

## REVIEW ARTICLE

# Assisted reproductive technology: Islamic Sunni perspective

HASSAN CHAMSI-PASHA<sup>1</sup> & MOHAMMED ALI ALBAR<sup>2</sup>

<sup>1</sup>Department of Cardiology, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia and <sup>2</sup>Department of Medical Ethics, International Medical Center, Jeddah, Saudi Arabia

### Abstract

**Background:** Islam acknowledges that infertility is a significant hardship. Attempts to cure infertility are not only permissible, but also encouraged in Islam. Over the last three decades, a multitude of advances in assisted reproductive technologies (ARTs) have appeared. This review was carried out to inform readers, who are not familiar with Islamic doctrine, about the Sunni perspective on this topic. **Study design:** Systematic review of the literature. **Method:** A series of searches was conducted of Medline databases published in English between January 1978 and December 2013 with the following Keywords: assisted reproduction, infertility, gender selection, ethics, bioethics, and Islam. **Results:** In Islamic Sunni law, all ARTs are allowed, provided that the source of the sperm, ovum, and uterus comes from a legally married couple during the span of their marriage. All forms of surrogacy are forbidden. A third-party donor is not allowed, whether he or she is providing sperm, eggs, embryos, or a uterus. Frozen preimplantation may be transferred to the wife in a successive cycle provided the marital bondage is not absolved by death or divorce. Gender selection for medical reasons is permitted. It is allowed for limited social reasons by some jurists, provided it does not involve discrimination against either sex. **Conclusions:** ART is acceptable and commendable in Islamic Sunni law provided it is practiced within the husband and wife dyad during the span of their marital contract. No third party should intrude upon the marital function of procreation. Surrogacy is not accepted by Sunni Islamic authorities.

**Keywords:** assisted reproduction, infertility, gender selection, ethics, bioethics, islam

### Introduction

Infertility is defined as the inability of a couple to conceive after 1 year of regular, unprotected intercourse. It is estimated that 10–15% of couples suffer from infertility, and it is quite appropriate to evaluate a couple for infertility after 1 year of trying to conceive (McLaren, 2012). There are 70–80 million couples suffering from infertility, mostly in developing countries (Boivin et al., 2007).

Childlessness affects women and men almost equally (Wischmann, 2013). In most Islamic societies, women may suffer the allegation that they are the cause of infertility and may even get divorced because of such allegations. The psychological impact of infertility cannot be underestimated, and should always be considered by health care services involved with assisted reproduction (Denton et al., 2013).

Since the birth of the first successful test-tube baby in 1978, a multitude of advances in assisted reproductive technology (ART) have appeared, refining earlier technologies (Rodini, 2012). ART is responsible for the birth of around 240,000 babies each year worldwide (Alaro, 2012).

Islam acknowledges that infertility is a significant hardship and Muslims are allowed, and even encouraged to seek, lawful cure of any form of illness or disorder they may have. If ART is indicated in a couple as a necessary line of treatment, it is permitted and even encouraged as it preserves humankind (Serour, 2013). This article gives a brief overview of Islamic law's perspective on issues relating to ARTs.

### Assisted reproductive technology

Currently, ART is utilized for various conditions. First is the use of ART as an aid to infertile couples. Second, it is used to enable women without a male partner to have children using sperm provided by a donor. Assisted reproduction is also used for gender selection of babies by fertile couples. Finally, it is employed to avoid genetic and chromosomal diseases by pre-implantation diagnosis (PGD) (Alaro, 2012).

Pregnancy outcomes after ART treatment are not generally as favorable as those for spontaneous conceptions. Iatrogenic multiple pregnancy is responsible for

an appreciable proportion of this increased risk. Multiple embryos are usually returned to increase the likelihood of a successful pregnancy. As a consequence, the total miscarriage and stillbirth rates are higher than in the general population (Davies, 2013).

Women undergoing in vitro fertilization (IVF) with multiple embryo transfers face an increased risk of twins and triplets. The social and economic consequences of multiple pregnancies are significant, as are risks to the mother and baby. A single embryo transfer may minimize the risk of multiples but the pregnancy and live birth rate may be lower (Pandian et al., 2004). Multifetal pregnancy, particularly high-order multiple pregnancy, should be prevented in the first place because of its associated fetal and maternal complications, increased cost (Serour, 2008), and the need for fetal reduction which involves the destruction of viable embryos. The International Islamic Fiqh Academy of Organization of Islamic Conference (OIC-IFA) recommended fertilizing the required number of ova only and replacing them. However, if spontaneous multiple pregnancies which pose a threat to the pregnancy or to the mother occur, then fetal reduction would be considered. (Decision No 6/6/57 of 30th of March 1990).

### Islamic views of ART

The teachings of the Quran (the holy book of all Muslims) emphasize the vital role of the institution of marriage and the family structure. Inseparable from this is the act of procreation. To this effect the Quran says “And God has given you wives of your own kind, and has given you, from your wives, sons and grandsons, and has made provisions of good things for you. Is it then in vanity that they believe and in the grace of God that they disbelieve?” (Quran 16:72).

There are a few case scenarios depicted in the Quran which helps us gain proper insight into the problem of infertility. The first illustrates the story of Prophet Abraham (May God give him His blessing) and his wife Sara as revealed in the Quran: “...And they (angels) gave him (Abraham) glad tidings of a son endowed with knowledge. But his wife came forward clamoring, she smote her face and said; “A barren old woman!” They said, “Even so has thy Lord spoken and He is full of wisdom and knowledge.” (Quran 51: 28–30). The aged Sara had willingly resigned to her destiny of being infertile but yet continued to be firm in her faith and true to her husband and she offered Hajar to Ibrahim, so as to enable him to have children. She was ultimately blessed with a child, Ishaq.

As with the example of Prophet Abraham, Prophet Zakaria remained faithful and supportive of his infertile wife. The Holy Quran attests to the curability of infertility when it states: “And (remember) Zakaria, when he cried to his Lord: “O my Lord! Leave me not without offspring, though You are the best of inheritors. So We answered his call, and We granted him Yahya (his son).

We cured his wife’s (infertility) for him” (Quran 21: 89–90).

Islamic bioethics refers to Islamic views on issues related to both the medical and research fields. Islamic bioethics is an extension of Shari’ah (Islamic law), which is based on 2 foundations: The Quran and the Sunna (the aspects of Islamic law based on the Prophet Muhammad’s words or acts). The fundamental basis of Islamic bioethics is that all rulings and actions must fall in accordance with Islamic law (Shari’ah). Development of Shari’ah in the Sunni branch of Islam over the ages has also required ijmaa (consensus of all competent jurists after the death of the prophet) and qiyas (analogy) using the human reason when no clear rule is found in the Quran or Sunna (Chamsi-Pasha & Albar, 2013).

Adoption is not an acceptable alternative in Islam. Attempts to cure infertility are not only permissible in Islam, but also encouraged. The duty of the physician is to help a barren couple achieve successful fertilization, conception, and delivery of a baby (Schenker, 2005).

ART is Islamically permissible provided it involves a married couple and both the sperm and the eggs come from this couple within the context of a valid marriage (Fadel, 2007). According to Islam, a man’s infertility should be accepted if it is beyond cure. Assisted reproduction became widely accepted in the Islamic world after establishing clear guidelines issued by prestigious religious organizations, which were adopted by concerned authorities in different Muslim countries. These guidelines included a Fatwa from Dar El Iftaa, Cairo (1980) and a Fatwa from the Islamic Fiqh Council, Makkah (1984), the Islamic Organization for Medical Sciences in Kuwait (1983), the Fatwa of the OIC-IFA in 1986, and the International Islamic Centre for Population Studies and Research, al-Azhar University. These guidelines are followed by most Muslims (Serour, 2008).

Islamic law frowns on any use of ART with no medical justification. Self-imposed single motherhood or fatherhood, as with lesbians or gays longing for children, is a sharp negation of Islamic law provisions.

Finally, no more than the appropriate number of fertilized eggs should be transferred to the uterus (Fadel, 2002). It is common to transfer only two to three fertilized eggs, although usually more fertilized eggs are produced. Many centers transfer only one or two fertilized eggs.

Freezing the remaining fertilized ova is permissible by many scholars on one condition, that they are used in subsequent cycles for the same couple within the span of their marriage.

### Cryopreservation and the use of preserved sperm

In medical terms, “cryopreservation” is the freezing and storage of gametes, zygotes, or preimplantation embryos (Ahmad, 2003). Essentially, cryopreservation is used for two purposes. First, in patients affected by

a disease where treatment from the disease may result in infertility. The sperm is then processed and kept, to be used at a later date, to fertilize the ovum from his wife. Second, the use of ART techniques often leads to the availability of extra preimplantation embryos (blastula before implantation) that are not transferred into the uterus of the mother. Cryopreservation or freezing techniques enable the storage of a pre-embryo for up to a few years after which it can be thawed and returned to the uterus of the same woman whenever the couple decide to have a child. Freezing the pre-embryos would avoid repeating the drug stimulation regime, and spare the side effects of these drugs (Ahmad, 2003).

In general, cryopreservation is permissible by many Islamic Sunni scholars, but they have expressed their caution that the frozen embryos belong only to the couple who produced them. Frozen embryos may be transferred only to the same wife in a successive cycle during the span of their marriage. Storing the husband's sperm for impregnating his wife after his death is illegal, since death terminates the marriage contract. The cryopreserved sperm or pre-embryo of an ex-husband in case of a divorce should not be used either, as divorce equally renders the union void, legally (Alaro, 2012). The scholars who allow sperm freezing also permit freezing of ova and pre-embryos.

Cryopreservation of gametes or gonads before exposure to radiotherapy or chemotherapy or for other medical reasons is allowed. These gametes or gonads can be used for conception later on by their owner. The cryopreserved gonads can be re-implanted after the end of chemotherapy or radiotherapy, based on the request of the owner of the gonads (Serour, 2008).

In the case of a husband serving a prison term but still maintaining the union with his wife, some contemporary Muslim jurists declared that the stored sperm of the jailed husband can be utilized to impregnate his legitimate wife with artificial insemination. This is obviously premised on the presumed continuity of the marriage contract, until and unless the contrary is proven.

This could be pertinent to women who would like to bear legitimate children during long incarcerations of their spouses. Furthermore, in the future it may provide a solid basis for the protection of conjugal rights of wives of prisoners, particularly in civil cases (Alaro, 2012); indeed, in Saudi Arabia the incarcerated husband is allowed to have conjugal contact with his wife in the prison itself on occasion, in civil cases.

If the frozen fertilized eggs are not used or are not needed by the owners, it is permissible to use them for medical research provided the consent of the couple is obtained and the appropriate guidelines are followed.

In Islam, human life begins at ensoulment which is 120 days after conception. Doctors are therefore not killing human beings when they leave these fertilized eggs to die, nor is this considered abortion, since abortion is defined as the expulsion of the contents of the uterus. The Islamic Jurisprudence Council of the Islamic World League in Makkah Al-Mukarama in its

17th session (December 13–17, 2003 CE) has declared Decree #3 on stem cell therapy:

(It is permissible to obtain stem cells, to be grown and used for therapy or for permissible scientific research, if the source is legitimate, as for example, leftover zygotes remaining from IVF, if donated by the parents, when it is ascertained that they will not be used in an illegal pregnancy).

### Third-party assistance

The involvement of a third person in the dyad of legal husband and wife is totally unacceptable in Islamic law, whether this takes the form of a sperm, an ovum, an embryo, or a uterus. Any kind of sperm, ovum, or embryo donation is therefore not permissible in Islam (Fadel, 2002). Several fatwas and bioethical decrees have been issued since 1980 in the Sunni Muslim countries (Inhorn et al., 2010). For example, fatwas supporting assisted reproduction treatment but banning third-party assistance have been issued in Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates (Serour, 2008). In 1997, 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 bioethical declaration included recommendations to prevent human cloning and to prohibit all situations in which a third party invades a marital relationship through donation of reproductive material (Moosa, 2003). This ban on all kinds of third-party reproductive assistance is followed by all Sunni Muslims, representing 90% of the world's 1.6 billion Muslims.

### Surrogacy

Surrogacy is another form of ART and is of two types: partial and complete. In the partial type, a couple will commission a woman to be artificially inseminated by the "husband's" semen. The surrogate mother will carry the pregnancy to term, and once the baby is born, she will hand him back to the soliciting couple. In such a case, the child will have the rearing father as the biological father, a rearing mother, and a biological birth mother (Hathout, 1989).

In a complete surrogacy, the commissioning couple will undergo IVF. The embryo produced by IVF is then transferred to a surrogate woman. The surrogate gives the baby to the soliciting/rearing couple at birth. In this case, the biological parents are the rearing couple, and the surrogate is the birth mother (Fadel, 2002).

Under Islamic law, surrogacy is prohibited (Hathout, 1989). Even if there is an agreement between the parties, the confusion of lineage, which is inevitable in these surrogacy arrangements and which is of major importance in Islamic law, prohibits surrogacy. If surrogacy is still performed despite the prohibition, it is the consensus of Islamic scholars that the birth mother is the "real" mother.



Surrogacy between the wives of one husband was accepted by Council of the Islamic World League in Makkah in 1984, but was withdrawn by the same Council in 1985, after a long debate on who would be the true mother.

### Shia's views on ART

Although we have endeavored to cover the Islamic Sunni views on this subject, it is worth mentioning the Shia's views briefly. There are two main branches of Islam—Shia and Sunni—each with its own jurisprudential, theological, and ethical school(s). Shi'a is the minority branch of Islam found in Iran, parts of Iraq, Lebanon, Bahrain, Syria, and Saudi Arabia, as well as in Afghanistan, Pakistan, and India (Inhorn, 2006). Whereas the majority of Muslims in the world are Sunni (about 90%), the majority of Iranians are Shia (about 90%) (Aramesh, 2009). Major divergences in Islamic juridical opinion between Sunni and Shia religious authorities have led to striking differences in the practice of ARTs, particularly with regard to the use of donor gametes (Inhorn, 2011).

In the late 1990s, the Leader of the Islamic Republic of Iran, Ayatollah Ali Khamene'i issued a fatwa effectively permitting third-party donations including egg donation, sperm donation, and surrogacy (Serour, 2013; Inhorn, 2011).

Iran is the only Muslim country in which ARTs using donor gametes and embryos have been legitimized by religious authorities and passed into law. This has placed Iran, a Shia-dominant country, in a unique position vis-à-vis the Sunni Islamic world, where all forms of gamete donation are strictly prohibited (Abbasi-Shavazi et al., 2008). Most Shia scholars have also issued jurisprudential decrees (fatwas) that allow surrogate motherhood as a treatment for infertility, albeit only for legal couples (Aramesh, 2009).

In the Iranian clinics following Khamene'i's lead, all types of egg, sperm, and embryo donation, as well as surrogacy, continue to take place, with his fatwa clearly displayed as moral justification. For over a decade, donor gametes have not only been donated and shared, but even purchased by infertile couples in IVF clinics in Iran and certain parts of Lebanon (some Shia Lebanese) (Inhorn et al., 2010; Inhorn, 2011).

Many Shia religious authorities support the majority Sunni view: namely, they agree that third-party donation should be strictly prohibited. For example, Iraq's Ayatollah Sistani has opposed any form of third-party donation (Clarke, 2009). Several Shia jurists do not agree with Khamenei's position, or his permissive fatwa on donor technologies. For example, Shaikh Muhammad Husayn Fadlallah, Lebanon's most prominent Shia religious authority, disagrees with Khamenei's allowance of sperm donation (Abbasi-Shavazi et al., 2008). However, he does permit the use of donor eggs (Clarke,

2006). Ayatollah Fadlallah's positions opposing sperm donation but supporting egg donation are in agreement with the dominant religious discourse in Iran (Inhorn, 2006).

Furthermore, Ayatollah Mohammad-Ali Taskhiri, the representative of Iran in the OIC-IFA has also agreed to all decrees (fatwas) issued by this Academy on this subject (OIC-IFA, 1997).

Legal adoption does not exist in Islam. However, the Islamic scriptures emphasize the kind of guardianship of orphans. In Iran, an adoption law was sanctioned, giving Iranian couples the right to legally adopt orphaned children (Abbasi-Shavazi et al., 2008). In some Sunni Islamic countries, an abandoned child of unknown parents may be taken by a family who breastfeed him/her who therefore becomes a child of that family through breastfeeding (Batterjee, 2010).

### Gender selection

One of the first questions prospective parents ask is "Are we having a boy or girl?" About 50–70% of parents express their desire to know the sex of their future child during pregnancy.

With the use of ultrasound, chromosome analysis, or testing of fetal DNA in maternal blood early in pregnancy, the answer is available several months before delivery (Jesudason & Baruch, 2012).

The strong cultural preferences for sons have led to marked gender ratio disparities in countries such as China and India. This preference for boys is often explained by gendered expectations that rely on sons to carry on the family name, support elderly parents, keep property within the family, perform specific religious rituals, or contribute more to the family's economic status (Jesudason & Baruch, 2012). Over the past three decades, sex-selective abortion has been widely practiced in China and has led to severe imbalances in the sex ratio at birth, and is the major contributor to the phenomenon referred to as "missing girls" or "female deficit." This phenomenon has recently attracted considerable attention by researchers and public alike. Globally, the number of missing women has increased to over 100 million, with China and India accounting for 80 million (Nie, 2011).

Gender selection is however permitted if a particular sex predisposes to a serious genetic condition. Embryonal sex selection would make possible the detection of serious x-linked disorders including, Duchenne muscular dystrophy, hemophilia, and fragile X syndrome (Rodini, 2012). It is therefore quite acceptable not to replace embryos produced in vitro if they show serious chromosomal or genetic anomalies, such as muscular dystrophy, aneuploidy, hemophilia, and cystic fibrosis (Albar, 2002).

The prophet Muhammad, peace be upon him said "Choose for your offspring the suitable woman for hereditary plays a role."

## Ethics of gender selection

The use of gender selection technologies has led to widespread debate among clinicians, bioethicists, and philosophers alike (Strange, 2010). Sex selection for medical reasons is considered ethically acceptable. However, concerns about disruption of the sex ratio, or aggravation of sexist discrimination has led the majority of countries to prohibit the use of sex selection for social reasons (de Melo-Martín, 2013). Professional societies and international policy documents have also joined the opposition to this practice on similar grounds (ACOG, 2007; FIGO, 2006).

Worldwide, sex selection for non-medical reasons is generally defined as gender discriminatory (whether prior to pregnancy or post-pregnancy). A host of international human rights laws, national laws and regulations, and ethical bodies of leading professional associations suggest that sex selection is an unacceptable ethical practice. They further suggest that it is the shared responsibility of nations to protect and promote human rights principles, particularly that of non-discrimination (Whittaker, 2011).

## Islamic views of gender selection

Is it ever appropriate to select for gender? In Islam, gender selection is only up to God (Athar, 2008). The Noble Qur'an unequivocally affirms that "He (Allah) creates what He wills. He bestows female upon whom He wills, and bestows male upon whom He wills" (Quran; 42: 49). Hence, it could be safely argued that gender selection on its own constitutes unacceptable interference in the divine demographic order and, ipso facto, a nullity under the law of Islam.

Abortion or infanticide has long been used as a means of sex selection. More than 1400 years ago Arabs, before Islam, used to practice infanticide for gender selection. The Holy Quran described this act and condemned it. It states in one version: "On God's Judgment Day the entombed alive female infant is asked, for what guilt was she made to suffer infanticide?" (Quran, 81:8–9).

The application of gender selection technologies will discriminate against female embryos and fetuses, expressing prejudice against the girl child and hence, social devaluation of women. Such discrimination and devaluation are condemned in Islam (Serour, 2008). Application of PGD or sperm-sorting techniques for sex selection should be discouraged in principle. It should not be used for selection of the gender unless there is a clear medical indication.

According to the legal resolution (Fatwa) sanctioned by The Islamic World League passed in November 2007, gender selection performed specifically for social reasons is banned. However, it allowed gender selection for medical reasons only.

Sex ratio balancing in the family is considered acceptable by a few Sunni scholars for very limited cases

such as a wife who has delivered five or six daughters and whose husband has a dire need for having a boy. Centers performing the procedure should keep a record of all cases performed to ensure they are not choosing one sex only.

## Conclusion

Seeking a cure for infertility is encouraged in Islam. IVF of an egg from the wife with the sperm of her husband followed by the transfer of the fertilized embryo(s) back to the uterus of the wife is permissible as long as it occurs while the marriage is intact.

No third party should intrude upon the marital functions of sex and procreation. Surrogacy is not accepted in Sunni Islam. An excess number of fertilized embryos can be preserved by cryopreservation and may be transferred to the same wife in a successive cycle, but only during the duration of the marriage contract. Using frozen sperm after the death of the husband is not permitted. Gender selection for medical and restricted social reasons is allowed provided it does not involve discrimination against either sex.

**Declaration of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

## References

- Abbasi-Shavazi, M.J., Inhorn, M.C., Razeghi-Nasrabad, H.B., & Toloo, G. (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.
- Ahmad, N.H. (2003). Assisted reproduction—Islamic views on the science of procreation. *Eubios Journal of Asian and International Bioethics*, 13, 59–61.
- Alaro, A.A. (2012). Assisted Reproductive Technology (ART): The Islamic Law Perspective. In: Berna Arda & Vardit Rispler-Chaim., (Eds), *Islam and Bioethics*, Turkey: Ankara University, pp. 95–108.
- Albar, M.A. (2002). Ethical considerations in the prevention and management of genetic disorders with special emphasis on religious considerations. *Saudi Medical Journal*, 6, 627–632.
- American College of Obstetricians and Gynecologists, Committee on Ethics. (2007). ACOG Committee Opinion No. 360: Sex Selection. *Obstetrics and Gynecology*, 109, 475–478.
- Aramesh, K. (2009). Iran's experience with surrogate motherhood: an Islamic view and ethical concerns. *Journal of Medical Ethics*, 35, 320–322.
- Athar, S. (2008). Enhancement technologies and the person: An Islamic view. *Journal of Law, Medicine & Ethics*, 36, 59–64.
- Batterjee, M.A. (2010). Fading art: Understanding breast-feeding in the middle east. CreateSpace Independent Publishing Platform (June 1, 2010).
- Boivin, J., Bunting, L., Collins, J.A., & Nygren, K.G. (2007). International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. *Human Reproduction*, 22, 1506–1512.
- Chamsi-Pasha, H. & Albar, M.A. (2013). Western and Islamic bioethics: How close is the gap? *Avicenna Journal of Medicine*, 3, 8–14.

- Clarke, M. (2006). Shiite perspectives on kinship and new reproductive technologies. *ISIM Review*, 17, 26–27.
- Clarke, M. (2009). Islam and new kinship: Reproductive technology and the Shariah in Lebanon. New York: Berghahn Books.
- Davies, M.J. (2013). Infertility treatment at the edge: discovery and risk converge at the limits of knowledge. *Archives of Disease in Childhood*, 98, 89–90.
- de Melo-Martin, I. (2013). Sex selection and the procreative liberty framework. *Kennedy Institute of Ethics Journal*, 23, 1–18.
- Denton, J., Monach, J., & Pacey, A. (2013). Infertility and assisted reproduction: counseling and psychosocial aspects. *Human Fertility*, 16, 1.
- Fadel, H.E. (2002). The Islamic viewpoint on new assisted reproductive technologies. *Fordham Urban Law Journal*, 30, 147–157.
- Fadel, H.E. (2007). Prospects and ethics of stem cell research: An Islamic perspective. *Journal of Islamic Medical Association*, 39, 73–84.
- FIGO Committee for the Ethical Aspects of Human Reproduction and Women's Health. (2006). Ethical Guidelines on Sex Selection for Non-Medical Purposes. FIGO Committee for the Ethical Aspects of Human Reproduction and Women's Health. *International Journal of Gynecology and Obstetrics*, 92, 329–330.
- Hathout, M.M. (1989). Surrogacy: An Islamic perspective. *Journal of Islamic Medical Association*, 21, 157–160.
- Inhorn, M.C. (2006). Making muslim babies: IVF and gamete donation in Sunni versus Shi'a Islam. *Culture, Medicine and Psychiatry*, 30, 427–450.
- Inhorn, M.C., Patrizio, P., & Serour, G. (2010). Third party reproductive assistance around the Mediterranean: comparing Sunni Egypt, Catholic Italy and multisectarian Lebanon. *Reproductive Biomedicine Online*, 21, 848–853.
- Inhorn, M.C. (2011). Globalization and gametes: reproductive 'tourism,' Islamic bioethics, and Middle Eastern modernity. *Anthropology & Medicine*, 18, 87–103.
- Jesudason, S. & Baruch, S. (2012). Sex selection: what role for providers. *Contraception*, 86, 597–599.
- McLaren, J.F. (2012). Infertility evaluation. *Obstetrics & Gynecology Clinics of North America*, 39, 453–463.
- Moosa, E. (2003). Human cloning in Muslim ethics. *Voices Across Boundaries*, Fall 2003, 23–26.
- Nie, J.B. (2011). Non-medical sex-selective abortion in China: ethical and public policy issues in the context of 40 million missing females. *British Medical Bulletin*, 98, 7–20.
- OIC-IFA . (1997). The International Islamic Fiqh Academy of Organization of Islamic Conferences. Jeddah, 10th session (28 June–3 July 1997). [www.fiqhacademy.org.sa/](http://www.fiqhacademy.org.sa/)
- Pandian, Z., Bhattacharya, S., Ozturk, O., Serour, G.I., & Templeton, A. (2004). Number of embryos for transfer following in-vitro fertilization or intra-cytoplasmic sperm injection. *Cochrane Database of Systematic Reviews*, 4, CD003416.
- Rodini, M. (2012). An investigation on Islamic perspective on the reproductive technologies. *International Journal of Medicine and Molecular Medicine*, 3, WMC0035486. [www.webmedcentral.com/wmcpdf/Article\\_WMC003548.pdf](http://www.webmedcentral.com/wmcpdf/Article_WMC003548.pdf)
- Schenker, J.G. (2005). Assisted reproductive practice: religious perspectives. *Reproductive Biomedicine Online*, 10, 310–319.
- Serour, G.I. (2008). Islamic perspectives in human reproduction. *Reproductive Biomedicine Online*, 17, 34–38.
- Serour, G.I. (2013). Ethical issues in human reproduction: Islamic perspectives. *Gynecological Endocrinology*, 29, 949–952.
- Strange, H., Cesagen (ESRC Centre for Economic and Social Aspects of Genomics). (2010). Non-medical sex selection: ethical issues. *British Medical Bulletin*, 94, 7–20.
- Whittaker, A.M. (2011). Reproduction opportunists in the new global sex trade: PGD and non-medical sex selection. *Reproductive Biomedicine Online*, 23, 609–617.
- Wischmann, T. (2013). 'Your count is zero'—counseling the infertile man. *Human Fertility*, 16, 35–39.