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TWO 'QUIET' REPRODUCTIVE REVOLUTIONS

Islam, gender, and (in)fertility

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Introduction

Over the past three decades, fertility rates have plummeted across the Muslim world – a fertility decline that has been profound, even revolutionary. For example, by 2012, nearly half of the world's top 15 fertility declines had occurred in Muslim-majority nations (United Nations 2012), reflecting both the increased use of contraceptives and married couples' willingness to have fewer children. Yet, this dramatic fertility decline is not the only reproductive revolution taking place across the Muslim world. From Morocco to Malaysia, the Muslim world has seen the growth of one of the world's largest in vitro fertilization (IVF) sectors, designed to overcome Muslim couples' infertility problems. Infertility treatment via assisted reproductive technologies (ARTs) has been encouraged by Islamic authorities in both Sunni and Shi'a-majority Muslim countries (Inhorn and Tremayne 2012). Furthermore, some Middle Eastern governments, such as Turkey and the United Arab Emirates, have subsidized ARTs for their citizens (Gürtin 2016; Inhorn 2015).

This chapter attempts to trace the connection between two seemingly disparate Muslim reproductive revolutions. The first is the massive fertility decline, achieved in part through religiously condoned contraceptive technologies, as well as by Muslim couples' own desires for smaller family sizes. The second is the massive infusion of ARTs into the Muslim world, and particularly the Muslim Middle East. Whereas contraceptive technologies have helped Muslim couples to control their number of births and their birth spacing, ARTs have helped Muslim couples to overcome their infertility problems and thus their involuntary childlessness.

The first half of this chapter focuses primarily on the Arab world, where these reproductive revolutions have been particularly profound. In the Arab world, the pronounced fertility decline began in Egypt in the 1960s, but took off in other Arab countries by the mid-1980s. Just as contraceptives were taking off, ARTs entered the region. Thus, the second half of the chapter focuses on the period from 1986 to the early 2000s, when these two reproductive revolutions converged. In this section, the role of Iran is highlighted, for it is there that Shi'a religious authorities made possible an 'Iranian ART revolution' (Abbasi-Shavazi et al. 2008), the results of which have affected infertile Muslim women's lives in a number of important ways.

Yet, these religiously condoned, reproductive transformations in Muslim women's lives have been 'quiet' revolutions, insofar as they have been overlooked in popular media, academic circles, and policy reports. Today, the Muslim world is still routinely conceived of as a region of high fertility – attributable to men's patriarchal control over women's bodies (Ali 2002) and religiously fueled pronatalism (Inhorn 1996). As will be seen in this chapter, however, this portrayal of Muslim hyper-fertility and male oppression is both outdated and inaccurate. Not only are many Muslim men supporting their wives in reproductive decision-making (Inhorn 2012), but the fertility declines and ART uptakes undertaken by Muslim couples over the past 30 years (1988–2018) have been profound (Johnson-Hanks 2006) – 'quiet revolution[s] ... hiding in plain sight' (Eberstadt and Shah 2012, pp. 43–44).

How did these revolutions happen? The introduction of reproductive technologies – both contraceptives and ARTs – is an important part of this story, as we shall see. But access to reproductive technologies is not the key factor. Instead, attitudinal change and human agency – or the desire for fewer children and the willingness to act upon this desire on the part of both men and women – has led to what anthropologists working in the Muslim Middle East have called the 'new Arab family' (Hopkins 2004). Today, this 'new' family is a 'small' family, usually consisting of two or three children at the most, and two parents who aspire to support and educate them.

Fertility and family planning

Where did it all begin? Concerns over Arab fertility date back to the post-World War II period. A growing rhetoric of 'overpopulation' in the 'underdeveloped' world led Western population analysts to recommend government interventions into fertility (Bier 2008). With implementation of national family planning programs, it was argued, governments in the 'Third World' could effectively curb their high rates of population growth, thereby mitigating 'resource shortages, economic catastrophe, and social and political instability' (Bier 2008, p. 59). In this post-war period, the International Planned Parenthood Federation (IPPF), the Population Council, the Ford Foundation, and the United Nations Fund for Population Activities (UNFPA), later renamed the United Nations Population Fund, were formed to initiate population control activities.

In the Arab world, the initial focus was on Egypt, a purportedly 'overpopulated' country with a projected population doubling rate that was deemed alarming (Mitchell 1991). In particular, Egypt was said to suffer from a problem of 'geography versus demography' – namely, a rapidly expanding population that would eventually outstrip its arable, habitable land mass along the Nile. Although *prima facie* evidence of this Egyptian 'population explosion' was questionable (Mitchell 2002), the Egyptian government was nonetheless inclined to accept Western advice and UNFPA support for a state-sponsored population control program, the first Middle Eastern Muslim country to do so (Stycos and Sayed 1988).

It is important to note that the introduction of contraceptive technologies in Egypt received early support from Egypt's grand mufti, who stated that Islam does not object to family planning, so long as it is practiced within the general guidelines of Islamic family life (e.g., marriage), is recommended by a trustworthy physician, and is not harmful when practiced. The grand mufti also argued that family planning is acceptable for 'hygienic,' economic, and social reasons, and when the husband and wife agree to use it. This permissive view of family planning was upheld by a fatwa (an authoritative religious decree) from Egypt's famed religious university, Al-Azhar, which stated that family planning does not contradict Islamic teachings, and can be used to delay birth until a married couple is able to properly care for a child (Al-Azhar Islamic Research Academy 1988).

Given this early Islamic support, Egypt experimented with many different 'scientific' forms of family planning, including diaphragms, foam tablets, contraceptive jelly, douches, and eventually birth control pills, all of which are considered to be 'female-controlled' methods (Bier 2008). This early effort to promote female (as opposed to male) contraception was soon replicated in several other Arab countries. The North African nations of Tunisia and Morocco were the first to follow the Egyptian lead, establishing national family planning programs in 1964 and 1966 respectively (Lapham 1972). By 1980, nine other Arab nations had instituted either direct government family planning programs (i.e., Algeria and the two halves of a divided Yemen), or had agreed to establish 'voluntary' family planning associations supported by IPPF (i.e., Bahrain, Iraq, Jordan, Lebanon, Sudan, and Syria) (Faour 1989). In the Arab countries with IPPF-sponsored programs, contraceptive information and guidance were provided freely, and low-cost contraceptives were offered to women who could not otherwise afford them.

By 1984, 15 Arab nations had endorsed the Mexico City Declaration on Population and Development, an international agenda supporting the 'right' of all individuals and couples to decide freely about contraception. However, as of 1984, less than half of all Arab nations had family planning programs. Two Arab nations, Iraq and Saudi Arabia, still restricted access to contraception, while the majority had refused to endorse family planning on a national level. Thus, in a region-wide evaluation of Arab family planning programs undertaken in the early 1980s, family planning program efforts were deemed to be 'weak,' 'very weak,' or 'nonexistent' in most Arab countries (with the exception of Tunisia, which received a 'moderate' rating) (Faour 1989). In fact, it was noted that several Arab countries, especially those in the Gulf, were opposed to family planning, because their governments hoped to increase population growth rates as a solution to perceived 'under-population' in their nations.

Table 23.1 provides an overall picture of fertility rates and fertility policies in 18 Arab nations during the 1980s. As shown in Table 23.1, total fertility rates (TFRs) – or the average number of children born to a woman over her lifetime – were quite high across the region as of 1988, with several Arab nations manifesting TFRs of more than seven children per woman. During this period, population growth was occurring in every single Arab country except war-torn Lebanon, which was considered exceptional in population circles because of its 'replacement fertility' level of only two children per Lebanese woman (Courbage 1999).

The rise of female contraception

Given the high total fertility rates shown in Table 23.1, it should come as no surprise that contraceptive prevalence rates across the Arab world at the time remained very low. In a survey of 11 Arab countries conducted in 1982, the mean contraceptive prevalence rate was only 19 per cent (Lapham and Mauldin 1985). Egypt, which had put the most effort into a direct government program, had only achieved a contraceptive prevalence rate of 30 per cent. Even in Lebanon with its low total fertility rate, slightly more than half (53 per cent) of Lebanese couples reported using contraceptives. Several Arab countries lacked any form of contraceptive prevalence data, or reported rates that were very low, ranging from 1 to 10 per cent (e.g., Algeria, Syria).

By 1985, however, female contraceptive prevalence rates began to increase significantly in several Arab countries, even in the absence of explicit family planning information or country-wide policies (Lapham and Mauldin 1985). In Jordan, for example – a country with no specific fertility policy (to either raise or lower population growth) and without any

Table 23.1 Fertility levels in Arab countries: the 1980s

Country	Population in 1988 (millions)	Total fertility rate (per woman)	Annual rate of population increase (%)	Country's fertility policy	Family planning program
Algeria	23.9	6.7	3.2	Lower	Direct government
Bahrain	0.5	4.6	2.8	None	IPPF member
Egypt	50.3	4.6	2.5	Lower	Direct government
Iraq	17.6	6.7	3.6	Raise	IPPF member, but restricted contraceptive access
Jordan	4.0	7.4	3.7	None	IPPF member
Kuwait	2.1	6.2	3.6	Raise	None
Lebanon	2.8	3.8	2.0	None	IPPF member
Libya	4.0	7.2	3.5	None	None
Morocco	23.5	5.1	2.5	Lower	Direct government
Oman	1.4	7.1	3.3	Maintain	None
Qatar	0.4	6.8	3.4	Maintain	None
Saudi Arabia	13.0	7.1	3.3	Raise	None; restricted contraceptive access
Sudan	23.5	6.6	2.9	None	IPPF member
Syria	12.0	7.2	3.8	None	IPPF member
Tunisia	7.6	4.8	2.3	Lower	Direct government
United Arab Emirates	1.5	5.9	2.6	Raise	None
Yemen Arab Republic	7.5	7.0	3.0	Lower	Direct government
Yemen Democratic Republic	2.3	6.8	3.0	Lower	Direct government

Sources: Faour (1989); Lapham and Mauldin (1985); United Nations (1986, 1987)

direct government family planning program – the contraceptive prevalence rate nonetheless rose from an average of 40 per cent in 1990 to 60 per cent in 2009. By then, 82 per cent of ever-married Jordanian women aged 15 to 49 had used contraception at some point in their reproductive lives, with the average Jordanian woman able to describe nine different contraceptive methods (Cetorelli and Leone 2012).

It is fair to say that by the beginning of the new millennium, knowledge of contraceptive methods among Arab women had become widespread (Cetorelli and Leone 2012). Surveys showed that between 90 and 98 per cent of married Arab women reported knowing about at least one modern method of contraception. Ten years on, a 2010 survey of the 22 Member States of the WHO Eastern Mediterranean Region showed that at least one of seven core components of successful family planning programs (e.g., integrated services and delivery, promotion of family planning, evaluation and monitoring) were available in 94 per cent of the 18 Member States that responded to the survey (Chikvaizde, Madi, and Mahaini 2012). As shown in Table 23.2, more than half of Middle Eastern countries responding to the survey had all seven core components of successful family planning programs in place.

Table 23.2 Number of essential components of successful family planning: 18 countries of the WHO Eastern Mediterranean Region

Countries	No. essential components present (max.=7)
Afghanistan, Egypt, Iran, Iraq, Jordan, Lebanon, Morocco, Pakistan, Qatar, Syrian Arab Republic, Yemen	7
Oman, Palestine, Saudi Arabia, Sudan	6
Bahrain, Somalia	5
United Arab Emirates	3
Djibouti, Kuwait, Libya, Tunisia	NA

Source: Chikvaidze, Madi, and Mahaini (2012)

Despite these national efforts, contraceptive usage among married women aged 15–49 exceeded 40 per cent in only nine Arab nations, and 20 per cent in nine others (Tabutin and Schoumaker 2005). A female 'contraceptive revolution' characterized by rapid adoption of a variety of methods was taking place in only four Arab countries (Tabutin and Schoumaker 2005) – the three North African Arab nations of Algeria, Morocco, and Tunisia, as well as Lebanon, which, by this time, had emerged from 25 years of civil war and occupation. In the most recent survey (in 2010), the authors noted that 'although progress has been made towards improving FP services in many countries of the EMR, the prevalence of use of modern contraceptives remains low' (Chikvaidze, Madi, and Mahaini 2012, p. 912). This was especially true in eight countries (Afghanistan, Djibouti, Iraq, Morocco, Pakistan, Somalia, Sudan, and Yemen), where maternal mortality rates were also 'unacceptably high.'

The Arab fertility decline

In the absence of widespread female contraception, how did the Arab world ultimately achieve the dramatic fertility declines that began in the 1980s? Part of the answer lies in the family planning support offered by Arab husbands – not only of female contraceptive methods, but of male-controlled methods as well. Studies conducted in a variety of Arab countries demonstrated men's strong advocacy of male-controlled birth control – not with condoms, which were shown to be negatively perceived in a variety of Arab countries (Kulczycki 2004), but rather through the time-tested method of *'azl* (withdrawal, or coitus interruptus) (Myntti et al. 2002). *'Azl* has played an important role in the history of Islamic societies (Musallam 1983). Not only does *'azl* receive support within the Islamic scriptures as a viable means of male-enacted contraception, but Arab men tend to prefer withdrawal as a 'safe' method of family planning that is more 'natural' than most female-controlled methods (Myntti et al. 2002).

That men and women together have enacted a reproductive revolution in the Arab world is evident in the numbers. Table 23.3 charts the momentous decline in Arab fertility levels. When TFRs were first recorded in the 1975–1980 period, women in all 17 Arab nations had TFRs far exceeding the world average of 3.85 children per woman at that time. Seven Arab countries – including Algeria, Kuwait, Libya, Oman, Saudi Arabia, Syria, and Yemen – had TFRs greater than 7.0, with the highest recorded TFR of 8.58 in Yemen (United Nations 2018).

Today, only three of these Arab countries – Egypt, Jordan, and Yemen – have TFRs above 3.0, and two others – Iraq and Sudan – above 4.0. In nine Arab countries – including Algeria,

Table 23.3 Decline in Arab fertility levels over 30 years

Country	Population (millions)		Total fertility rate			
	1988	2017	1975–1980	2000–2005	2010–2015	2015–2020
World	5,100	7,550	3.85	2.53	2.45	2.47
Algeria	23.9	41.3	7.18	2.72	2.82	2.65
Bahrain	0.5	1.49	5.23	2.98	2.10	2.00
Egypt	50.3	97.6	5.5	2.98	2.79	3.15
Iraq	17.6	38.3	6.8	4.38	4.06	4.27
Jordan	4.0	9.7	7.38	3.64	3.27	3.26
Kuwait	2.1	4.1	5.89	2.71	2.60	1.97
Lebanon	2.8	6.1	4.23	1.58	1.51	1.7
Libya	4.0	6.4	7.94	2.67	2.38	2.21
Morocco	23.5	35.7	5.90	2.38	2.78	2.42
Oman	1.4	4.6	8.1	2.89	2.91	2.54
Qatar	0.4	2.6	6.11	2.21	2.05	1.88
Saudi Arabia	15.2	32.9	7.28	3.03	2.68	2.48
Sudan	18.9	40.5	6.92	4.83	4.46	4.43
Syria	11.7	18.2	7.32	3.19	3.0	2.84
Tunisia	7.9	11.5	5.69	2.05	2.02	2.15
United Arab Emirates	1.7	9.4	5.66	1.97	1.82	1.73
Yemen	11	28.2	8.58	4.91	4.15	3.84

Sources: United Nations (2012, 2018)

Jordan, Libya, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates, and Yemen – TFRs have declined by nearly four births per woman. For example, an Algerian woman in 1980 would have expected to have more than seven children on average. But an Algerian woman today has only two to three – four to five less than her mother.

Of the world's top 15 fertility declines occurring between 1950 and 2010, seven Arab countries could be counted (United Nations 2012). In each of these countries, fertility levels declined by more than 60 per cent, as shown in Table 23.4, with Libya showing the largest fertility reduction of nearly 70 per cent.

Table 23.4 Arab countries in the top 15 for fertility decline over 60 years

Country	Total fertility rate		Difference	Percentage decline
	1975–1980	2005–2010		
Libya	7.94	2.67	-4.39	69.9
United Arab Emirates	5.66	1.97	-3.69	65.2
Oman	8.10	2.89	-5.21	64.3
Tunisia	5.69	2.05	-3.64	63.9
Qatar	6.11	2.21	-3.90	63.8
Lebanon	4.23	1.58	-2.66	62.8
Algeria	7.18	2.72	-4.45	62.0

Source: United Nations (2012)

What is most impressive about this Arab fertility decline is that it has occurred even in resource-poor Arab nations. As noted by demographers, most Arab countries have fewer resources (i.e., income, education, urbanization, modern contraception) than the 'more developed regions with which their fertility levels currently correspond today' (Eberstadt and Shah 2012, p. 35). Put another way, the Arab world has achieved its reproductive revolution with few preexisting resources or advantages. The decline has occurred largely through human agency – namely, the actions of Arab couples wanting fewer children to love and support.

The Muslim ART revolution

Arab couples have also accepted alternative forms of baby-making. While the world's first test-tube baby, Louise Brown, was born in England exactly 40 years ago (in 1978), it took less than ten years for the Muslim world's first test-tube baby, Heba Mohammed, to be born in Egypt (in 1987) (Inhorn 2003). IVF, the ART used to conceive both of these children, rapidly globalized in the 1990s, subsequently spreading to many parts of the Muslim world. For example, Egypt was the first country to open an IVF clinic in 1986, followed by Saudi Arabia and Jordan. By the mid-1990s, Egypt was experiencing an IVF 'boom period,' with more than 50 IVF clinics eventually opening up in Cairo, Alexandria, and other major cities (Inhorn 2003; Inhorn and Patrizio 2015).

Other Middle Eastern countries soon followed suit. By the mid-2000s, the Middle East boasted one of the largest and most successful IVF industries in the world (Inhorn and Patrizio 2015). As shown in Table 23.5, among the 48 countries performing the most ART cycles per million inhabitants, eight Arab nations could be counted.

This eager uptake of IVF across the Middle East has been due in large part to the permissive attitudes of both Sunni and Shi'a Islamic religious authorities (Inhorn and Tremayne 2012), who have viewed ARTs as biomedical tools to overcome human suffering. In the now rich scholarship on Islam and ARTs in Egypt (Inhorn 2003), Iran (Tremayne 2006; Tremayne and Akhondi 2016), Lebanon (Clarke 2007, 2009; Clarke and Inhorn 2011; Inhorn 2012), and Turkey (Gürtin 2011, 2016), anthropologists have demonstrated how the continuous emergence of new ARTs has led to a concomitant emergence of mostly supportive Islamic bioethical discourses and religious decrees (fatwas) on how these technologies should be used appropriately by Muslim physicians and their patients.

Table 23.5 Middle Eastern countries performing the most ART cycles per capita

<i>Country</i>	<i>Rank in top 48</i>
Lebanon	6
Jordan	8
Tunisia	25
Bahrain	28
Saudi Arabia	31
Egypt	32
Libya	34
United Arab Emirates	35

Source: Adamson (2009)

Islamic support for IVF began with Egypt's early entrance into assisted reproduction (Inhorn 2003; Serour 2008). The Grand Shaykh of Al-Azhar issued the first widely authoritative fatwa on assisted reproduction on March 23, 1980 – only two years after the birth of the first IVF baby in England, but a full six years before the opening of Egypt's first IVF center. Forty years later, this original Al-Azhar fatwa has proved to be quite authoritative and enduring across the Sunni Muslim world. It has been reissued many times in Egypt, and subsequently reaffirmed by fatwa-granting authorities in other parts of the Sunni Muslim world, from Morocco to Saudi Arabia to Malaysia.

In general terms, the Sunni Islamic religious authorities have been very permissive in granting use of ARTs to Muslim IVF physicians and their patients. The Sunni *fatwas* on ARTs have deemed the following techniques *halal*, or religiously permissible:

- (1) Artificial insemination with a husband's sperm;
- (2) In vitro fertilization of an egg from a wife with the sperm of her husband;
- (3) Intracytoplasmic sperm injection (ICSI), in which the sperm of a husband is injected into the egg of his wife;
- (4) Cryopreservation, or freezing, of any excess embryos, as well as sperm and eggs to be used later by a married couple;
- (5) Post-menopausal pregnancy using a wife's own cryopreserved embryos or oocytes, in combination with the sperm of her husband;
- (6) Preimplantation genetic diagnosis for couples at high risk of genetic disorders in their offspring, or for couples with children of only one sex, who wish to pursue gender selection for the purposes of family balancing;
- (7) Multifetal pregnancy reduction, a form of selective abortion, which eliminates one or more fetuses in a high-risk IVF pregnancy with triplets, quadruplets, or beyond. In general, Islam is permissive when it comes to therapeutic abortion, especially when preventing harm or loss of life of either the mother or remaining fetuses;
- (8) Embryo research on excess embryos that are donated by couples for the advancement of scientific knowledge and the benefit of humanity; and
- (9) Uterine transplantation, a newly emergent technique in which a healthy uterus is transplanted from a willing donor to another woman who is lacking a competent uterus. Initially tried in Saudi Arabia, the goal of this procedure is to achieve a successful IVF pregnancy in the transplanted uterus (Fageeh et al. 2002).

This clearly represents a substantial list of permissions, thereby fueling the development of a robust IVF industry across the Sunni Muslim world, which constitutes about 90 per cent of the world's Muslims, including in the Middle Eastern region (Inhorn and Tremayne 2012). However, Sunni religious authorities have not condoned every possible ART practice. The list of ART restrictions is equally long, with the following techniques considered *haram*, or religiously forbidden:

- (1) Third-party donors are not allowed, whether they are providing donor sperm, eggs, embryos, or uteruses, as in surrogacy. Even with no physical touch or gaze, the use of a third party is considered tantamount to *zinā* (illicit intercourse, adultery).
- (2) Similarly, all forms of surrogacy are strictly forbidden.
- (3) A donor or surrogate child conceived through any of these illegitimate forms of assisted reproduction cannot be made legitimate through adoption. The child who results from

a forbidden method belongs to the mother and is considered to be a *walad al-zinā*, or an illegitimate child.

- (4) Assisted reproduction cannot be performed on an ex-wife or widow using sperm from a divorced or dead husband (i.e., posthumous reproduction).
- (5) Sperm banks for the purposes of sperm donation are forbidden. Sperm may only be used when cryopreserved before cancer treatment and then employed later in life by that same individual.
- (6) Genetic alteration of embryos for the purpose of trait selection (i.e., 'designer babies') is forbidden. However, in the future, gene therapy may be approved to remediate inherited genetic diseases and pathological conditions.
- (7) Human reproductive cloning for the creation of a cloned child – who would theoretically be the genetic twin of the cloning parent – is forbidden.

This is a long list, but it clearly summarizes which technologies are *haram*, or forbidden in Sunni Islam. Most important from a clinical perspective, all forms of third-party reproductive assistance are *haram*, including sperm donation, egg donation, embryo donation, and surrogacy. As noted by Islamic legal scholar Ebrahim Moosa (2003),

In terms of ethics, Muslim authorities consider the transmission of reproductive material between persons who are not legally married to be a major violation of Islamic law. This sensitivity stems from the fact that Islamic law has a strict taboo on sexual relations outside wedlock (*zinā*). The taboo is designed to protect paternity (i.e., family), which is designated as one of the five goals of Islamic law, the others being the protection of religion, life, property, and reason.

(p. 23)

With regard to the first issue, Islam is a religion that can be said to privilege – even mandate – heterosexual marital relations. As is made clear in the original Al-Azhar *fatwa*, reproduction outside of marriage is considered *zinā*, or adultery, which is strictly forbidden in Islam. Although third-party donation does not involve the sexual body contact ('touch or gaze') of adulterous relations, nor presumably the desire to engage in an extramarital affair, it is nonetheless considered by most Islamic religious scholars to be a form of adultery, by virtue of introducing a third party into the sacred dyad of husband and wife. It is the very fact that another man's sperm or another woman's eggs enter a place where they do not belong that makes donation of any kind inherently wrong and threatening to the marital bond.

The second aspect of third-party donation that troubles marriage is the potential for incest among the offspring of anonymous donors. If an anonymous sperm donor, for example, 'fathers' hundreds of children, the children could grow up, unwittingly meet each other, fall in love, and marry. The same could be true for the children of anonymous egg donors. Thus, moral concerns have been raised about the potential for incest to occur among donor children who are biological half-siblings.

The final moral concern is that third-party donation confuses issues of kinship, descent, and inheritance. As with marriage, Islam is a religion that can be said to privilege – even mandate – biological inheritance. Preserving the *nasab*, or genealogical 'origins' of each child, meaning his or her relationships to a known biological mother and father, is considered not only an ideal in Islam, but a moral imperative. The problem with third-party donation, therefore, is that it destroys a child's *nasab* and violates the child's legal rights to known parentage, which is considered immoral, cruel, and unjust.

Sunni Muslim IVF patients use the term ‘mixture of relations’ to describe this untoward outcome. Such a mixture of relations, or the literal confusion of lines of descent introduced by third-party donation, is described as being very ‘dangerous,’ ‘forbidden,’ ‘against nature,’ ‘against God’ – in a word, *haram*, or morally unacceptable. It is argued that donation, by allowing a ‘stranger to enter the family,’ confuses lines of descent. For men in particular, ensuring paternity and the ‘purity’ of lineage through ‘known fathers’ is of paramount concern. This is because virtually all Muslim societies are organized patrilineally – that is, descent and inheritance are traced through fathers and the ‘fathers of fathers’ through many generations. Thus, knowing paternity is of critical concern (Clarke 2009).

Accordingly, at the ninth Islamic law and medicine conference, held under the auspices of the Kuwait-based Islamic Organization for Medical Sciences (IOMS) in Casablanca, Morocco, a landmark five-point declaration included recommendations to prohibit all situations in which a third party invades a marital relationship through donation of reproductive material (Moosa 2003). Such a ban on third-party reproductive assistance is effectively in place in the Sunni-dominant countries. Not a single Sunni Muslim-majority country in the Middle East allows third-party gamete or embryo donation or surrogacy. Couples who need these technologies are often told firmly that third-party donation is ‘against the religion,’ or they are encouraged to travel outside the Middle Eastern region to pursue these forms of third-party reproductive assistance (Inhorn 2015).

However, in the 1990s, Shi‘a clerics in Iran began supporting third-party reproductive assistance, particularly egg donation, but sometimes also sperm donation (Tremayne 2006, 2009, 2015; Tremayne and Akhondi 2016). Indeed, most leading Shi‘a clerics have allowed third-party reproductive assistance over the past 20 years. This includes the supreme leader of the Islamic Republic of Iran, Ayatollah Ali al-Husseini al-Khamene‘i, the hand-picked successor to Iran’s Ayatollah Khomeini, who issued an authoritative *fatwa* effectively permitting both egg and sperm donation to be used (Tremayne and Akhondi 2016). Ayatollah Khamene‘i’s *fatwa* justified these donor technologies as a ‘marriage saviour,’ preventing the ‘marital and psychological disputes’ that would otherwise arise from remaining childless indefinitely.

Indeed, these Shi‘a *fatwas* have led to what some scholars have described as an ‘Iranian ART revolution’ (Abbasi-Shavazi et al. 2008). Since the new millennium, all forms of sperm donation, egg donation, embryo donation, and gestational surrogacy are taking place in Iran. Iran is also leading the way into a Middle Eastern stem cell industry (Saniei 2012). This ‘millennial moment’ in Iran has also had a major impact in Shi‘a-dominant Lebanon (Clarke 2007, 2009; Clarke and Inhorn 2011; Inhorn 2012). By 2003, one of the major Shi‘a-serving IVF clinics in Beirut had developed a full-fledged egg donation program, and had begun to cater to so-called ‘reproductive tourists’ coming from other parts of the Sunni-dominant Middle East. Soon, other IVF clinics in Lebanon began providing egg donation services, as market demand increased among both Shi‘a and Sunni Muslims, as well as Middle Eastern Christian couples (Inhorn 2012). Indeed, it is fair to say that the development of third-party reproductive assistance programs in both Iran and Lebanon has weakened the regional Sunni Muslim ban on donor technologies, as infertile Sunni Muslim couples increasingly turn to other countries to solve their infertility problems through the use of third-party donors (Inhorn and Tremayne 2012, 2016).

ARTs and Muslim women’s lives

These divergent stances of Sunni and Shi‘a religious authorities toward ARTs and third-party reproductive assistance have had significant gender effects, impacting the lives of

Muslim women in various ways. The religiously supported emergence of a variety of ARTs in both Sunni- and Shi'a-dominant Middle Eastern countries has created new hope for infertile couples, encouraging them to pursue these technologies in their quests for conception (Inhorn 1994). Overall, increasing access to ARTs across the Middle East appears to be changing gender relations in several positive ways through: 1) increased knowledge of both male and female infertility among the general population; 2) normalization of both male and female infertility problems as medical conditions that can be overcome; 3) decreased stigma, blame, and social suffering for both men and women, and particularly women, who bear the major social burden of infertility when they do not become pregnant; 4) increased marital commitment as husbands and wives seek ART services together; and 5) increased male adoption of ARTs, especially for male infertility problems, which are involved in at least 60 per cent of all cases of childlessness in the Middle Eastern region (Inhorn 2012). In other words, the coming of ARTs to the Middle East has had major, salutary impacts on marriage and on gender relations more generally (Inhorn 2003, 2012). As infertile Middle Eastern couples remain together in their searches for ARTs, the demand for these services also grows, fueling the continual expansion of the Middle Eastern IVF sector.

Having said that, some ART gender effects have impacted the lives of Middle Eastern women in either ambiguous or in clearly negative ways. First, the success rates of IVF and other ARTs continue to be low (e.g., 20–40 per cent), leading to endless rounds of fruitless repetition for many couples. For women, IVF involves a physically grueling procedure, as it is highly dependent upon the complicated hormonal stimulation and extraction of healthy oocytes (i.e., eggs) from women's bodies. Unfortunately, women's fertility is highly age sensitive, with oocyte quality diminishing at later stages of the reproductive lifecycle (i.e., slightly at age 32, but significantly at age 37). Thus, older women may 'age out' of IVF, causing highly gendered, life-course disruptions surrounding women's 'biological clocks.' Sunni Muslim women whose egg quality has declined irrevocably are not allowed to use donor eggs, effectively ending any possibility of biological motherhood and increasing their risk of marital dissolution.

Given this potentiality, egg donation has been cast as a 'marriage saviour' in Shi'a bio-ethical discourses, with the majority of Shi'a jurists now allowing the practice. For infertile women who receive a donated egg, the fact that they can gestate, give birth to, and breastfeed the egg-donor child creates the bonds of *rida'* or milk kinship (Al-Torki 1980; Khatib-Chahidi 1992). Thus, husbands sympathetic to their wives' infertility problems may become active participants in obtaining donor eggs, sometimes engaging in *mut'a*, or temporary marriages (Haeri 2002), in order to undertake egg donation within the remit of a temporary polygynous marriage (Inhorn 2012). This use of temporary marriage as a way to make egg donation morally permissible is a creative Shi'a solution to the challenges posed by third-party reproductive assistance within an Islamic framework (Tremayne and Akhondi 2016).

Perhaps not surprisingly, many infertile Shi'a Muslim couples prefer to use their close relatives, especially same-sex siblings, for egg donation, as well as gestational surrogacy. Thus, sisters donate their eggs or uteruses (via surrogacy) to their infertile sisters and sisters-in-law. But, if a sister donates her eggs to her brother's infertile wife, the child so produced would be the biological offspring of the actual brother and sister – a form of biological incest not only in Islamic societies, but in most if not all societies around the world. Furthermore, under Islamic law, this kind of intrafamilial donation may lead to peculiar forms of relatedness and the possibility of committing incest or adultery according to the Islamic laws governing association between the sexes (Tremayne and Akhondi 2016). Increasingly,

intrafamilial egg donation and gestational surrogacy are leading to bioethical conundrums (i.e., biological incest) and social repercussions for women. For example, once a donor-egg or surrogate child is born, the infertile woman may be asked to relinquish the child to other family members who decide to stake their biological claims. Such difficult cases have increased over time in Iranian ART clinics, leading to virulent family disputes that are not easy to resolve (Tremayne 2018). As a result, legislation is currently being drafted in Iran to make all third-party reproductive assistance strictly anonymous, thereby avoiding the complexities of ‘known’ donation between family members (Tremayne 2018).

With or without third-party reproductive assistance, infertile Middle Eastern women’s lives can be affected for better or for worse, depending upon a woman’s particular circumstances, her religious affiliation, and the supportiveness of her husband and other family members. Access to ARTs can be a great boon to infertile Middle Eastern women when they become mothers of IVF offspring (Inhorn 2003, 2015). But as described above, ARTs can also produce profound difficulties, disappointments, and bioethical conundrums for Middle Eastern women and for societies as a whole.

For example, one of the most disturbing bioethical consequences of ARTs that is now beginning to be seen across the Middle East is the emergence of so-called ‘gender selection’ (Inhorn 2018). Although son preference and daughter discrimination are anathema in Islam – with the Prophet Muhammad explicitly forbidding the pre-Islamic practice of female infanticide – the emergence of ARTs, particularly preimplantation genetic diagnosis (PGD), is leading to a new form of female ‘embryocide’ in the Muslim world. Namely, in some Middle Eastern IVF clinics, couples who want sons, especially after the birth of only daughters, are using IVF with PGD to perform sex selection, culling IVF-created female embryos in an attempt to produce male-only progeny (Inhorn 2015, 2018; Serour 2008). Furthermore, new forms of ‘feticide’ are also occurring in many Middle Eastern IVF clinics, through selective abortion of fetuses in high-order multiple pregnancies (i.e., triplets and beyond), when too many embryos are returned to a woman’s uterus during an IVF cycle (Inhorn 2015; Serour 2008).

Like the ART-abetted forms of biological incest occurring in Iran, these ‘selective’ reproductive practices of embryo and fetal ‘culling,’ especially of female embryos, are deeply disturbing (Wahlberg and Gammeltoft 2018). However, these are part of the ‘bioethical aftermath’ of ARTs in the Muslim Middle East, a world where the widespread acceptance and use of ARTs has not been entirely unambiguous (Inhorn and Tremayne 2016). Indeed, the emergence of ARTs has led to a bioethical ‘slippery slope,’ where technologies intended for one use may morph into another, as shown in the case of PGD-assisted sex selection, which may be leading to new instantiations of son preference and daughter discrimination, as well as irremediable alterations in male-to-female sex ratios (Inhorn 2018).

Conclusion

As in any revolution, future outcomes are never entirely clear. At the present time, the introduction of ever newer reproductive technologies to the Muslim world is bringing with it both hope and trepidation. Nonetheless, it is fair to say that overall, the introduction of both contraceptive technologies and ARTs has been a great boon to the Muslim world, and especially to Muslim women.

As shown in this chapter, massive fertility declines have been facilitated by family planning programs and the influx of female contraceptive technologies into the region. But ‘human factors’ have also been important, including support from male religious leaders and the reproductive behaviour of Muslim couples themselves, not only wives, but also husbands. Today across

the Arab world, women are using a variety of female contraceptives to plan their smaller families. This family planning revolution has clearly been effective. Today, most Arab nations are close to achieving 'replacement fertility' – or two children for every two parents.

This dramatic decline in fertility is not the only reproductive revolution taking place across the region. Over the past three decades, the Muslim Middle East, both the Sunni- and Shi'a-dominant nations, has also seen the growth of one of the largest ART sectors in the world. Infertility treatment via ARTs has been encouraged by both Islamic authorities and has been supported by Muslim men, who have embraced ART-assisted family building with the wives they love. Increasing access to ARTs across the region has led to the births of thousands of Muslim IVF babies in countries such as Egypt (Inhorn 2003), Lebanon (Inhorn 2012), the United Arab Emirates (Inhorn 2015), and many other nations in the Muslim world (Inhorn and Patrizio 2015).

In other words, not all 'revolutions' in the Muslim world are political. As shown in this chapter, across the Muslim Middle East, two reproductive revolutions have quietly taken place, and forever more, have changed the lives of Muslim women.

Further reading

- Ali, Kamran Asdar. 2002. *Planning the Family in Egypt: New Bodies, New Selves*. Austin, TX: University of Texas Press. This critical study examines the ways in which Egyptian family planning programs, heavily influenced by Western agencies and funding, attempt to shape local practices of contraception and family building. Ethnographic vignettes focus on experiences of Egyptian men, women, and midwives as they attempt to respond to family planning discourses and demands.
- Eberstadt, Nicholas, and Apoorva Shah. 2012. 'Fertility Decline in the Muslim World: A Demographic Sea Change Goes Largely Unnoticed.' *Policy Review* 173: 29–44. This article is the first to clearly address the rapid decline in fertility levels across the Muslim world. It characterizes this fertility decline as a 'quiet revolution ... hiding in plain sight.' The article also looks to the future, addressing the policy implications of significantly lower fertility levels across the region.
- Hopkins, Nicholas, ed. 2004. *The New Arab Family*. Cairo: American University in Cairo Press. This edited volume showcases the work of anthropologists, demographers, psychologists, and sociologists, who explore new configurations of family life across the Arab world. With a focus on Egypt, chapters examine emerging patterns of marriage, divorce, and reproduction, focusing on how individuals attempt to renegotiate their relationships to larger familial and social structures.
- Inhorn, Marcia C., and Soraya Tremayne, eds. 2012. *Islam and Assisted Reproductive Technologies: Sunni and Shia Perspectives*. New York: Berghahn. This edited volume highlights the development of burgeoning IVF and ART sectors across the Muslim Middle East. Designed to overcome the problem of infertility, these technologies are now practiced in radically different ways in Sunni- versus Shi'a-majority Muslim countries, for reasons that are explored in depth by anthropologists, historians, and legal scholars in this volume.
- Kanaaneh, Rhoda Ann. 2002. *Birthing the Nation: Strategies of Palestinian Women in Israel*. Berkeley, CA: University of California Press. This ethnographic study focuses on the reproductive aspirations of middle-class Palestinian couples in the Galilee, who now opt for 'quality' over 'quantity' of children. This study of Palestinian family life is set against a backdrop of demographic contestation, where relative 'strength in numbers' matters to both Israeli and Palestinian nation building.

References

- Abbasi-Shavazi, Mohammad Jalal, Marcia C. Inhorn, Hajjeh Bibi Razeghi-Nasrabad, and Ghasem Toloo. 2008. "'The Iranian ART Revolution': Infertility, Assisted Reproductive Technology, and Third-Party Donation in the Islamic Republic of Iran.' *Journal of Middle East Women's Studies* 4: 1–28.
- Adamson, G. David. 2009. 'Global Cultural and Socioeconomic Factors that Influence Access to Assisted Reproductive Technologies.' *Women's Health* 5: 351–358.
- Al-Azhar Islamic Research Academy, Fatwa Committee. 1988. 'Al-Azhar Fatwa Committee's Points of View on Birth Planning.' *Population Science* 8: 15–17.

- Ali, Kamran Asdar. 2002. *Planning the Egyptian Family: New Bodies, New Selves*. Austin, TX: University of Texas Press.
- Al-Torki, Soraya. 1980. 'Milk Kinship in Arabic Society: An Unexplored Problem in the Ethnography of Marriage.' *Ethnology* 19: 233–244.
- Bier, Laura. 2008. 'From Birth Control to Family Planning: Population, Gender, and the Politics of Reproduction in Egypt.' In *Family in the Middle East: Ideational Change in Egypt, Iran, and Tunisia*, edited by Kathryn M. Yount and Hoda Rashad, pp. 55–79. London and New York: Routledge.
- Cetorelli, Valeria, and Tiziana Leone. 2012. 'Is Fertility Stalling in Jordan?' *Demographic Research* 26: 293–318.
- Chikvaizde, P., H.H. Madi, and R.K. Mahaini. 2012. 'Mapping Family Planning Policy and Programme Best Practices in the WHO Eastern Mediterranean Region: A Step towards Coordinated Scale-up.' *Eastern Mediterranean Health Journal* 18: 1–9.
- Clarke, Morgan. 2007. 'Children of the Revolution: 'Ali Khamenei's 'Liberal' Views on in Vitro Fertilization.' *British Journal of Middle Eastern Studies* 34: 287–303.
- Clarke, Morgan. 2009. *Islam and New Kinship: Reproductive Technologies and the Shariah in Lebanon*. New York and Oxford: Berghahn.
- Clarke, Morgan, and Marcia C. Inhorn. 2011. 'Mutuality and Immediacy between *Marja'* and *Muqallid*: Evidence from Male IVF Patients in Shi'i Lebanon.' *International Journal of Middle East Studies* 43: 409–427.
- Courbage, Youssef. 1999. 'Economic and Political Issues of Fertility Transition in the Arab World—Answers and Open Questions.' *Population and Environment: A Journal of Interdisciplinary Studies* 20: 353–379.
- Eberstadt, Nicholas, and Apoorva Shah. 2012. 'Fertility Decline in the Muslim World: A Demographic Sea Change Goes Largely Unnoticed.' *Policy Review* 173: 29–44.
- Fageeh, Wafa, Hassan Raffa, Hussain Jabbad, and A. Marzouki. 2002. 'Transplantation of the Human Uterus.' *International Journal of Gynecology & Obstetrics* 76: 245–251.
- Faour, Muhammad. 1989. 'Fertility Policy and Family Planning in the Arab Countries.' *Studies in Family Planning* 20: 254–263.
- Gürtin, Zeynep B. 2011. 'Banning Reproductive Travel: Turkey's ART Legislation and Third-Party Assisted Reproduction.' *Reproductive BioMedicine Online* 23: 555–564.
- Gürtin, Zeynep B. 2016. 'Patriarchal Pronatalism: Islam, Secularism and the Conjugal Confines of Turkey's IVF Boom.' *Reproductive BioMedicine & Society Online* 2: 39–46.
- Haeri, Shahla. 2002. *Law of Desire: Temporary Marriage in Shi'i Iran*. Syracuse, NY: Syracuse University Press.
- Hopkins, Nicholas S., ed. 2004. *The New Arab Family*. Cairo: American University Press.
- Inhorn, Marcia C. 1994. *Quest for Conception: Gender, Infertility, and Egyptian Medical Traditions*. Philadelphia, PA: University of Pennsylvania Press.
- Inhorn, Marcia C. 1996. *Infertility and Patriarchy: The Cultural Politics of Gender and Family Life in Egypt*. Philadelphia, PA: University of Pennsylvania Press.
- Inhorn, Marcia C. 2003. *Local Babies, Global Science: Gender, Religion, and in Vitro Fertilization in Egypt*. New York: Routledge.
- Inhorn, Marcia C. 2012. *The New Arab Man: Emergent Masculinities, Technologies, and Islam in the Middle East*. Princeton, NJ: Princeton University Press.
- Inhorn, Marcia C. 2015. *Cosmopolitan Conceptions: IVF Sojourns in Global Dubai*. Durham, NC: Duke University Press.
- Inhorn, Marcia C. 2018. 'Fertility Decline, Small Families, and Son Selection in the Muslim World: The Controversial Convergence of Contraceptive and Reproductive Technologies.' Paper presented at 'Family Structure in the Wake of Genetic and Reproductive Technologies,' Georgetown University in Qatar, October 7.
- Inhorn, Marcia C., and Pasquale Patrizio. 2015. 'Infertility around the Globe: New Thinking on Gender, Reproductive Technologies, and Global Movements in the 21st Century.' *Human Reproduction Update* 21: 411–426.
- Inhorn, Marcia C., and Soraya Tremayne, eds. 2012. *Islam and Assisted Reproductive Technologies: Sunni and Shia Perspectives*. New York: Berghahn.
- Inhorn, Marcia C., and Soraya Tremayne. 2016. 'Islam, Assisted Reproduction, and the Bioethical Aftermath.' *Journal of Religion and Health* 55: 422–430.

- Johnson-Hanks, Jennifer. 2006. 'On the Politics and Practice of Muslim Fertility.' *Medical Anthropology Quarterly* 20: 12–30.
- Khatib-Chahidi, Jane. 1992. 'Milk Kinship in Shi'ite Islamic Iran.' In *The Anthropology of Breastfeeding: Natural Law or Social Construct*, edited by Vanessa Maher, pp. 109–132. Oxford: Berg.
- Kulczycki, Andrej. 2004. 'The Sociocultural Context of Condom Use within Marriage in Rural Lebanon.' *Studies in Family Planning* 35: 246–260.
- Lapham, Robert J. 1972. 'Population Policies in the Maghrib.' *Middle East Journal* 26: 1–10.
- Lapham, Robert J., and W. Parker Mauldin. 1985. 'Contraceptive Prevalence: The Influence of Organized Family Planning Programs.' *Studies in Family Planning* 16: 117–137.
- Mitchell, Tim. 1991. 'America's Egypt: Discourse of the Development Industry.' *Middle East Report* 21: 18–36.
- Mitchell, Tim. 2002. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley, CA: University of California Press.
- Moosa, Ebrahim. 2003. 'Human Cloning in Muslim Ethics.' *Voices across Boundaries* Fall: 23–26.
- Musallam, Basim F. 1983. *Sex and Society in Islam: Birth Control before the Nineteenth Century*. Cambridge, UK: Cambridge University Press.
- Myntti, Cynthia, Abir Ballan, Omar Dewachi, Faysal El-Kak, and Mary E. Deeb. 2002. 'Challenging the Stereotypes: Men, Withdrawal, and Reproductive Health in Lebanon.' *Contraception* 65: 165–170.
- Saniei, Mansooreh. 2012. 'Human Embryonic Stem Cell Research in Iran: The Significance of the Islamic Context.' In *Islam and Assisted Reproductive Technologies: Sunni and Shia Perspectives*, edited by Marcia C. Inhorn and Soraya Tremayne, pp. 194–217. New York: Berghahn.
- Serour, Gamal I. 2008. 'Islamic Perspectives in Human Reproduction.' *Reproductive BioMedicine Online* 17: 34–38.
- Stycos, J. Mayone, and Hussein Abdel Aziz Sayed. 1988. *Community Development and Family Planning: An Egyptian Experiment*. Boulder, CO: Westview Press.
- Tabutin, Dominique, and Bruno Schoumaker. 2005. 'The Demography of the Arab World and the Middle East from the 1950s to the 2000s.' *Population* 60: 505–615.
- Tremayne, Soraya. 2006. 'Not All Muslims Are Luddites.' *Anthropology Today* 22: 1–2.
- Tremayne, Soraya. 2009. 'Law, Ethics and Donor Technologies in Shia Iran.' In *Assisting Reproduction, Testing Genes: Global Encounters with the New Biotechnologies*, edited by Daphna Birenbaum-Carmeli and Marcia C. Inhorn, pp. 144–164. New York: Berghahn.
- Tremayne, Soraya. 2015. 'Whither Kinship: Assisted Reproductive Technologies and Relatedness in Iran.' In *Assisted Reproductive Technologies in the Third Phase: Global Encounters and Emerging Moral Worlds*, edited by Kate Hampshire and Bob Simpson, pp. 69–82. New York: Berghahn.
- Tremayne, Soraya. 2018. 'Third Party Gamete Donation in Iran: The Shift from "All in the Family" to "Going It Alone".' Paper presented at 'Family Structure in the Wake of Genetic and Reproductive Technologies,' Georgetown University in Qatar, October 7.
- Tremayne, Soraya, and Mohammad Mehdi Akhondi. 2016. 'Conceiving IVF in Iran.' *Reproductive Biomedicine & Society Online* 2: 62–70.
- United Nations. 1986. *World Population Prospects: Estimates and Projections as Assessed in 1984*. New York: United Nations.
- United Nations. 1987. *World Population Trends and Policies: 1987 Monitoring Report*. New York: United Nations.
- United Nations. 2012. *World Population Prospects: The 2012 Revision*. New York: United Nations.
- United Nations. 2018. *World Population Prospects: The 2017 Revision*. New York: United Nations.
- Wahlberg, Ayo, and Tine Gammeltoft, eds. 2018. *Selective Reproduction in the 21st Century*. London: Palgrave Macmillan.