who had undergone EEF reveal important similarities. First, women across the three faith traditions turned to EEF at a similar age, the late 30s, when they could not find a suitable marriage partner with whom to found a family. Like their highly educated secular counterparts, EEF was undertaken because they were single and facing the end of their reproductive lifespans. However, unlike secular women, these religious women were faced with an additional conundrum: Namely, religiously observant men were not necessarily educated, and educated men were not necessarily religious. Thus, finding the right mate proved elusive. For the religious women in this study, freezing their eggs made sense, while still proactively searching for a "good" religious man to marry.

A second similarity across the faith traditions was the expectation of early marriage, motherhood, and large family norms—all crucial components of religious women's self-identities. In this study, these religious women longed to be married mothers, but realized that they were at a distinct marital disadvantage, as they were assumed to be too old to bear children, or not enough of them. The stigma of age-related fertility decline was felt keenly by these "thirty-something" women. Thus, EEF served to reduce some of their anxiety, giving them a reproductive reprieve amidst otherwise inexorable time pressure.

Third, although religious women generally paid close attention to the ethical domain, hoping to adhere to their religious communities' convictions, women were sometimes forced to exert proactive discretion, applying technologies that did not conform to their communities' beliefs and dictates. This was especially true for Catholic women, who undertook egg freezing and embryo freezing, despite the Church's prohibition of both and serious moral concerns over the sanctity of human embryos and their disposition. In defying the Church's

teachings, Catholic women were not alone. Indeed, this study showed the agentive ways in which religious women of *all* faith traditions were sometimes willing to bypass various religious restrictions and sensitivities. For example, Orthodox Jewish women considered ultrasound scanning and egg retrieval on the day of the sabbath to be necessary. Muslim women relinquished their highly valued virginity—which is supposed to be preserved until the wedding night—through the transvaginal procedures undertaken in the clinic. In other words, women of different faith backgrounds were confronted with different "local moral" dilemmas. But, whatever moral anxieties these religious transgressions generated for women seemed to be outweighed by their sense of relief and satisfaction derived from EEF. The religious women in this study invariably viewed EEF as expanding their reproductive futures, even though, technically, such reproductive futures could never be guaranteed.

In summary, as with all other forms of ART (e.g., Birenbaum-Carmeli and Carmeli, 2010; Inhorn, 1994, 2003; Inhorn and Tremayne, 2012; Kahn, 2000; Kanaaneh, 2002; Nahman, 2013), EEF is invariably shaping women's local moral worlds, including their notions of appropriate marriage, their gender relations, and their aspirations for motherhood. Women's religious affiliations and belief systems emerge as highly significant in their perceptions and experiences of EEF. Furthermore, the Abrahamic traditions themselves are adapting to these new reproductive realities. With the exception of the Catholic Church, leaders of the Jewish, Christian, and Muslim faiths have provided religious support for EEF, including for single women. This "religious turn" to EEF demonstrates yet again how ARTs may be used to accomplish traditional religious and pronatalist social goals.

With only 14 self-identified religious women in this study, the findings described in this paper cannot be considered definitive. The sample size of the study was quite small and consisted only of women who had chosen to pursue EEF. Thus, religiously observant women of all faiths who opposed EEF were not represented in this study. Clearly, further studies of religiously observant Jewish, Christian, and Muslim women are needed to more fully apprehend women's EEF trajectories. Having said that, as the first study of religion and EEF across all three Abrahamic faith traditions, this study stands as an important beginning, tracing the ways in which EEF is already beginning to shape women's local moral worlds.

CRedit authorship contribution statement

Marcia C. Inhorn: Data curation, Formal analysis, Writing - original draft. **Daphna Birenbaum-Carmeli:** Formal analysis, Writing - review & editing. **Mira D. Vale:** Formal analysis, Data curation. **Pasquale Patrizio:** Conceptualization, Formal analysis, Writing - review & editing.

Acknowledgments

The authors would like to thank Jennifer DeChello, Jeannine Estrada, Rose Keimig, Sandee Murray, Tasha Newsome, and Ruoxi Yu for various forms of editorial, research, study recruitment, and transcription assistance. We are grateful to our colleagues Martha Dirnfeld, Joseph Doyle, Norbert Gleicher, Arik Kahane, Dror Meiorow, Daniel Seidman, and Lynn Westphal, for helping to make this ethnographic study possible. This study was funded by a grant from the US National Science Foundation, BCS-1356136, PI Marcia C. Inhorn and Co-PI Pasquale Patrizio.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2020.112976>.

References

- Alawi, S., 2019. Egg Freezing Permissible in Islam, According to Egypt's Dar Al-Iftha, September 23. Retrieved December 18, 2019, from Bill of Health website: <https://blog.petrieflom.law.harvard.edu/2019/09/23/egg-freezing-permissible-in-islam-according-to-egypts-dar-al-ifta/>.
- Allahbadia, G.N., 2016. Social egg freezing: developing countries are not exempt. *J. Obstet. Gynaecol. India* 66, 213–217.
- American Society for Reproductive Medicine, 2018. Planned oocyte cryopreservation for women seeking to preserve future reproductive potential: An ethics committee opinion. *Fert. Steril.* 110, 1022–1028.
- Andruchow, B., 2010. Medical Bioethics: an Orthodox Christian Perspective for Orthodox Christians. file:///Users/mci5/Desktop/Parish%20Ministry%20Resources%20-%20Medical%20Bioethics%20An%20Orthodox%20Christian%20Perspective%20for%20Orthodox%20Christ.webarchive.
- Argyle, C.E., Harper, J.C., Davies, M.C., 2016. Oocyte cryopreservation: where are we now? *Hum. Reprod. Update* 22, 440–449.
- Baldwin, K., 2017. I suppose I think to myself, that's the best way to be a mother": how ideologies of parenthood shape women's use of social egg freezing technology. *Socio. Res. Online* 22, 1–15.
- Baldwin, K., 2018. Conceptualising women's motivations for social egg freezing and experience of reproductive delay. *Soc. Health Illness* 40, 859–873.
- Baldwin, K., 2019. Egg Freezing, Fertility and Reproductive Choice: Negotiating Responsibility, Hope and Modern Motherhood. Emerald Publishing Ltd., Bingley, UK.
- Baldwin, K., Culley, L., Hudson, N., Mitchell, H., 2014. Reproductive technology and the life course: current debates and research in social egg freezing. *Hum. Fertil.* 17, 170–179.
- Baldwin, K., Culley, L., Hudson, N., Mitchell, H., 2019. Running out of time: exploring women's motivations for social egg freezing. *J. Psychosom. Obstet. Gynecol.* 40 (2), 166–173.
- Baldwin, K., Culley, L., Hudson, N., Mitchell, H., Lavery, S., 2015. Oocyte cryopreservation for social reasons: demographic profile and disposal intentions of UK users. *Reprod. Biomed. Online* 31, 239–245.
- Balkenende, E.M., Dahhan, T., van der Veen, F., Repping, S., Goddijn, M., 2018. Reproductive outcomes after oocyte banking for fertility preservation. *Reprod. Biomed. Online* 37, 425–433.
- Birenbaum-Carmeli, D., 2009. The politics of 'the natural family' in Israel: state policy and kinship ideologies. *Soc. Sci. Med.* 69, 1018–1024.
- Birenbaum-Carmeli, D., 2016. Thirty-five years of assisted reproductive technologies in Israel. *Reprod. Biomed. Soc. Online* 2, 16–23.
- Birenbaum-Carmeli, D., Carmeli, Y.S. (Eds.), 2010. Kin, Gene, Community: Reproductive Technologies Among Jewish Israelis. Berghahn, New York.
- Birger, J., 2015. Date-onomics: How Dating Became a Lopsided Numbers Game. Workman Publishing, New York.
- Broadway, A., 2012. Banking on God Alone: Why I Won't Be Freezing My Eggs. May 24. Retrieved December 18, 2019, from Christianity Today website: <https://www.christianitytoday.com/women/2012/may/banking-on-god-alone-why-i-wont-be-freezing-my-eggs.html>.
- Brown, E., Patrick, M., 2018. Time, anticipation, and the life course: egg freezing as temporarily disentangling romance and reproduction. *Am. Socio. Rev.* 83, 959–982.
- Carroll, K., Kroløkke, C., 2018. Freezing for love: enacting "responsible" reproductive citizenship through egg freezing. *Cult. Hlth. Sexuality* 20, 992–1005.
- Cioffi, F.A. Dignitas Personae on freezing oocytes and genetic selection: a commentary on Dignitas Personae, Part Two. n.d.nn 20-22. Retrieved December 18, 2019, from National Catholic Bioethics Center website: <https://www.ncbcenter.org/resources/information-topic/dignitas-personae/freezing-oocytes/>.
- Clark, K., 2015. Freeze your eggs, free your career? February 26. Retrieved December 18, 2019, from The Ethics & Religious Liberty Commission of the Southern Baptist Convention website: <https://erlc.com/resource-library/articles/freeze-your-eggs-free-your-career>.
- Clarke, M., 2009. Islam and New Kinship: Reproductive Technology and the Shariah in Lebanon. Berghahn, New York.
- Cobo, A., García-Velasco, J.A., 2016. Why all women should freeze their eggs. *Curr. Opin. Obstet. Gynecol.* 28, 206–210.
- Cromer, R., 2018. Saving embryos in stem cell science and embryo adoption. *New Genet. Soc.* 37, 362–386.
- Cromer, R., 2019. Making the ethnic embryo: enacting race in US embryo adoption. *Med. Anthropol.* 38, 603–619.
- Czarnecki, D., 2015. Moral women, immoral technologies: how devout women negotiate gender, religion, and assisted reproductive technologies. *Gen. Soc.* 29, 716–742.
- Donnez, J., Dolmans, M.-M., 2017. Fertility preservation in women. *N. Engl. J. Med.* 377, 1657–1665.
- Evans, J.H., Hudson, K., 2007. Religion and reproductive genetics: beyond views of embryonic life? *J. Sci. Stud. Relig.* 46, 565–581.
- Göçmen, İ., Kılıç, A., 2018. Egg freezing experiences of women in Turkey: from the social context to the narratives of reproductive ageing and empowerment. *Eur. J. Wom. Stud.* 25, 168–182.
- Goldman, K.N., Grifo, J.A., 2016. Elective oocyte cryopreservation for deferred child-bearing. *Curr. Opin. Endocrinol. Diabetes Obes.* 23, 458–464.
- Greenwood, E.A., Pasch, L.A., Hastie, J., Cedars, M.I., Huddleston, H.G., 2018. To freeze or not to freeze: decision regret and satisfaction following elective oocyte cryopreservation. *Fertil. Steril.* 109, 1097–1104.
- Gunnala, V., Schattman, G., 2017. Oocyte vitrification for elective fertility preservation: the past, present, and future. *Curr. Opin. Obstet. Gynecol.* 29, 59–63.
- Gürtin, Z.B., Shah, T., Wang, J., Ahuja, K., 2019. Reconceiving egg freezing: insights from an analysis of 5 years of data from a UK clinic. *Reprod. Biomed. Online* 38, 272–282.
- Hammarberg, K., Kirkman, M., Pritchard, N., Hickey, M., Peate, M., McBain, J., Agresta, F., Bayly, C., Fisher, J., 2017. Reproductive experiences of women who cryopreserved oocytes for non-medical reasons. *Hum. Reprod.* 32, 575–581.
- Hodes-Wertz, B., Druckenmiller, S., Smith, M., Noyes, N., 2013. What do reproductive-age women who undergo oocyte cryopreservation think about the process as a means to preserve fertility? *Fertil. Steril.* 100, 1343–1349.
- Hollan, D., 2001. Developments in person-centered ethnography. In: Moore, C.C., Mathews, H.F. (Eds.), *The Psychology of Cultural Experience*. Cambridge University Press, Cambridge, pp. 48–67.
- Inhorn, M.C., 1994. *Quest for Conception: Gender, Infertility and Egyptian Medical Traditions*. University of Pennsylvania Press, Philadelphia.
- Inhorn, M.C., 1996. *Infertility and Patriarchy: The Cultural Politics of Gender and Family Life in Egypt*. University of Pennsylvania Press, Philadelphia.
- Inhorn, M.C., 2003. *Local Babies, Global Science: Gender, Religion and in Vitro Fertilization in Egypt*. Routledge, New York.
- Inhorn, M.C., 2012. *The New Arab Man: Emergent Masculinities, Technologies, and Islam in the Middle East*. Princeton University Press, Princeton, NJ.
- Inhorn, M.C., Birenbaum-Carmeli, D., Tremayne, S., Gürtin, Z.B., 2017. Assisted reproduction and Middle East kinship: a regional and religious comparison. *Reprod. Biomed. Soc. Online* 4, 41–51.
- Inhorn, M.C., Birenbaum-Carmeli, D., Birger, J., Westphal, L.M., Doyle, J., Gleicher, N., Meirou, D., Dirnfeld, M., Seidman, D., Kahane, A., Patrizio, P., 2018a. Elective egg freezing and its underlying socio-demography: a binational analysis with global implications. *Reprod. Biol. Endocrinol.* 16, 70.
- Inhorn, M.C., Birenbaum-Carmeli, D., Westphal, L.M., Doyle, J., Gleicher, N., Meirou, D., Dirnfeld, M., Seidman, D., Kahane, A., Patrizio, P., 2018b. Ten pathways to elective egg freezing: a binational analysis. *J. Assist. Reprod. Genet.* 35, 2003–2011.
- Inhorn, M.C., Patrizio, P., Serour, G.I., 2010. Third-party reproductive assistance around the Mediterranean: comparing Sunni Egypt, Catholic Italy and multisectarian Lebanon. *Reprod. Biomed. Online* 21, 848–853.
- Inhorn, M.C., Tremayne, S. (Eds.), 2012. *Islam and Assisted Reproductive Technologies: Sunni and Shia Perspectives*. Berghahn Books, New York.
- James, S.D., 2012. *Rabbis Urge Single, Orthodox Women to Freeze Eggs at 38*. September 7. Retrieved December 18, 2019, from ABC News website: <https://abcnews.go.com/Health/rabbis-urge-single-orthodox-women-freeze-eggs-age/story?id=17185321>.
- Kahn, S.M., 2000. *Reproducing Jews: A Cultural Account of Assisted Conception in Israel*. Duke University Press, Durham, NC.
- Kahn, S.M., 2006. Making technology familiar: Orthodox Jews and infertility support, advice, and inspiration. *Cult. Med. Psychiatr.* 30, 467–480.
- Kanaaneh, R.A., 2002. *Birth of the Nation: Strategies of Palestinian Women in Israel*. University of California Press, Berkeley, CA.
- Khalife, D., Kutteh, W., Tarhini, H., Khalil, M.A., Beyrouthy, C., Ghazeeri, G., 2019. Parental attitudes toward fertility preservation in female adolescent cancer patients in Lebanon. *J. Pediatr. Adolesc. Gynecol.* 32, 525–529.
- Kim, R., Yoon, T.K., Kang, I.S., Koong, M.K., Kim, Y.S., Kim, M.J., Lee, Y., Kim, J., 2018. Decision making processes of women who seek elective oocyte cryopreservation. *J. Assist. Reprod. Genet.* 35, 1623–1630.
- Kılıç, A., Göçmen, İ., 2018. Fate, morals and rational calculations: freezing eggs for non-medical reasons in Turkey. *Soc. Sci. Med.* 203, 19–27.
- Kleinman, A., 1992. Local worlds of suffering: an interpersonal focus for ethnographies of illness experience. *Qual. Health Res.* 2, 127–134.
- Kleinman, A., 2007. *What Really Matters: Living a Moral Life amidst Uncertainty and Danger*. Oxford University Press, Oxford, UK.
- Larijani, B., Zahedi, F., 2007. Ethical and religious aspects of gamete and embryo donation and legislation in Iran. *J. Relig. Health* 46, 399–408.
- Nahman, M., 2013. *Extractions: An Ethnography of Reproductive Tourism*. Springer, New York.
- Office of Technology Assessment, 1988. Appendix F. Religious perspectives. In: *Infertility: Medical and Social Choices*. Office of Technology Assessment, Washington, DC, pp. 364–368.
- Parler, B., 2014. *Egg Freezing and the Facts of Life*, November 14. Retrieved December 18, 2019, from Think Christian website: <https://thinkchristian.reframedia.com/egg-freezing-and-the-facts-of-life>.
- Potdar, N., Gelbaya, T.A., Nardo, L.G., 2014. Oocyte vitrification in the 21st century and post-warming fertility outcomes: a systematic review and meta-analysis. *Reprod. Biomed. Online* 29, 159–176.
- Pritchard, N., Kirkman, M., Hammarberg, K., McBain, J., Agresta, F., Bayly, C., Hickey, M., Peate, M., Fisher, J., 2017. Characteristics and circumstances of women in Australia who cryopreserved their oocytes for non-medical indications. *J. Reprod. Infant Psychol.* 35, 108–118.
- PUAH Institute, 2018. *Statement on Egg Freezing*. December 11. Retrieved from. <https://puah.org.il/shut/%D7%94%D7%A7%D7%A4%D7%90%D7%AA-%D7%91%D7%99%D7%A6%D7%99%D7%95%D7%AA/>.
- Sallam, H.N., Sallam, N.H., 2016. Religious aspects of assisted reproduction. *Facts, Views, Vis. Obstet. Gynecol.* 8, 33–48.
- Santo, E.V.E., Dieamant, F., Petersen, C.G., Mauri, A.L., Vagnini, L.D., Renzi, A., Zamara, C., Oliveira, J.B.A., Baruffi, R.L.R., Franco Jr., J.G., 2017. Social oocyte cryopreservation: a portrayal of Brazilian women. *JBRAS Assist. Reprod.* 21, 101–104.
- Schon, S.B., Shapiro, M., Gracia, C., Senapati, S., 2017. Medical and elective fertility preservation: impact of removal of the experimental label from oocyte cryopreservation. *J. Assist. Reprod. Genet.* 34, 1207–1215.
- Stoop, D., Maes, E., Polyzos, N.P., Verheyen, G., Tournaye, H., Nekkebroeck, J., 2015. Does oocyte banking for anticipated gamete exhaustion influence future relational and reproductive choices? A follow-up of bankers and non-bankers. *Hum. Reprod.* 30, 338–344.

- Temam, E., 2010. *Birthing a Mother: The Surrogate Mother and the Pregnant Self*. University of California Press, Berkeley.
- Traina, C., Georges, E., Inhorn, M.C., Kahn, S., Ryan, M.A., 2008. Compatible contradictions: religion and the naturalization of assisted reproduction. In: Lustig, B.A., Brody, B.A., McKenny, G.P. (Eds.), *Altering Nature-Volume II: Religion, Biotechnology, and Public Policy*. Ford Foundation, New York, pp. 15–85.
- Tremayne, S., Akhondi, M.M., 2016. Conceiving IVF in Iran. *Reprod. Biomed. Soc. Online* 2, 62–70.
- United States Conference of Catholic Bishops, 2009. *Reproductive Technology*. Retrieved from. www.usccb.org.
- Waldby, C., 2015. “Banking time”: Egg freezing and the negotiation of future fertility. *Cult. Health Sex.* 17, 470–482.
- Waldby, C., 2019. *The Oocyte Economy: The Changing Meaning of Human Eggs*. Duke University Press, Durham, NC.
- Zanini, G., 2019. Jesus is in favor: Catholicism and assisted reproduction in Italy. *Med. Anthropol.* 38, 356–369.