Islamic concepts in ethics of pediatric clinical research

Areej AG AlFattani
Section of Epidemiology, Department of Biostatistics, Epidemiology and Scientific Computing, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia

Hala AlAlem
King Abdullah Specialized Children Hospital, Intensive Care Medicine, King Abdul Aziz Medical City, Riyadh, Saudi Arabia

Abstract
Background: Medical research on children has increased in the last 20 years. International ethical regulations for conducting clinical research on children may not pertain to Muslim communities where religious beliefs play a big role in decision-making process.

Methods: The aim of this paper was to illustrate the origins of bioethics principles in Islam, to appraise the existing regulations of Islamic countries, and to systematically review areas of improvements.

Conclusion: This review recommends a customized approach for regulators to set culturally adapted ethical guidelines that highlight Islamic traditions in dealing with children of different ages.

Keywords
Children, autonomy, Islam, informed consent, pediatrics, research ethics

Corresponding author:
Areej Abdul Ghani AlFattani, Section of Epidemiology, Department of Biostatistics, Epidemiology and Scientific Computing, King Faisal Specialist Hospital and Research Center, MBC 03, P.O. Box 3354, Riyadh 11211, Saudi Arabia.
Email: aralfattani@kfshrc.edu.sa
Introduction

**Importance of pediatric research in Islam**

Since ancient times, even before Islam, doctors have sought cure for sick children as well as adults. Islam like other divine religions conforms with this aim. The five objectives of Islam are to preserve people’s lives, wealth, progeny, minds, and dignity. In many verses of the Glorious Quran, God encourages people to learn and look for wisdom to build the earth (Qur’an 35:28, 56:58–59). The Prophet Mohammed—Peace be upon him—is reported to have said “Allah has not made a disease without appointing remedy for it, with the exception of one disease, namely senility” (Sunan Abi Dawud 3855). These recommendations encouraged the scholars to put efforts into improving children’s health as well as that of adults by including them in research and experiments to obtain better treatments.

In the golden Islamic era from the 9th to the 11th century, many new discoveries and huge advances in science and medicine were revealed. For example, Mohammed Zakariya AlRazi (born in 854 CE) was the first to conduct clinical trials comparing two identical groups on monkeys and human (Zarrintan et al., 2014). He wrote about medical ethics in his book *Kitab al Hawi fi al-tibb* [The Comprehensive Book of Medicine], which is considered one of the most valuable books in medicine in all times (Amr and Tbakhi, 2007). Ahmed AlQirawani from Tunisia (born in 898 CE) wrote a book named *Kitab siysat al atfal wa tadberahom* [Politics in Dealing and Management of Children], which became a reference for pediatricians for many centuries afterwards (Browne, 2001).

In Islamic countries, medical ethical obligations come principally from Islamic beliefs, which play an important role in the decision-making process. Although great efforts have been made by Islamic jurists and bioethicists in solving medical ethical issues, there are limited resources about Islamic perspectives in regard to research among children. The aim of this review was to highlight the origins of research ethics in Islam, to review the existing Islamic regulations, and to suggest recommendations that help Muslims in making valid decisions.

**Sources of legislations in Islam**

Muslims believe the Glorious Quran and Sunna to be the main resources for legislations in the Islamic nations. These sources put forth the general frames of human ethics. However, formulating civil regulations usually require more detailed guidance. Table 1 lists the four well-recognized sources of legislations on ethics in Islam that help Muslims in decision-making (Abu’l-Suroor, 2001; Al-Bar and Chamsi Pasha, 2015; FAwzan, 2005).
Origins of Islamic research ethics

Allah and Prophet Mohammed have mentioned many values and principles in Islam to guide people in their lives, such as honesty, giving, helping the needy, justice, and respect. However, applying these values to children is different from that for adults. From among these values, this section discusses those related to research.

A basic cornerstone concept is the dignity, which is given by God to all humans "ولقد كرمنا بني أدم وحملناهم في البر والبحر و رزقناهم من الطيبات وفضلناهم على كثير ممن خلقنا تفضيل" [We have certainly honored the children of Adam and carried them on the land and sea and provided for them of the good things and preferred them over much of what We have created, with definite preference] (Qur’an, 17:70). Moreover, Allah has given people the freedom to choose between God’s way and the devil’s way. In another verse “لا إكراه في الدين قد تبين الرشد من الغير” [There is no compulsion in Faith. The correct way has become distinct from the erroneous] (Qur’an, 2:256). From this verse, scholars concluded that since people are not forced to follow the Islamic way, they should not be forced to take unwanted decisions especially when it comes to preserving their health. Their decisions must be respected, as long as they have the capacity for self-determination. This basic and important rule about human dignity guided early Muslim scholars to think about the “Autonomy” of children in clinical research, which is a complicated issue with many still unanswered questions (Sachedina, 2011).

Autonomy in Islam has two essential conditions: free will (i.e. being independent from influence by others) and the ability to comprehend (the competent person is able to understand and make decision to protect his/her own interest) (IOMS, 2005). Based on this, anyone who is deficient in at least one of these

| The source       | Definition                                                                 | Example of a matter related to children                                      |
|------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Quran            | The most authentic source of religion that sets the fundamental basics of faith, and moralities of all times | Raising children and protect them from any harm is a must for parents        |
| Sunna            | Sayings, deeds, and approved directives by Prophet Mohammed—Peace be upon him—represents the second source | Teachings of the prophets on raising children, teaching them values, and principles |
| Al Ejma’a        | A consensus decision made by learned scholars in Islamic legislations       | Prohibition of a surrogate womb                                              |
| AlQiyas and Fatwa| Analogical reasoning is used to derive a fresh decision from a similar event that happened in Quran or Sunna or during the days of early followers | Children are prohibited to hit their parents                                 |

Table 1. The four sources of legislations in Islam with definitions and examples.
two conditions is vulnerable and needs a guardian’s care. Such cases include children, elders, prisoners, servants, diseased people who have lost their intellectual abilities, and anyone in a similar situation. Allah, His majesty, recommended that Muslims take care of their families and vulnerable members and protect them from any harm. “Yalah ala al-ethn anfeesum wa-aheleikum yara” [O you who believe, save yourselves and your families from a fire] (Qur’an, 66:6). It was concluded by Muslim scholars that in pediatric research, guardians are responsible for making decisions that are in the best interest of their children even if the decision is against the child’s choice. Therefore, guardian’s permission should be obtained through an informed consent (Beauchamp, 2003). It is important that this permission is given voluntarily without any persuasion or coercion, with the aim to protect the well-being of the child.

Another value that was mentioned by Allah and highly enforced by his Prophet Mohammed—Peace be upon him—is Justice. God spoke to His Messenger: [My slaves, I have forbidden injustice for myself and forbade it also for you. So avoid being unjust to one another] (Sahih Muslim 2577). In the Glorious Qur’an “إن الله يأمر بالعدل والإحسان”[Allah enjoins to do justice and to adopt good behavior and to give relatives (their due rights), and forbids shameful acts, evil deeds and oppressive attitude] (Qur’an 16; 90). Justice is a requirement as is equity; for example, slaves in the historic Islamic societies were not assigned to the same obligations and punishments as free persons because they did not have free will.

In pediatric research this value translated into justice is seen in terms of distributing benefits and harms of the drug used in a study between participants and whether the research will add a burden on the participants (Afifi, 2007a, 2007b). Taking child’s assent in pediatric research is a form of justice. The assent is the agreement of the child to participate in research when he/she is not competent to provide a legally valid informed consent. However, this process is not straightforward. First, children vary in age with regard to when they develop competency and capacity, and it is very difficult to assess their capacity. Second, children are constantly maturing mentally and emotionally, and their perspective toward a specific decision might change with time. For older adolescents, informed consent might be more suitable and assent no longer applies. Third, the complexity of scientific and technical information provided to a child during the assent process can affect his/her understanding, although efforts should be made to deliver it in simple language. It is the responsibility of the institutional review boards (IRBs) as well as the sponsors and the investigators to ensure the informed consent and the assent process are fair and adequate (Christina Tally, 2018).

The third value is beneficence and non-maleficence or doing no harm. It is reported that Prophet Mohammed—Peace be upon him—said, “There should be neither harming nor reciprocating harm” (Sunan Ibn Majah 2341). He also said “Allah likes when any one does a work, to do it with perfection” (Imam Al Baihaqi).
Additionally, *Al Ihsan* (one of the three ranks of Islam) means that one should work and do anything as he sees Allah, and if he does not achieve this state of devotion, then Allah sees him (Rattani and Hyder, 2017). Islamic scholars explained that these values are applicable to persons, families, and the community. In order to apply Al-Ihsan in the pediatric research context some points must be considered; investigators are required to be qualified and committed to conducting the research; safe guards for the well-being of the participants should be in place, the data should be accurate and transparent; and the methodology must be correct (Afifi, 2007a; Rattani and Hyder, 2017). Furthermore, Muslims are encouraged to take into account the public interest. The general benefit of the society is considered when making decisions related to a specific change or solution. In pediatric research, this value applies when the research questions are scientifically sound and lead to the understanding, advancement, or improvement of a medical issue for a larger population (Sachedina, 2011).

**Overview of guidelines in pediatric research ethics in Islamic countries**

It is historically known that participation of children in clinical research is essential because children develop different diseases and respond to treatment in a different way than adults. Nevertheless, 50% of the drugs approved in 2017 have inadequate information on toxicity and administration regimens for children according to US Food and Drug Administration (U.S. FDA, 2016).

In children, this matter holds distinct ethical challenges including the consenting process, the risk/benefit assessment, and the decision consequences (CPA, 2008). Many well-known international regulations and legal documents have been released to protect children involved in medical research and to ensure their welfare such as The Nuremberg Code in 1947 (Nuremberg Military, 1996), Declaration of Helsinki 1964 (WMA, 2013), Good Clinical Practice in 1995 (Ravinetto, 2017), and the ICH “International Ethical Guideline for Biomedical Research Involving Human Subjects” in 2002 (CIOMS, 2002).

Unlike in other countries, serious violations of research bioethics for children were not reported from Islamic counties. Yet, Muslim jurists joined the worldwide movement by developing a memoranda on medical research ethics derived from Islamic guidance of ethics. Regulations were published in Lebanon in 1994, and in Egypt in 2003 (MOHP Egypt, 2003). Similar guidelines were released from Kuwait, Qatar, United Arab Emirates (IMS Kuwait, 2009; MOH Qatar, 2009; MOH UAE Dubai, 2006), and Jordan (PMC Jordan, 2001). In 1998, Saudi Arabia (SCHS, 2007) released a regulation on bioethics. The last updated Saudi law released in 2010 titled “System of Ethics of Research on Living Subjects” (KACST, 2010) clearly references to the Declaration of Helsinki. It is stated in Article 25 of
this law that “Research may not be conducted on minors, incompetent or disabled persons unless the interest of these categories is so required.” However, no detailed regulations were released after that, that is, regulations like, in case of divorce, who takes the decision to allow a child to participate in a research and who is eligible to take the financial benefit, if any.

According to a review of national research ethics regulations and guidelines in Middle East Arab countries by Al Ahmed in 2012, most of the mentioned guidelines are compatible with well-known international ones. However, these regulations can be of a greater benefit if they are edited and modified according to the customs and beliefs of the society. Few regulations released details about participation of children in clinical research (AlAhmad G. et al., 2012). This is considered a limitation for two reasons. First, in the Arab world majority of the population is young. In Saudi Arabia for example, 40% of the people are under 19 years old. Second, Middle Eastern and Islamic countries are favorable targets for drug companies to apply clinical trials, due to economic reasons and absence of a strong auditing system (Maal Economics Journal, 2016). Among the reviewed documents, the guidelines by the Islamic Organization of Medical Sciences—released in 2005 from Kuwait (IOMS, 2005) and updated in 2016—was the most balanced and included all key points of research ethics. The latter from Kuwait documents stated that “Children and adolescents must not be included in health-related research unless a good scientific reason justifies their exclusion.” They mentioned assent, legal guardian’s responsibilities, the IRB responsibilities, the waiver in case of emergency, and the balance of the potential risks and benefits (van Delden and van der Graaf, 2017). However, participation of children in clinical trials and research is still much less than what is needed (Joseph et al., 2015).

Among Muslims, three items might add to the inherent difficulties in children’s participation: the right knowledge, the uncertainty about religious judgment, and the cultural barriers in the relationship between parents and children (Rashad et al., 2004). Knowledge barriers have been reported among parents in Arab countries—when approached to join a clinical trial. They are expressed as negative perceptions such as fear of pain and adverse events, mistaken perception of direct benefit, and confusion regarding randomization techniques (Nabulsi et al., 2011). While positive perceptions appear when assuring parents of direct benefit to the child, trusting of the physician through effective communication, and in case of financial gain (Alahmad et al., 2015; Caldwell et al., 2003).

The uncertain religious judgment in some medical and research situations may affect the complete autonomy of the parents, due to the fear of being guilty. For example, a Muslim mother delivered a baby girl with respiratory distress syndrome after mechanical ventilation, but soon she had wounds in her belly and lost a lot of weight. Doctors gradually realized that further treatment would offer no chance of survival and would even harm the girl. The baby was eligible for a
cohort research study about reasons of end-of-life decisions in infants. While the father was confused, the mother refused to join the study and to apply the doctor’s recommendations to terminate the baby’s life, because her Islamic religious beliefs maintain that killing babies is an unconditional sin, and that death and life is a matter of God’s will (Westra et al., 2009).

**Cultural barriers** in research—like in any other society—appear in terms of mistaken understanding of guardianship of children and women, which in some cases lead to limiting their freedom of choice (Husseini, 2011). For instance, in an experience of the author as a research coordinator, 12-year-old Muslim girl was invited to join a clinical trial. The author explained the study but she seemed unconvinced. When the name of the prominent primary investigator was mentioned, the father tried to convince his daughter to join the study. She gave her assent. Later the father wanted to interfere with the girls’ responses to the study survey especially for those questions about family. The author stopped the father at this point and ensured that the participant gave her own responses.

Thus, culturally relevant guidelines need to be added to the previous regulations. Cultural adaptation will help parents to understand their rights and duties when involving their children in research, especially when linked to correct, moderate, and wise religious origins, thereby improving their attitude and response. One way to solve that is to consider Islamic teachings on preserving children’s rights, dignity, and well-being, given that the Glorious Quran and Sunna have mentioned valuable directions regarding children’s rights and duties. In-depth study of Islamic teaching is recommended in order to understand how to deal with children in research.

**Children’s rights and duties in Islam**

In Islam, children are very precious. In the Glorious Qur’an it says: “وَالطَّلاَبُ وَالطَّلاَبُ زينة” [Wealth and children are the embellishment of the worldly life] (18:46). Because children have limited comprehension and no ability to choose, they are vulnerable and they should be protected from any harm. Therefore, their rights to life and welfare have to be preserved. The Quran gives a complete guide on how to raise children through the stories of the prophets with their sons. There are also many verses about pregnancy, breastfeeding, and caring for orphans. There are other verses about infanticide and adoption (The Qur’an). Furthermore, in Islam, children are not like adults regarding the onus and punishments in case of sins; this aligns with the justice and respect principles in research.

Islam divides children into three categories in regard to their comprehension level and ability (Fawzan, 2005). **The first group is from birth until about seven years.** Children in this group have very poor ability to understand and make decisions, so their guardians are responsible for making decisions that are in their
interest. The protection of children’s rights begins in Islam even before they are born; Islam saves their lives by assuring the health of mothers during pregnancy. For example, a pregnant woman is exempted from the fasting, which is expected of other Muslims during Ramadan if it will harm her or her baby; she can fast any other time after delivery. In case of divorce, pregnant women also get coverage for expenses from their ex-husband until the baby becomes independent. His Majesty Allah has said "على المولود له رزقهن وكسوتهن بالمعروف." [It is the obligation of the one to whom the child belongs that he provides food and clothing for them (the mothers) with fairness] (Qur'an 2:233). Such rules from the Quran and Sunna, which care about children at every stage in their life, clearly put the responsibility on the legal guardians. Hence, in medical research the permission from the guardians should definitely be required.

The second group is from seven years to young adolescence who have a fair level of comprehension and understanding. In this age group, children are required to learn and practice their religious and community-related duties. Although children at this age are not completely independent from their parents or guardians, their decisions are worthy of being heard and respected because the youth in this age are full of passion, energy, desire, and power. For example, according to Islamic instructions, children are asked to decide whether to live with their mothers or their fathers in case of divorce (Sunan Ibn Majah 2351). They are strongly encouraged to practice praying and fasting although they are not obligated to do so (Sunan Abi Dawud 495). It is also recommended that parents take their children to attend the adult gatherings in order to allow them to learn more about life experiences. Additionally, it is an Islamic tradition that children older than seven learn equestrian skills and keep their bodies fit through physical exercise. These recommendations come to prepare children to become aware, strong, confident, and successful adults.

Prophet Mohammed—Peace be upon him—was the best role model role for treating children. He was patient, kind, caring, and compassionate. Moreover, he respected children and honored them. He cautioned against offending them underestimating their minds. It is told by him that one day, a mother called her child and promised that she would give him dates if he came. The Prophet—Peace be upon him—asked her if she would actually do that. She replied no. Then he told that it will be reported as a lie (Sunan Abi Dawud 4991). The Prophet also demonstrated through sayings and acts that children’s decisions should be respected. It was narrated by him—Peace be upon him—that he was sitting in an assembly where there were men on his right and a boy on his left. He wanted to pass a milk container to them, but before he passed it, he asked the boy if he would allow him to begin with the older men, and the boy told that he did not want to give his turn to anyone else due to his love for the Prophet. With full respect, the Prophet gave him first (Sahih al-Bukhari 2605). From such events, scientists deduced that asking the child for
his/her permission when doing research is recommended. Regardless of the specific age, a child’s assent shall be sought if he/she is able to understand the research objectives, the benefits, the potential risks, and that his participation is voluntary. A child participant should be informed in a language that he/she can understand and be given enough time to decide. When thinking about how the Prophet Mohammed—Peace be upon him—treated children, this guidance, therefore, makes sense as it is very similar to his way.

The third group is older adolescents, who have full comprehension and responsibility for their acts. Adults are held accountable to Islamic obligations if they are free persons (not slaves) and not mentally disabled. In Islam, religious obligations start when the girl gets her first menstrual cycle and when the boy shows signs of maturity (Afifi, 2007b; Fawzan, 2005). However, there were situations in Islamic history where the children were given responsibilities that adults are held to because they showed high perceptivity and the capability to take on responsibilities. For example, Usamah Ibn Zaid, a 16-year-old boy, was recognized by the Prophet Mohammed to be the youngest general to lead the Muslim army in battle against the Romans at that time. Usamah was brave, smart, and reliable, and the Prophet Mohammed asked him to lead an army, which included older men (AlRehaili, 1996; AlThahabi, 1985). Another example was Ziad Ibn Thabet who was assigned as the formal scribe and interpreter of Muslims in the Prophet’s days when he was under 15 years old because he showed a talent for writing and languages. It was reported about him that he learned Hebrew in about 40 days and the Syriac language in only 17 days (AlThahabi, 1985). To conclude from these examples, it is clear in Islamic culture that if children reach enough cognitive determination and they show strong capability of realizing risks, they can be given responsibilities and allowed to decide for themselves and others, regardless of age.

Finally, a recent qualitative study from Kenya on different age groups showed that the idea of involving children and adolescents in decision-making for research was strongly supported. The conclusion is supported by the facts that adolescence carry similar levels of responsibility in everyday life, have existing capacity, hold excitement of understanding of new knowledge in science, and are exempt from parental control (Marsh et al., 2019).

**Conclusion**

Islam teachings pay great attention to children’s honor, respect, and well-being. Although religious obligations start after maturity, many daily decisions can be made by children according to the Islamic tradition. The key point here is their ability for understanding and comprehension. It is recommended that Muslim ethicists study these examples in the Quran and Sunna in order to extract a guidance
for research ethics regarding participation of children in clinical research. This
guidance may not be necessarily different from what has been mentioned in previ-
ous Islamic and international regulations, but it can include detailed directions that
can better reflect the beliefs of an Islamic society.

Acknowledgements

The authors would like to acknowledge Ms Sanaa Hyder from King Faisal Specialist Hospital
and Research Centre, Riyadh, KSA for her significant contribution in editing and reviewing
this work.

Funding

All articles in Research Ethics are published as open access. There are no submission charges
and no article processing charges as these are fully funded by institutions through Knowledge
Unlatched, resulting in no direct charge to authors. For more information about Knowledge
Unlatched please see here: http://www.knowledgeunlatched.org.

ORCID iD

Areej AG AlFattani https://orcid.org/0000-0002-9459-9936

References

Abu’l-Suroor PJ (2001) Renting wombs is haram: Islam question and answers. Available at:
https://islamqa.info/en/answers/22126/renting-wombs-is-haraam (accessed 14 July).
Afifi RY (2007a) Biomedical research ethics: an Islamic view–part I. Int J Surg 5(5):
292–296.
Afifi RY (2007b) Biomedical research ethics: an Islamic view part II. Int J Surg 5(6):
381–383.
Alahmad G, Al-Jumah M and Dierickx K (2012) Review of national research ethics reg-
ulations and guidelines in Middle Eastern Arab countries. BMC Med Ethics 13: 34.
doi:10.1186/1472-6939-13-34
Alahmad G, Al Jumah M and Dierickx K (2015) Confidentiality, informed consent, and chil-
dren’s participation in research involving stored tissue samples: interviews with medical
professionals from the Middle East. Narrat Inq Bioeth 5(1): 53–66.
AlRehaili DW (1996) Usamah Ibn Zaid. Birute Dar AlQlam
AlThahabi ISA (1985) Siyar Aalam AlNobala’a (Vol. 2). Birute AlResalah.
Al-Bar MA and Chamsi-Pasha H (2015) Contemporary Bioethics, Islamic Perspective.
London: Springer, 273.
Amr SS and Tbakhi A (2007) Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): philoso-
pher, physician and alchemist. Ann Saudi Med 27(4): 305–307.
Beauchamp TL (2003) Methods and principles in biomedical ethics. J Med Ethics 29(5):
269–274.
Browne EG (2001) Islamic Medicine. India: Goodword Books Pvt. Ltd.
Caldwell PH, Butow PN and Craig JC (2003) Parents’ attitudes to children’s participation in
randomized controlled trials. J Pediatr 142(5): 554–559.
Christina Tally (2018) Pediatric clinical research: informed consent and assent considerations
for high-risk studies. SOCRA Source 95(1): 40–47.
AlFattani and AlAlem

CIOMS (2002) *International Ethical Guidelines for Biomedical Research Involving Human Subjects*. Geneva: WHO.

CPA (2008) Ethical issues in health research in children, Canadian Paediatric Society. *Paediatr Child Health* 13(8): 707–720.

Fawzan SA (2005) *A Summary of Islamic Jurisprudence* (Vol. 1). Saudi Arabia: AlMaiman Publishing House.

Hussein DIMA (2011) *The implications of religious beliefs on medical and patients care* (Master), University of Pennsylvania Philadelphia, Pennsylvania. Available at: https://repository.upenn.edu/cgi/viewcontent.cgi?article=1047&context=od_theses_msod

Imam Al Baihaqi. *Hadith Sahih*.

IMS Kuwait (2009) *Ethical Guidelines for Biomedical Research*. Kuwait.

IOMS (2005) *International Ethical Guidelines for Biomedical Research Involving Human Subjects-Islamic View*. Kuwait: Islamic Organization for Medical Sciences.

Joseph PD, Craig JC and Caldwell PH (2015) Clinical trials in children. *Br J Clin Pharmacol* 79(3): 357–369.

KACST, K. A. C. o. S. a. T. (2010) *System of Ethics of Research on the Living Subjects* (نظام أخلاقيات البحث على المخلوقات الحية). Riyadh, Saudi Arabia.

Maal Economics Journal (2016) *General authority of statistics*. Available at: https://www.maaal.com/archives/20161227/84743

Marsh V, Mwangome N, Jao I, et al. (2019) Who should decide about children’s and adolescents’ participation in health research? The views of children and adults in rural Kenya. *BMC Medical Ethics* 20(1): 41.

MOH Qatar (2009) *Guidelines, Regulations and Policies for Research Involving Human Subjects*. Qatar: Ministry of Health.

MOH UAE Dubai (2006) *Guidance for Conducting Clinical Trials Based on Drugs/ Medical Products & Good Clinical Practice*. Abo Dabi, UAE: Ministry of Health.

MOHP Egypt (2003) *Profession Ethics Regulations*. Cairo, Egypt.

Nabulsi M, Khalil Y and Makhoul J (2011) Parental attitudes towards and perceptions of their children’s participation in clinical research: a developing-country perspective. *J Med Ethics* 37(7): 420–423.

Nuremberg Military T (1996) The Nuremberg code. *JAMA* 276(20): 1691.

PMC Jordan (2001) *Law of Clinical Studies*. Amman, Jordan: Prime Minster’s Council.

Rashad AM, MacVane Phipps F and Haith-Cooper M (2004) Obtaining informed consent in an Egyptian research study. *Nurs Ethics* 11(4): 394–399.

Rattani A and Hyder AA (2017) Developing an Islamic Research ethics framework. *J Relig Health* 56(1): 74–86.

Ravinetto R (2017) The revision of the ICH Good Clinical Practice guidelines: a missed opportunity? *Indian J Med Ethics* 2(4): 255–259.

Sachedina A (2011) *Islamic Biomedical Ethics: Principles and Application*. New York: Oxford University Press.

SCHS. (2007) *Ethics of Medical Profession* (أخلاقيات المهنة الطبية). Riyadh, Saudi Arabia: Saudi Commission of Health Specialties.