

AN INTEGRATIVE REVIEW ON FEMALE REPRODUCTIVE PATHOPHYSIOLOGY ACCORDING TO ISLAMIC PERSPECTIVE

Maryam Syahidah Azalan¹ and Radiah Abdul Ghani^{1*}

¹Department of Biomedical Science, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, Malaysia

Abstract

Islamic medical ethics provides Muslims with a crucial framework that directs their lives in all spheres, including women's health. The intersection of Islamic medical ethics with female reproductive physiology and pathology is of paramount importance in today's diverse world, as it not only informs ethical and moral guidelines but also has practical implications for Muslim women's healthcare. However, how these medical ethics address the intricate matters of female reproductive physiology remains to be studied. A significant gap exists in the literature on how religious beliefs influence understanding of biomedicine. Addressing this gap is crucial to ensure that religious and medical guidelines align, ultimately benefiting the well-being of Muslim women. A thorough search of the literature found the existing body of literature emphasizing the relationship between Islamic medical ethics and female reproductive pathophysiology. The scope, including female and maternal health, highlighting menstruation, contraception, pregnancy, childbirth, and fertility in conjunction with an Islamic viewpoint, was identified and documented. The findings revealed that Islamic medical ethics incorporate principles largely compatible with contemporary scientific understanding of female reproductive pathophysiology. Key themes included the importance of preserving life, protecting the mother's health, and the prohibition of harm, which align well with the modern concept of reproductive health. This study emphasizes the evolving knowledge of the female reproductive system through an Islamic jurisprudence point of view. It also highlights the importance of synchronizing religious and medical guidelines to ensure the well-being of Muslim women. The findings may serve as a foundational platform for future dialogues and collaborations between scholars of Islamic jurisprudence and healthcare professionals. Ultimately, this integration may lead to improved reproductive healthcare practices for Muslim women, rooted in the convergence of religious and medical ethics.

Keywords: female reproductive system, Islamic perspective, physiology, pathology

Perkembangan Artikel

Diterima: 13 Disember 2023

Disemak: 1 Mac 2024

Diterbit: 30 April 2024

*Corresponding Author: Radiah Abdul Ghani, PhD, Department of Biomedical Sciences, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, Jalan Istana 25200 Kuantan, Pahang, Malaysia

Email: radiah@iium.edu.my

INTRODUCTION

The Qur'an (49:13), translated as, “O mankind! We created you from a single (pair) of a male and a female, and made you into nations and tribes, that ye may know each other (not that ye may despise (each other). Verily the most honoured of you in the sight of Allah is (he who is) the most righteous of you. And Allah has full knowledge and is well acquainted (with all things).” Islam's appreciation for women and its guidance on taking care of their health extends to a nuanced understanding of the physiology of the female reproductive system. Islam's teachings emphasize women's holistic well-being, encompassing physical, emotional, and spiritual aspects (Ayubi, 2021; Hamdy, 2009; Serour, 2013). The exploration through *The Qur'an* and *Al-Hadith* can be seen through the guidance on the physiology of the female reproductive system that emphasizes the sanctity of life, medical care, purity, and rituals during menstruation, maternal health, pregnancy, and childbirth. Islam's appreciation for women and its guidance on their health align with a deep understanding of the physiology of the female reproductive system (Del-Vecchio, 1980; Hughes Rinker, 2015; Valizadeh et al., 2021). The teachings also emphasize respect for women's natural processes, advocate for compassionate care during various life stages, and recognize the interconnectedness of physical, emotional, and spiritual well-being. This holistic approach contributes to a framework that appreciates and supports women in maintaining their health and fulfilling their roles within the broader Islamic ethical context.

The female reproductive system is a marvel of intricate design, comprising a complex network of organs and structures dedicated to the initiation and sustenance of life. At its core are the ovaries, responsible for producing eggs and essential reproductive hormones—estrogen and progesterone. The menstrual cycle, a central element of this system, unfolds in distinct phases, including the maturation of eggs, ovulation, and the preparation of the uterus for potential pregnancy (Aolymat et al., 2023; Ayoola et al., 2016; Czajkowska et al., 2019). The fallopian tubes act as conduits for the eggs to travel from the ovaries to the uterus, where fertilization may occur. The uterus, a muscular organ, serves as a nurturing environment for a fertilized egg to implant and develop into a fetus during pregnancy. The cervix, connecting the uterus to the vagina, plays a crucial role in childbirth and menstruation. Supporting structures include the mammary glands, which change during pregnancy to facilitate breastfeeding (Flynn, 1981; Hwang et al., 2016). This intricate symphony of physiological processes, governed by hormonal regulation, exemplifies the female reproductive system's dynamic nature. It reflects not only the complexity of biological mechanisms but also the profound role women play in perpetuating life within the intricate framework of their bodies. The multifaceted functions of this system highlight its significance in shaping the various stages of a woman's life, from puberty and fertility to pregnancy and childbirth.

The profound teachings of Islam, as exemplified in the *Qur'an* and *Al-Hadith*, underscore the intrinsic value of women, and provide comprehensive guidance on the care of their health. This belief extends to a detailed understanding of the female reproductive system, as emphasized through the *Qur'an* and *Hadith*. The appreciation for women within Islam is not confined to spiritual or emotional realms; it extends to a profound understanding of the physiological intricacies of the female reproductive system (Chin et al., 2023; Dogan et al., 2016; Odusina et al., 2020). The detailed exploration of this system reveals an intricate ballet of hormonal regulation, anatomical structures, and physiological processes that collectively

enable the initiation, development, and sustenance of life. This Islamic framework recognizes the natural processes women undergo and advocates for compassionate care during various life stages. The understanding of the physiology of female reproductive systems and practicing Islam are also in parallel with the five principles of *Maqasid Shariah* (Farohah, 2022; Hasim et al., 2016). Therefore, this review aims to understand the complexes of female reproductive physiology from the Islamic perspective.

METHODOLOGY

This study required a comprehensive and detailed review and analysis of literature review from various sources to gain a deep understanding of the scientific explanation of one of the six human physiology systems, specifically the female reproductive system, from the Islamic viewpoints that Muslims refer to as guidelines, *Usul Al-Fiqh*. The investigation involved searches conducted through Google Scholar, IJUM Discovery Service-EBSCO, and manual searches using specific keywords such as "female reproductive system," "Islamic perspective," "pathology," and "physiology." To enhance the precision of the literature search, Boolean Operators, along with Medical Subject Headings (MeSH) terms with similar meanings, were employed (refer to Table 1). Additionally, the references of identified academic journals, journal indexes from which articles were obtained, and pertinent reviews were scrutinized. The inclusion criteria for this article focused on publications in either English or Bahasa Malaysia within the timeline of 2010 until 2023.

Table 1: The synonyms used from the searched keywords

Keyword	Synonym keywords
Female reproductive system	Female Genitalia, female reproductive organs, fallopian tubes, ovary, uterus, vagina
Islamic perspective	Islam, <i>Al-Qur'an</i> , <i>Al-Hadith</i> , <i>Maqasid Shariah</i> , <i>Usul Al-Fiqh</i> , Islamic medical ethics

FINDINGS

(A) Basic Concepts of Islamic Worldview in Health and Islamic Medical Ethics

The Islamic worldview originates from the fundamental belief that life and existence came into reality due to the will, desire, and design of the One and Only Creator. This refers to the most basic essence of Islam that makes up the Islamic belief and faith. Hence, the concept of God is the main essence that should come first in any discussions on nature and man's relation to it. (Mavani, 2023; Sajjad, 2023) For example, the concept of the Oneness of God and the belief of all creatures and the universe are the signs of Allah's Glory. The most important thing on the Islamic concept and faith is that they are divinely origin revealed by Allah the Most High, not corrupted by human source (Bouzarinejad et al., 2017; Shanan, 2010). Meanwhile, *shariah* is the Islamic law that can be defined as the principles that control a Muslim's manner toward himself and people around him including the nation and Muslims as a whole. It has the objective to establish justice, to promote individual education, to uphold morality either in public or private, to prevent hardship of individual and community and to prevent oppression

in the society (Dickson, 2014; Osman, 2017).

Islam offers such a system and presents the ethics and moral order in which good and evil can be evidently distinguished by resorting to human reason. *The Qur'an* (3:110) translated as, "You are the best of peoples, evolved for mankind, enjoining what is right, forbidding what is wrong and believing in Allah." In general, medical ethics focus on four principles; beneficence (promotion of welfare, denoting acts of mercy, unstinting love and selfless humanity), non-maleficence (the concept of avoiding the risk of harm to others), justice (to ensure fairness and equity, aspiring to fulfil the rights of all actors in any given scenario), and autonomy (the acknowledgement of, and respect for, each individuals having the entitlement to hold views, decide and act according to their beliefs and value systems, provided that this does not cause harm to or impinge upon the rights of others) (Al Sayyari, 2021; Bouhedda et al., 2018; Sartell & Padela, 2015). These principles are in line with the Islamic medical ethics which involves;

1. The principles of Islamic jurisprudence, known as *Usul al Fiqh*, involve the methodology and compilation of principles through which Muslim jurists derive legal rulings from the foundational sources of Islamic law. These sources include *Al-Qur'an*, *Al-Hadith*, *Ijma'*, and *Qias*.
2. The foundation of Sharia law, *Maqasid Shariah*, aims to uphold five key purposes: *din* (religion), *nafs* (life), *nasl* (progeny), *'aql* (intellect), and *māl* (wealth).
3. Islamic legal maxims, known as *Qawa'id fiqhiyya*, constitute a set of abstract rules derived from a comprehensive study of jurisprudence. The five major legal maxims include: matters are determined by intentions (*al-umur bi maqasidiha*), certainty is not overcome by doubt (*al-yaqin la yazul bi al-shak*), hardship begets facility (*al-mashaqqah tajlib al-taysir*), harm is to be eliminated (*al-darar yuzal*), and custom is an arbiter (*al-'adah muhakkamah*).

The Islamic perspective on the reproductive system, particularly that of women, is rooted in a holistic understanding of human existence, guided by the teachings of the Quran and Al-Hadith. Islam places a significant emphasis on the sanctity of life, the family structure, and the physical and spiritual well-being of individuals (Arawi, 2010; Naseem et al., 2023). Islam acknowledges that men and women were created from a single soul and are complementary to each other (The Quran 7:189, 4:1). The reproductive system, designed by Allah, is integral to the continuation of life and the establishment of families. The Quran also recognizes the process of conception and development in the womb as a divine creation, emphasizing the stages of embryonic development (The Quran 23:13-14). Islam places a strong emphasis on maintaining good health and well-being. The general view of the women's reproductive system includes promoting a healthy lifestyle, seeking medical care when needed, and recognizing the importance of physical and mental health in fulfilling one's religious and familial duties.

(B) The General View of Women Reproductive System

Reproductive system is a system that involves the reproductive organs of male and female in producing offspring. However, besides involves in producing offspring, female reproductive organ has extra role to preserve the growth of embryos and fetuses. The reproductive system is made by God as the means for human creation in this world for it to be something to be

pondered by humans in perceiving His Glory. The miracle of human creation is mentioned by Allah in The Qur'an translated as, "But does not man call to mind that We created him before out of nothing?" (The Qur'an, 19: 67). In the other verse translated as, "And Allah did create you from dust; then from a sperm-drop; then He made you in pairs. And no female conceives, or lays down (her load), but with His knowledge. Nor is a man long-lived granted length of days, nor is a part cut off from his life, but is in a Decree (ordained). All this is easy to Allah." (The Qur'an, 35:11)

The female reproductive system is a complex and intricately regulated system that plays a crucial role in the creation and sustenance of life. Comprising internal and external structures, this system undergoes dynamic changes throughout a woman's life, primarily governed by the interplay of hormones. At the core of the system are the ovaries, which produce eggs (ova) and hormones, including estrogen and progesterone (Del-Vecchio, 1980; Hasim et al., 2016). The menstrual cycle, a fundamental aspect of female reproductive physiology, is orchestrated by the cyclic release of these hormones. The cycle consists of distinct phases, starting with the follicular phase, where an egg matures within a follicle, and leading to ovulation, the release of the egg from the ovary. On the other hand, the fallopian tubes serve as conduits for the egg to travel from the ovary to the uterus. Fertilization typically occurs in the fallopian tubes when sperm meets the released egg. The fertilized egg then journeys to the uterus for implantation. If fertilization doesn't occur, hormonal changes trigger the shedding of the uterine lining, marking the onset of menstruation (Chatterjee, 2020; Thomas, 2019).

Furthermore, the uterus, a muscular organ, is pivotal in pregnancy. It provides a nurturing environment for a fertilized egg to implant and develop into a fetus. The cervix, the lower part of the uterus, connects it to the vagina. This canal serves as a passage for menstrual blood, receives sperm during intercourse, and acts as the birth canal during childbirth. Supporting structures include the mammary glands, responsible for breastfeeding (Liu et al., 2023; Tjahyadi & Tjandraprawira, 2022). Hormonal changes during pregnancy stimulate the growth and development of these glands, preparing them for lactation. The intricate ballet of hormones, the menstrual cycle, and the anatomical structures collectively enable the female reproductive system to fulfill its multifaceted roles—from the initiation of menstruation and the potential for conception to the gestation of a developing fetus and the capacity for nourishing an infant through breastfeeding (Dunphy et al., 2022; Li et al., 2023; Muhsin et al., 2023). This dynamic system reflects the marvel of biological design, allowing for the perpetuation of life within the intricate framework of the female body.

(D) The Menstrual Cycle and Pathophysiology of Female Fertility in relation with Islamic viewpoint

Menstruation is a natural process in a woman's reproductive cycle. Islam acknowledges menstruation and provides guidelines for women during this period. While there is a prohibition on certain acts of worship (such as prayer and fasting) during menstruation, this is not considered a stigma (Hasim et al., 2016; Merritt et al., 2015). Instead, it is a recognition of the physical and emotional changes women undergo during this time, allowing for a period of rest and self-care. The menstrual cycle is a complex, orchestrated series of physiological events that occurs in women of reproductive age, typically lasting around 28 days, although variations are common. This intricate cycle is governed by a delicate interplay of hormones, primarily

estrogen and progesterone, orchestrated by the hypothalamus, pituitary gland, and ovaries. The cycle is divided into several phases: the menstrual phase, the follicular phase, ovulation, and the luteal phase. The menstrual phase marks the shedding of the uterine lining if fertilization did not occur in the previous cycle. This phase is initiated by a drop in estrogen and progesterone levels, leading to the release of the endometrial tissue and blood through the vagina. Following menstruation, the follicular phase begins. The hypothalamus releases gonadotropin-releasing hormone (GnRH), stimulating the pituitary gland to release follicle-stimulating hormone (FSH). FSH, in turn, triggers the maturation of ovarian follicles, each containing an immature egg. As these follicles grow, they produce estrogen, preparing the uterine lining for a potential pregnancy (Anthony et al., 2022; Belay & Aragaw, 2022; Zhang et al., 2023). Ovulation, a pivotal event in the menstrual cycle, occurs around the midpoint. High levels of estrogen trigger a surge in luteinizing hormone (LH), causing the mature follicle to rupture and release the egg into the fallopian tube. This phase represents the window of fertility, as the released egg awaits fertilization by sperm. The luteal phase ensues after ovulation. The ruptured follicle transforms into a structure called the corpus luteum, which secretes progesterone. This hormone maintains the uterine lining, preparing it for potential embryo implantation. If fertilization does not occur, the corpus luteum degenerates, leading to a decline in progesterone and initiating the next menstrual cycle.

In the absence of implantation, the glandular secretion of progesterone and estrogen is inhibited, thus, triggers spiral artery vascular spasm that finally leads to endometrial ischemia causing the destruction of the endometrial lining (S.Berek, 2011). On day 20th to 23rd, due to progesterone action, the stromal edema of fibroblast is apparent and after a few days of towards the menstruation, the stroma becomes infiltrated by natural killer cells, macrophages, and T cells (R.Nair & S.Taylor, 2010). This leucocytic infiltration stimulates the collapse of the endometrial stroma and the onset of menstrual flow (S.Berek, 2011). All of these highly coordinated and complex events of the menstrual cycle are repeated in all females over a specific period. In every month, there will be formation of new mature egg and secretion of the same hormones according to the different phases. During this period of menstrual cycle, the changes pertaining to the endometrial lining can only be identified by an anatomical or gynaecological examination which is only possible in this modern century by means of modern medical technology. However, all the endometrial changes, which are also declared by scientists are miraculously mentioned in The Qur'an (13:8) translated as, "Allah knows what every female bears and what increases and decreases in the wombs. And with Him everything is determined with precision."

The interpretation from the verse had been interpreted in women reproductive physiology where every shrinking and swelling of the womb refers to the shedding of the endometrial lining during menstruation due to the absence of implantation and the thickening of the endometrium in preparation for the implantation of the blastocyst in which these changes signify the whole events of the menstrual cycle. Begin with the menstruation phase, the thickness of the endometrial layer increases from 0.5 to 5mm during the proliferative phase. While during the secretory phase, the endometrium layer can become as thick as 5 to 6mm. It is such an amazing discovery to know that what have been only discovered by us today is actually has been long before indicated in the Quran. This reality only reveals the miracles of the Quran which is no doubt that it is definitely created by Allah the Most Glorious and the Most Knowing above all and revealed to The Prophet Muhammad Peace be Upon Him (PBUH)

This discovery also denies the claim of others who intentionally said that the Quran is invented by Rasulullah s.a.w himself or any other human being to deceive people.

Furthermore, the above verse also stress that He has set everything in specific measures. This can be reflected to the fact that for different phases of menstrual cycle, specific levels of combination of hormones is crucially required in order for particular phase to occur. Any disruption to the normal levels of any of the hormones will affect the build up or shedding of the endometrium lining. In addition, it can also be understand from the verse that the endometrium lining also undergoes the process of thickening and thinning to a specific thickness according to different phases. Therefore, menstrual cycle can be explained in terms of the organ being examined which can be either ovary or endometrium. Pertaining to the ovary, the phases can be divided into follicular phase and luteal phase. While, taking into account the endometrium changes, the phases include the proliferative and secretory phases. All these phases are integrated and marked by the release of sex steroid hormones which stimulate the changes of endometrium's thickness. And this changes miraculously stated in the Quran which exist long before the invention of anatomical or gynaecological examination which indicate the miracle of the Quran and the glory of Allah s.w.t, the Most knowing above all.

Islamic medical ethics also provide comprehensive guidance on the female reproductive system within the context of both physiology and healthcare. This guidance is derived from Islamic jurisprudence, The Quran, and Al-Hadith (Al Sayyari, 2021; Arawi, 2010; Sartell & Padela, 2015). Islam provides a holistic understanding of life, emphasizing hygiene, respect, dignity, and ethical considerations. The guidance spans various aspects that aim to ensure the well-being of individuals, families, and communities while maintaining a balance between religious principles and the physiological realities of the female reproductive system. For example, the guidance on cleanliness and purification especially during menstruation. Poor menstrual hygiene management (MHM) can have significant and far-reaching effects on a woman's health, both in the short term and over the course of her reproductive life. These effects extend beyond mere discomfort and can impact various aspects of physical, mental, and social well-being. Poor menstrual hygiene management can lead to infections and reproductive health issues where untreated infection will give impact on fertility and pregnancy, increased risk of Pelvic Inflammatory Disease (PID), and impact of mental health (Al Omari et al., 2016; Siti Fatimah et al., 2018). To address these challenges, it is crucial to promote awareness about menstrual hygiene, provide access to affordable and sustainable menstrual products, improve sanitation facilities, and combat societal stigma surrounding menstruation. Empowering women with knowledge and resources for proper menstrual hygiene management not only has immediate health benefits but also contributes to broader goals of gender equality, education, and economic development.

Islamic law prohibits a menstruating woman from participating in activities such as prayer, fasting, or engaging in sexual relations during her menstrual cycle. Prohibition of sexual intercourse in Islam are explained in The Qur'an (2:222) translated as, "And they ask you about menstruation. Say, "It is harm, so keep away from wives during menstruation. And do not approach them until they are pure. And when they have purified themselves, then come to them from where Allāh has ordained for you. Indeed, Allāh loves those who are constantly repentant and loves those who purify themselves." Scientifically, it is established that blood provides an optimal environment for bacterial growth. Furthermore, sexually transmitted infections can be

transmitted through menstrual blood, making it crucial to avoid sexual activity with menstruating women. Engaging in intercourse during menstruation may introduce bacteria into the female uterus, triggering inflammation in the urinary organs. This can result in pain during menstruation, anemia, endocrine damage, and complications in pregnancy. These conditions collectively heighten the risk of infections associated with sexual activity during menstruation. Consequently, it is emphasized that menstrual flow serves as a form of cleansing for a woman's body, acting as a protective mechanism against toxins that could pose significant harm and danger. The prohibition on intercourse during menstruation is also grounded in concerns related to potential foetal abnormalities, as well as health issues such as leprosy and vitiligo.

Many researchers have argued that, fasting during menstruation is generally forbidden based on religious teachings where it actually aligning with physiological considerations and the overall well-being of women. Menstruation is a natural physiological process that involves hormonal fluctuations, changes in blood flow, and potential discomfort for many women (Bawadi et al., 2020; Dunphy et al., 2022; Siti Fatimah et al., 2018). Fasting, which involves abstaining from food and drink for an extended period, can impose additional physiological stress on the body. The combination of fasting and menstruation may exacerbate symptoms such as fatigue, headaches, and abdominal cramps, potentially compromising a woman's overall health and well-being. During menstruation, women may also experience increased nutritional needs due to the loss of blood and the body's efforts to repair and regenerate tissues. Fasting may restrict the intake of essential nutrients, including iron, which is crucial for replenishing the blood lost during menstruation. Inadequate nutrition during this period can lead to fatigue, weakness, and may impact long-term health. Menstruation can contribute to fluid loss and combining it with fasting may lead to dehydration. Dehydration can exacerbate menstrual symptoms, cause dizziness, and impact cognitive function, which is particularly important to consider during fasting (Ahuja et al., 2020; Akhavan Amjadi et al., 2022; Grieger & Norman, 2020).

Additionally, hormonal changes during menstruation already affect a woman's physical and emotional well-being. Fasting may further disrupt hormonal balance, potentially leading to mood swings, irritability, and increased stress levels. Maintaining stable hormonal levels is crucial for overall health, and the additional stress of fasting during menstruation may have negative consequences. The Islamic legal maxim that involve elimination of harm are in parallel with health sciences perspective where it is crucial for women to prioritize their health during menstruation, ensuring they meet their nutritional needs, stay adequately hydrated, and manage any symptoms effectively (Hashi, 2019; Muhsin et al., 2023; Shanan, 2010).

(E) Pregnancy and Childbirth in Relation with Islamic Perspective

Pregnancy is highly valued in Islam, and motherhood is considered one of the noblest roles for women. The Quran emphasizes the gratitude owed to mothers for the hardships they endure during pregnancy, childbirth, and breastfeeding (Quran 46:15, 31:14). Islam encourages compassion, care, and support for pregnant women, recognizing the challenges they face and the importance of creating a nurturing environment for the unborn child. The pregnancy starts from understanding of the physiology of fertilization is a complex and orchestrated process essential for the continuity of life. In the female reproductive system, fertilization typically occurs in the fallopian tubes after the release of an egg from the ovary during ovulation. Sperm,

introduced through sexual intercourse, navigates through the cervix and into the uterus, ultimately reaching the fallopian tubes. Successful fertilization is contingent upon the meeting of a viable sperm with a mature egg, forming a zygote. This union initiates a cascade of events, including the fusion of genetic material, the activation of developmental pathways, and the formation of a single-cell embryo. The zygote undergoes multiple rounds of cell division, leading to the development of a blastocyst. From an Islamic perspective, the process of fertilization is revered as a divine and purposeful creation. The Quran acknowledges the stages of embryonic development, highlighting the meticulous design and progression from a fertilized egg to a developed fetus (Quran 23:13-14). Islamic teachings emphasize the sanctity of life, recognizing that each individual is fashioned with intention and purpose by the Creator. The intricate physiological processes involved in fertilization align with Islamic beliefs, reinforcing the reverence for life and the profound nature of the reproductive journey.

Upon successful fertilization, the blastocyst implants into the lining of the uterus, marking the commencement of pregnancy. The physiological changes that accompany pregnancy are orchestrated by intricate hormonal interactions, particularly those involving human chorionic gonadotropin (hCG), estrogen, and progesterone. These hormones play pivotal roles in maintaining the uterine environment, supporting the growing embryo, and preparing the body for the impending changes of gestation. As pregnancy progresses, the placenta develops, serving as a vital interface between the maternal and fetal circulatory systems. The placenta facilitates the exchange of nutrients, oxygen, and waste products, ensuring the well-being and nourishment of the developing fetus (Church et al., 2023; Legro et al., 2020; Okunlola, 2022). The mother's body undergoes remarkable adaptations to accommodate the growing life within, including changes in blood volume, cardiac output, and the structure of organs such as the uterus. Islam places a profound emphasis on the sanctity of life and the responsibilities associated with parenthood. The Quran acknowledges the stages of fetal development, underscoring the divine knowledge and intention behind the creation of each individual (Quran 23:13-14). Pregnancy is regarded as a blessed and noble experience in Islamic teachings, and the nurturing of the unborn child is considered a virtuous and sacred responsibility. Islamic teachings emphasize the well-being of pregnant women and advocate for compassionate care during this transformative period. Husbands are encouraged to provide emotional and physical support to their wives, recognizing the challenges and significance of pregnancy. The holistic approach of Islam to pregnancy aligns with the physiological intricacies, emphasizing the interconnectedness of spiritual and physical well-being.

The physiological processes of fertilization and pregnancy intertwine seamlessly with Islamic perspectives, emphasizing the intentional design and purpose behind human creation. The intricate biological mechanisms are viewed through the lens of divine wisdom, reinforcing the sanctity of life from the moment of conception. The physiological changes in the female body during pregnancy align with the Quranic recognition of the gradual and purposeful development of the fetus (Flynn, 1981; Nose-Ogura et al., 2023; Romieu et al., 2018). Moreover, the responsibilities and ethical considerations associated with pregnancy find resonance in Islamic teachings. The Quran and Hadith emphasize the importance of providing care, nourishment, and respect to pregnant women, recognizing their elevated status during this critical period. The relationships between the physiological aspects of reproduction and Islamic perspectives create a harmonious narrative that underscores the interconnectedness of spiritual beliefs and the biological processes that sustain life.

Contraception, within the framework of Islamic viewpoints and Maqasid Shariah (objectives of Islamic law), is a subject that requires careful consideration. The primary objective of Islamic teachings is to preserve life, and family planning is regarded as permissible as long as it aligns with the broader ethical principles of Islam. The Quran emphasizes responsible parenthood, encouraging individuals to ensure the well-being of their families. The use of contraception is seen as a means to fulfill this responsibility by spacing or limiting the number of children according to the family's capacity to provide for them. Islamic scholars have endorsed various forms of contraception, including temporary methods such as hormonal contraceptives and barrier methods, as long as they do not harm the woman's health (Parikh et al., 2018; Thomas, 2019; Velez et al., 2021). Permanent methods, such as sterilization, are generally discouraged unless there is a valid medical reason. The key consideration is the intent behind family planning, ensuring it aligns with the principles of justice, compassion, and responsibility.

Islamic teachings place a high value on the sanctity of life, and pregnancy is considered a blessed and noble experience. The Quran acknowledges the challenges and hardships associated with pregnancy but emphasizes the importance of providing care and support to pregnant women. The principles of Maqasid Shariah, particularly the preservation of life and lineage, underscore the significance of maternal health during pregnancy. Pregnancy is viewed as a natural and transformative phase in a woman's life, deserving of utmost care and attention. Islamic teachings encourage proper nutrition, healthcare, and emotional support for pregnant women. The health of both the mother and the developing fetus is considered a priority, reflecting the broader Islamic ethic of safeguarding life.

Childbirth is seen as a profound and significant event in Islam, marking the continuation of life and the expansion of the family. The Prophet Muhammad (peace be upon him) emphasized the importance of a safe and dignified childbirth experience, highlighting the need for skilled attendants and compassionate care for laboring women (Bartholomew et al., 2022; Boyce et al., 2019; Dogan et al., 2016). Islamic teachings underscore the mutual responsibilities of spouses during childbirth. Husbands are encouraged to provide emotional and physical support to their wives, and the mother is accorded a high level of respect and care during the process of labor and delivery. The principles of Maqasid Shariah, particularly the preservation of life and the well-being of the family, are evident in the emphasis on ensuring a safe and healthy childbirth experience (Hashi, 2019; Hasim et al., 2016).

In addressing contraception, pregnancy, and childbirth, the principles of Maqasid Shariah act as a guiding framework. The preservation of life, religion, intellect, lineage, and property are central objectives that shape the ethical considerations within these domains. Contraception is viewed through the lens of responsible family planning, aligning with the objectives of preserving life and ensuring the well-being of the family. Pregnancy is approached with a commitment to safeguarding the lives of both the mother and the unborn child. The principles of justice and compassion are evident in the encouragement of proper maternal care, nutrition, and emotional support (Obermeyer, 1994; Serour, 2013; Underwood et al., 2013). Childbirth, as a natural and transformative process, is guided by principles of dignity, respect, and the preservation of life. The balancing act involves recognizing the autonomy and well-being of individuals and families while upholding the broader ethical principles of Islam. The flexibility within Islamic teachings allows for adaptation to individual circumstances, emphasizing the overarching goals of justice, compassion, and responsibility.

In the contemporary context, issues such as reproductive technologies, surrogacy, and assisted reproductive procedures pose new challenges within the realm of Islamic perspectives on contraception, pregnancy, and childbirth. The application of Maqasid Shariah principles requires ongoing scholarly discourse to address emerging ethical dilemmas while staying true to the foundational objectives of Islamic law. Additionally, discussions around women's health, reproductive rights, and access to healthcare become integral to the broader conversations about Islamic viewpoints on family planning. Striking a balance between individual choices, societal needs, and ethical considerations is an ongoing process that necessitates engagement with evolving medical, ethical, and social landscapes (Arousell & Carlbom, 2016; Gooshki & Allahbedashti, 2015).

In a nutshell, contraception, pregnancy, and childbirth within Islamic viewpoints and Maqasid Shariah are nuanced topics that require a delicate balance between individual choices and ethical considerations. The preservation of life, justice, and the well-being of the family are central objectives that guide the ethical dimensions of family planning, maternal health, and childbirth. The flexibility within Islamic teachings allows for adaptation to contemporary challenges while staying true to the overarching principles of Islam. The ongoing dialogue between Islamic scholars, healthcare professionals, and communities is essential to navigate the complexities of these issues in a manner that aligns with the enduring values of justice, compassion, and responsibility inherent in Islamic teachings

Table 2 The physiology of the female reproductive system and The Qur'an and Al-Hadith sources

Female reproductive system	Physiological overview	The Qur'an and Al-Hadith source on physiology of female reproductive system	Reference
Ovaries	At the core of the female reproductive system are the ovaries, a pair of almond-shaped organs. The ovaries produce eggs (ova), the female gametes, and secrete hormones, including estrogen and progesterone. These hormones play pivotal roles in regulating the menstrual cycle, supporting pregnancy, and maintaining overall reproductive health	While the Quran does not specifically mention ovaries, it acknowledges the creation of humans in stages. Quran 23:13-14 states, "Then We made the sperm-drop into a clinging clot, and We made the clot into a lump [of flesh], and We made [from] the lump, bones, and We covered the bones with flesh; then We developed him into another creation. So blessed is Allah, the best of creators."	(Alomair et al., 2020; Ghodrati & Akbarzadeh, 2019; Rashid & Iguchi, 2019)
Hormonal regulation	Hormones, such as follicle-stimulating hormone (FSH), luteinizing hormone (LH), estrogen, and progesterone, regulate the female reproductive system. FSH and LH control the menstrual cycle and ovulation, while estrogen and progesterone regulate the uterine lining and support early pregnancy.		
Menstrual cycle	<p>The menstrual cycle is a fundamental aspect of female reproductive physiology. It is orchestrated by the cyclic release of hormones, particularly estrogen and progesterone. The cycle consists of distinct phases:</p> <ul style="list-style-type: none"> • Follicular Phase: An egg matures within a follicle in the ovary. • Ovulation: The mature egg is released from the ovary. • Luteal Phase: The empty follicle transforms into a structure called the corpus luteum, secreting progesterone to prepare the uterus for potential pregnancy. 	Menstruation is indirectly addressed in the Quran regarding rules related to prayer and fasting. Quran 2:222 states, "And they ask you about menstruation. Say, 'It is harm, so keep away from wives during menstruation. And do not approach them until they are pure. And when they have purified themselves, then come to them from where Allah has ordained for you.'"	(Chowdhury et al., 2023; Placek et al., 2022; Siti Fatimah et al., 2018)
Menstruation	Menstruation is the cyclical shedding of the uterine lining when pregnancy does not occur. It is a normal part of the menstrual cycle and is influenced by hormonal fluctuations.		(Lieberman et al., 2018; Southmayd et al., 2019; Thomas, 2019)

Female reproductive system	Physiological overview	The Qur'an and Al-Hadith source on physiology of female reproductive system	Reference
Fallopian tubes	The fallopian tubes serve as conduits for the egg to travel from the ovary to the uterus. Fertilization typically occurs in the fallopian tubes when sperm meets the released egg. The fertilized egg, now called a zygote, then travels towards the uterus for implantation.	And made his progeny from a quintessence of the nature of a fluid despised: (32: 8) “ We cause whom We will to rest in the womb for an appointed term” (22:5)	(Appiah et al., 2021; Mustafa et al., 2021; Valizadeh et al., 2021)
Vagina	The vagina is a muscular tube that connects the cervix to the external genitalia. It serves as the outlet for menstrual blood, receives the penis during sexual intercourse, and acts as the birth canal during childbirth.	“ Verily, We created man from a small quantity of mingled liquids “ (76:2) “ Was (man) not a sperm which has been poured out. After that he was something which clings, then (God) fashioned him in due proportion “ (75:37-38)	(Al Zaabi et al., 2022; Hani et al., 2021; Hayee et al., 2021)
Uterus	The uterus is a muscular organ where a fertilized egg implants and develops into a fetus during pregnancy. If fertilization does not occur, hormonal changes trigger the shedding of the uterine lining, marking the onset of menstruation. The uterus also plays a crucial role in labor and childbirth.	He created you (all) from a single person: then created, of like nature, his mate; and he sent down for you eight head of cattle in pairs: He makes you, in the wombs of your mothers, in stages, one after another, in three veils of darkness. such is Allah, your Lord and Cherisher: to Him belongs (all) dominion. There is no god but He: then how are ye turned away (from your true Centre)? (39: 6)	(Akseer et al., 2018; Ghodrati & Akbarzadeh, 2019)
Cervix	The cervix is the lower part of the uterus that connects it to the vagina. This canal serves multiple functions, acting as a passage for menstrual blood, receiving sperm during intercourse, and functioning as the birth canal during childbirth.		
External genitalia	The external genitalia, including the labia, clitoris, and vaginal opening, play roles in sexual pleasure, arousal, and childbirth.	Your wives are a place of sowing of seed for you, so come to your place of cultivation however you wish and put forth [righteousness] for yourselves. And fear Allah and know that you will meet Him. And give good tidings to the believers. The Quran (2:223)	(Koukkula et al., 2016)
Pregnancy and maternal health	During pregnancy, hormonal changes support the growth and development of the fetus. The placenta, an organ that develops during pregnancy, facilitates the	Quran 46:15 acknowledges the challenges women face during pregnancy, stating, "And We have enjoined upon man, to his parents, good treatment. His mother carried him with hardship and gave birth to him with hardship, and his gestation and	(Abdi et al., 2020; Al Omari et al., 2016; Pinter et al., 2016)

Female reproductive system	Physiological overview	The Qur'an and Al-Hadith source on physiology of female reproductive system	Reference
	exchange of nutrients and waste products between the mother and the fetus.	weaning [period] is thirty months. [He grows] until, when he reaches maturity and reaches [the age of] forty years, he says, 'My Lord, enable me to be grateful for Your favor which You have bestowed upon me and upon my parents and to work righteousness of which You will approve and make righteous for me my offspring. Indeed, I have repented to You, and indeed, I am of the Muslims.'"	
Breastfeeding	Hormonal changes during pregnancy stimulate the growth and development of mammary glands in the breasts. After childbirth, these glands produce milk to nourish the newborn.	Quran 2:233 encourages breastfeeding and specifies a minimum period of two years for nursing, stating, "The mothers shall give suck to their children for two whole years, (that is) for those (parents) who desire to complete the term of suckling..."	(Espina-Jerez et al., 2022; Naseem et al., 2023)

CONCLUSION

This review has illuminated the intricate intersection of religious teachings and physiological processes. By delving into the nuances of menstruation, contraception, pregnancy, childbirth, and fertility, this manuscript has provided a comprehensive exploration of how Islamic principles influence and intertwine with the complexities of women's reproductive health. The synthesis of Islamic medical ethics with physiological insights not only bridges gaps in understanding but also highlights the harmonious integration of religious values with the inherent biological design. Through this exploration, it becomes evident that Islamic teachings emphasize a holistic approach to women's reproductive well-being, underscoring the sanctity of life, the significance of responsible family planning, and the respect accorded to women throughout the various stages of their reproductive journey. This integrative review contributes to a deeper appreciation of the interconnectedness between religious beliefs and physiological realities, fostering an insight that can inform healthcare practices, cultural perceptions, and future research endeavours in the realm of women's reproductive health within the context of Islamic principles.

CONFLICT OF INTEREST

The author has no conflicts of interest, whether financial or otherwise, in conducting this research.

ACKNOWLEDGMENT

The authors express their gratitude to the Ministry of Higher Education (MOHE) of Malaysia for supporting this publication through the Fundamental Research Grant Scheme (FRGS/1/2021/SKK0/UIAM/02/8).

REFERENCES

- Abdi, B., Okal, J., Serour, G., & Temmerman, M. (2020). “children are a blessing from God”- A qualitative study exploring the socio-cultural factors influencing contraceptive use in two Muslim communities in Kenya. *Reproductive Health*, 17(1). <https://doi.org/10.1186/s12978-020-0898-z>
- Ahuja, M., Frimpong, E., Okoro, J., Wani, R., & Armel, S. (2020). Risk and protective factors for intention of contraception use among women in Ghana. *Health Psychology Open*, 7(2). <https://doi.org/10.1177/2055102920975975>
- Akhavan Amjadi, M., Simbar, M., Hoseini, S. A., & Zayeri, F. (2022). Evaluation of sexual reproductive health needs of women with spinal cord injury in Tehran, Iran. *Sexuality and Disability*, 40(1), 91–104. <https://doi.org/10.1007/s11195-021-09717-9>
- Akseer, N., Kamali, M., Bakhache, N., Mirza, M., Mehta, S., Al-Gashm, S., & Bhutta, Z. A. (2018). Status and drivers of maternal, newborn, child and adolescent health in the Islamic world: a comparative analysis. *The Lancet*, 391(10129), 1493–1512. [https://doi.org/10.1016/S0140-6736\(18\)30183-1](https://doi.org/10.1016/S0140-6736(18)30183-1)
- Al Omari, O., Abdel Razeq, N. M., & Fooladi, M. M. (2016). Experience of Menarche Among Jordanian Adolescent Girls: An Interpretive Phenomenological Analysis. *Journal of Pediatric and Adolescent Gynecology*, 29(3), 246–251. <https://doi.org/10.1016/j.jpbg.2015.09.005>
- Al Sayyari, A. A. K. (2021). Medical Ethics form the Perspective of a Moslem Patient. *Academia Letters*. <https://doi.org/10.20935/AL150>
- Al Zaabi, O., Heffernan, M. E., Holroyd, E., & Jackson, M. (2022). Parent-adolescent communication about sexual and reproductive health including HIV and STIs in Oman. *Sex Education*, 22(5), 611–627. <https://doi.org/10.1080/14681811.2021.1980719>
- Alomair, N., Alageel, S., Davies, N., & Bailey, J. V. (2020). Sexually transmitted infection knowledge and attitudes among Muslim women worldwide: a systematic review. *Sexual and Reproductive Health Matters*, 28(1). <https://doi.org/10.1080/26410397.2020.1731296>
- Anthony, M. S., Zhou, X., Schoendorf, J., Reed, S. D., Getahun, D., Armstrong, M. A., Gatz, J., Peipert, J. F., Raine-Bennett, T., Fassett, M. J., Saltus, C. W., Ritchey, M. E., Ichikawa, L., Shi, J. M., Alabaster, A., Wahdan, Y., Wang, J., Xie, F., Merchant, M., ... Pisa, F. (2022). Demographic, Reproductive, and Medical Risk Factors for Intrauterine Device Expulsion. *Obstetrics and Gynecology*, 140(6), 1017–1030. <https://doi.org/10.1097/AOG.0000000000005000>
- Aolymat, I., Al-Tamimi, M., Almomani, H., Abu-Hassan, D. W., Alzayadneh, E. M., Al-Husban, N., Al Haj Mahmoud, S., & Alsheikh, A. (2023). COVID-19-associated mental health impact on menstruation physiology: A survey study among medical students in Jordan. *Women's Health*, 19. <https://doi.org/10.1177/17455057221150099>
- Appiah, F., Salihu, T., Fenteng, J. O. D., Darteh, A. O., Djan, E. T., Takyi, M., Ayerakwah, P. A., & Ameyaw, E. K. (2021). Factors influencing early postnatal care utilisation among women: Evidence from the 2014 Ghana demographic and health survey. *PLoS ONE*, 16(4 April). <https://doi.org/10.1371/journal.pone.0249480>
- Arawi, T. A. (2010). The Muslim physician and the ethics of medicine. *Journal of the Islamic Medical Association of North America*, 42(3). <https://doi.org/10.5915/42-3-5403>
- Arousell, J., & Carlbom, A. (2016). Culture and religious beliefs in relation to reproductive health. *Best*

- Practice and Research: Clinical Obstetrics and Gynaecology*, 32, 77–87. <https://doi.org/10.1016/j.bpobgyn.2015.08.011>
- Ayoola, A. B., Zandee, G. L., & Adams, Y. J. (2016). Women's Knowledge of Ovulation, the Menstrual Cycle, and Its Associated Reproductive Changes. *Birth (Berkeley, Calif.)*, 43(3), 255–262. <https://doi.org/10.1111/birt.12237>
- Ayubi, Z. (2021). Authority and Epistemology in Islamic Medical Ethics of Women's reproductive Health. *Journal of Religious Ethics*, 49(2), 245–269. <https://doi.org/10.1111/jore.12350>
- Bartholomew, M. E., Rozalski, V., Richards, A., Gurdock, J., Thornton, M., Fee, C., Lipshitz, S. L., Metzler, T. J., Neylan, T. C., & Inslicht, S. S. (2022). Impact of hormonal contraceptives on sex differences in fear conditioning and fear extinction in PTSD. *Learning and Memory*, 29(9), 332–339. <https://doi.org/10.1101/lm.053597.122>
- Bawadi, H., Al-Hamdan, Z., & Ahmad, M. M. (2020). Needs of Migrant Arab Muslim Childbearing Women in the United Kingdom. *Journal of Transcultural Nursing*, 31(6), 591–597. <https://doi.org/10.1177/1043659620921219>
- Belay, D. G., & Aragaw, F. M. (2022). Trend, multivariate decomposition and spatial variations of unintended pregnancy among reproductive-age women in Ethiopia: evidence from demographic and health surveys. *Tropical Medicine and Health*, 50(1). <https://doi.org/10.1186/s41182-022-00440-5>
- Bouhedda, G., Muhammad, A., Luqman, Z., & Sayyed Mohamed, M. (2018). Medical Ethics in the Light of Maqāṣid Al-Sharī'ah: A Case Study of Medical Confidentiality. *Intellectual Discourse*, 26(1), 133–160.
- Bouzarinejad, Y., Zarpeyma, S., & Marandi, E. (2017). Sayyid Qutb and Political Islam: Islamic Government from the Perspective of Sayyid Qutb. *Journal of History Culture and Art Research*, 5(4), 92. <https://doi.org/10.7596/taksad.v5i4.587>
- Boyce, A. M., Casey, R. K., Ovejero Crespo, D., Murdock, C. M., Estrada, A., Guthrie, L. C., Brillante, B. A., Gomez-Lobo, V., Nieman, L. K., & Collins, M. T. (2019). Gynecologic and reproductive outcomes in fibrous dysplasia/McCune-Albright syndrome. *Orphanet Journal of Rare Diseases*, 14(1). <https://doi.org/10.1186/s13023-019-1057-x>
- Chatterjee, P. (2020). Improving menstrual hygiene among adolescent girls in India. *The Lancet Child and Adolescent Health*, 4(6), 422–423. [https://doi.org/10.1016/S2352-4642\(20\)30142-5](https://doi.org/10.1016/S2352-4642(20)30142-5)
- Chin, A. H. B., Muhsin, S. M., & Ahmad, M. F. (2023). Islamic Perspectives on Elective Ovarian Tissue Freezing by Single Women for Non-medical or Social Reasons. *Asian Bioethics Review*, 15(3), 335–349. <https://doi.org/10.1007/s41649-022-00236-z>
- Chowdhury, S., Rahman, M. M., & Haque, M. A. (2023). Role of women's empowerment in determining fertility and reproductive health in Bangladesh: a systematic literature review. *AJOG Global Reports*, 3(3). <https://doi.org/10.1016/j.xagr.2023.100239>
- Church, S., Ejder Apay, S., Gurol, A., Slaveva, Y., & Mills, R. (2023). Student midwives' perspectives of women's sexual and reproductive health literacy in Turkey. *Sexual and Reproductive Healthcare*, 37. <https://doi.org/10.1016/j.srhc.2023.100864>
- Czajkowska, M., Plinta, R., Rutkowska, M., Brzęk, A., Skrzypulec-Plinta, V., & Drosdzol-Cop, A. (2019). Menstrual cycle disorders in professional female rhythmic gymnasts. *International Journal of Environmental Research and Public Health*, 16(8).

<https://doi.org/10.3390/ijerph16081470>

- Del-Vecchio, G. M. J. (1980). Of blood and babies: The relationship of popular islamic physiology to fertility. *Social Science and Medicine*, 14 B(3), 147–156. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-0019129576&partnerID=40&md5=a7853cfe84324e10f5cdeea58fe4c2ec>
- Dickson, W. R. (2014). An American Sufism: The Naqshbandi-Haqqani Order as a Public Religion. *Studies in Religion/Sciences Religieuses*, 43(3), 411–424. <https://doi.org/10.1177/0008429814538229>
- Dogan, M., Yiginer, O., Uz, O., Kucuk, U., Degirmencioglu, G., Isilak, Z., Uzun, M., & Davulcu, E. (2016). The Effects of Female Sex Hormones on Ventricular Premature Beats and Repolarization Parameters in Physiological Menstrual Cycle. *PACE - Pacing and Clinical Electrophysiology*, 39(5), 418–426. <https://doi.org/10.1111/pace.12821>
- Dunphy, L., Wood, F., Hallchurch, J., Douce, G., & Pinto, S. (2022). Ruptured ovarian ectopic pregnancy presenting with an acute abdomen. *BMJ Case Reports*, 15(12). <https://doi.org/10.1136/bcr-2022-252499>
- Espina-Jerez, B., Romera-Álvarez, L., de Dios-Aguado, M., Cunha-Oliveira, A., Siles-Gonzalez, J., & Gómez-Cantarino, S. (2022). Wet Nurse or Milk Bank? Evolution in the Model of Human Lactation: New Challenges for the Islamic Population. *International Journal of Environmental Research and Public Health*, 19(15). <https://doi.org/10.3390/ijerph19159742>
- Farohah, N. (2022). Reform on the Marriage Age Limit by Jakarta Women’s Health Organizations in Maqāsid al-Syarī’ah Perspective. *Samarah*, 6(1), 198–223. <https://doi.org/10.22373/SJHK.V6I1.12892>
- Flynn, A. M. (1981). A survey of postpartum fertility studies with particular reference to the breastfeeding mother. *International Journal of Fertility*, 26(3), 203–208. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-0019850387&partnerID=40&md5=7f496240427f3de2d650d423e49b79e6>
- Ghodrati, F., & Akbarzadeh, M. (2019). Jurisprudence study of muslim rules and effects of ovarian transplants in women with infertility; A review. *Current Women’s Health Reviews*, 15(3), 165–170. <https://doi.org/10.2174/1573404814666181015125406>
- Gooshki, E. S., & Allahbedashti, N. (2015). The process of justifying assisted reproductive technologies in Iran. *Indian Journal of Medical Ethics*, 12(2), 57–96. <https://doi.org/10.20529/ijme.2015.027>
- Grieger, J. A., & Norman, R. J. (2020). Menstrual cycle length and patterns in a global cohort of women using a mobile phone app: Retrospective cohort study. *Journal of Medical Internet Research*, 22(6). <https://doi.org/10.2196/17109>
- Hamdy, S. F. (2009). Islam, Fatalism, and Medical Intervention: Lessons from Egypt on the Cultivation of Forbearance (Sabr) and Reliance on God (Tawakkul). *Anthropological Quarterly*, 82(1), 173–196. <http://www.jstor.org/stable/25488262>
- Hani, R. A., Peleg, R., Freud, T., & Treister-Goltzman, Y. (2021). Knowledge, attitudes and contraceptive use among Muslim Bedouin women in southern Israel. *Health and Social Care in the Community*, 29(4), 889–896. <https://doi.org/10.1111/hsc.13122>
- Hashi, A. A. (2019). The Applications of Maqasid Al-Shari’ah in Medicine: An Overview. *Revelation and Science*, 9(2), 1–20.

- Hasim, N. A., Kashim, M. I. A. M., Othaman, R., Yahaya, M. Z., Khalid, R., & Samsudin, M. A. (2016). Menses from the perspective of science and Maqasid Syariah. *Sains Malaysiana*, 45(12), 1879–1885. <https://doi.org/10.17576/jsm-2016-4512-12>
- Hayee, F., Fongkaew, W., Chanprasit, C., Kaewthummanukul, T., & Voss, J. G. (2021). Sexual risk behaviors and influencing factors among Muslim adolescents on southern border of Thailand. *International Journal of Adolescent Medicine and Health*, 33(6), 469–477. <https://doi.org/10.1515/ijamh-2019-0221>
- Hughes Rinker, C. (2015). Creating Neoliberal Citizens in Morocco: Reproductive Health, Development Policy, and Popular Islamic Beliefs. *Medical Anthropology: Cross Cultural Studies in Health and Illness*, 34(3), 226–242. <https://doi.org/10.1080/01459740.2014.922082>
- Hwang, I. R., Choi, Y. K., Lee, W. K., Kim, J. G., Lee, I. K., Kim, S. W., & Park, K. G. (2016). Association between prolonged breastfeeding and bone mineral density and osteoporosis in postmenopausal women: KNHANES 2010-2011. *Osteoporosis International*, 27(1), 257–265. <https://doi.org/10.1007/s00198-015-3292-x>
- Koukkula, M., Keskimäki, I., Koponen, P., Mölsä, M., & Klemetti, R. (2016). Female Genital Mutilation/Cutting among Women of Somali and Kurdish Origin in Finland. *Birth (Berkeley, Calif.)*, 43(3), 240–246. <https://doi.org/10.1111/birt.12236>
- Legro, N. R., Lehman, E. B., & Kjerulff, K. H. (2020). Mode of first delivery and postpartum weight retention at 1 year. *Obesity Research and Clinical Practice*, 14(3), 241–248. <https://doi.org/10.1016/j.orcp.2020.04.009>
- Li, J., Li, Y., Li, M., Zhao, X., Zheng, W., Zhang, J., Zhang, Y., Li, J., & Guan, Y. (2023). Analysis of cumulative live birth rate outcomes of three ovarian stimulation protocols in patients after laparoscopic cystectomy of ovarian endometrioma: a retrospective cohort study. *Reproductive Health*, 20(1). <https://doi.org/10.1186/s12978-023-01671-3>
- Lieberman, J. L., De Souza, M. J., Wagstaff, D. A., & Williams, N. I. (2018). Menstrual Disruption with Exercise Is Not Linked to an Energy Availability Threshold. *Medicine and Science in Sports and Exercise*, 50(3), 551–561. <https://doi.org/10.1249/MSS.0000000000001451>
- Liu, D., Li, L., Sun, N., Zhang, X., Yin, P., Zhang, W., Hu, P., Yan, H., & Zhang, Q. (2023). Effects of body mass index on IVF outcomes in different age groups. *BMC Women's Health*, 23(1). <https://doi.org/10.1186/s12905-023-02540-8>
- Mavani, H. (2023). Islam. In *World Religions for Healthcare Professionals: Third Edition* (pp. 127–141). Taylor and Francis. <https://doi.org/10.4324/9781003288862-10>
- Merritt, M. A., Riboli, E., Murphy, N., Kadi, M., Tjønneland, A., Olsen, A., Overvad, K., Dossus, L., Dartois, L., Clavel-Chapelon, F., Fortner, R. T., Katzke, V. A., Boeing, H., Trichopoulou, A., Lagiou, P., Trichopoulos, D., Palli, D., Sieri, S., Tumino, R., ... Gunter, M. J. (2015). Reproductive factors and risk of mortality in the European Prospective Investigation into Cancer and Nutrition; a cohort study. *BMC Medicine*, 13(1). <https://doi.org/10.1186/s12916-015-0484-3>
- Muhsin, S. M., Chin, A. H. B., & Padela, A. I. (2023). An Ethico-Legal Analysis of Artificial Womb Technology and Extracorporeal Gestation Based on Islamic Legal Maxims. *New Bioethics*. <https://doi.org/10.1080/20502877.2023.2269638>
- Mustafa, M., Zaman, K., Ahmad, T., Batool, A., Ghazali, M., & Ahmed, N. (2021). *Religion and women's intimate health: Towards an inclusive approach to healthcare*.

<https://doi.org/10.1145/3411764.3445605>

- Naseem, A., Majed, M., Abdallah, S., Saleh, M., Lirhoff, M., Bazzi, A., & Caldwell, M. T. (2023). Exploring Muslim Women's Reproductive Health Needs and Preferences in the Emergency Department. *Western Journal of Emergency Medicine*, 24(5), 983–992. <https://doi.org/10.5811/westjem.58942>
- Nose-Ogura, S., Yoshino, O., Kamoto-Nakamura, H., Kanatani, M., Harada, M., Hiraike, O., Saito, S., Fujii, T., & Osuga, Y. (2023). Age and menstrual cycle may be important in establishing pregnancy in female athletes after retirement from competition. *Physician and Sportsmedicine*. <https://doi.org/10.1080/00913847.2023.2199687>
- Obermeyer, C. M. (1994). Reproductive choice in Islam: gender and state in Iran and Tunisia. *Studies in Family Planning*, 25(1), 41–51. <https://doi.org/10.2307/2137988>
- Oduşina, E. K., Ayotunde, T., Kunnuji, M., Ononokpono, D. N., Bishwajit, G., & Yaya, S. (2020). Fertility preferences among couples in Nigeria: A cross sectional study. *Reproductive Health*, 17(1). <https://doi.org/10.1186/s12978-020-00940-9>
- Okunlola, D. A. (2022). Women's and male partners' socio-demographic and economic characteristics associated with contraceptive decision making in Nigeria. *BMC Women's Health*, 22(1). <https://doi.org/10.1186/s12905-022-02045-w>
- Osman, M. N. M. (2017). The Islamic conservative turn in Malaysia: impact and future trajectories. *Contemporary Islam*, 11(1), 1–20. <https://doi.org/10.1007/s11562-016-0373-3>
- Parikh, N. I., Kapphahn, K., Hedlin, H., Olgin, J. E., Allison, M. A., Magnani, J. W., Ryckman, K. R., Waring, M. E., Perez, M. V., & Howard, B. V. (2018). Effects of reproductive period duration and number of pregnancies on midlife ECG indices: A secondary analysis from the Women's Health Initiative Clinical Trial. *BMJ Open*, 8(8), 1–11. <https://doi.org/10.1136/bmjopen-2017-019129>
- Pinter, B., Hakim, M., Seidman, D. S., Kubba, A., Kishen, M., & Di Carlo, C. (2016). Religion and family planning. *European Journal of Contraception and Reproductive Health Care*, 21(6), 486–495. <https://doi.org/10.1080/13625187.2016.1237631>
- Placek, C., Mohanty, S., Bhoi, G. K., Joshi, A., & Rollins, L. (2022). Religion, Fetal Protection, and Fasting during Pregnancy in Three Subcultures. *Human Nature*, 33(3), 329–348. <https://doi.org/10.1007/s12110-022-09433-z>
- Rashid, A., & Iguchi, Y. (2019). Female genital cutting in Malaysia: A mixed-methods study. *BMJ Open*, 9(4). <https://doi.org/10.1136/bmjopen-2018-025078>
- Romieu, I., Biessy, C., Carayol, M., His, M., Torres-Mejía, G., Ángeles-Llerenas, A., Sánchez, G. I., Jaramillo, R., Navarro, E., Porras, C., Ocampo, R., Rodriguez, A. C., Garmendia, M. L., Bustamante, E., Olivier, M., Porter, P., Rinaldi, S., Tejeda, J., Gaete, F., ... Guillen, D. (2018). Reproductive factors and molecular subtypes of breast cancer among premenopausal women in Latin America: the PRECAMA study. *Scientific Reports*, 8(1). <https://doi.org/10.1038/s41598-018-31393-7>
- Sajjad, H. B. (2023). The Designed Limitation of Human Epistemology and the Necessity of Faith: An Islamic Perspective. *Islamic Studies*, 62(3), 403–422. <https://doi.org/10.52541/ISIRI.V62I3.2793>
- Sartell, E., & Padela, A. I. (2015). Adab and its significance for an Islamic medical ethics. *Journal of Medical Ethics*, 41(9), 756–761. <https://doi.org/10.1136/medethics-2014-102276>

- Serour, G. I. (2013). Ethical issues in human reproduction: Islamic perspectives. *Gynecological Endocrinology*, 29(11), 949–952. <https://doi.org/10.3109/09513590.2013.825714>
- Shanan, M. (2010). *Contemporary Islamic Legal Discourse: A Study of Sayyid Qutb (Fi Zilal Al-Qur'an)*. Iain Press.
- Siti Fatimah, S., Nadhirah, N., Siti Khatijah, I., Tengku Fatimah, M. T. M., Zurita, Mohd. Y., Ramlah, M. A., & Rogayah, S. S. A. (2018). Intercourse during Menstruation: Islamic Ethics and Medical Views. *International Journal of Academic Research in Business and Social Sciences*, 8(10), 212–217. <http://hrmars.com/index.php/pages/detail/IJARBSS>
- Southmayd, E. A., Williams, N. I., Mallinson, R. J., & De Souza, M. J. (2019). Energy Deficiency Suppresses Bone Turnover in Exercising Women with Menstrual Disturbances. *Journal of Clinical Endocrinology and Metabolism*, 104(8), 3131–3145. <https://doi.org/10.1210/jc.2019-00089>
- Thomas, V. G. (2019). The Link Between Human Menstruation and Placental Delivery: A Novel Evolutionary Interpretation: Menstruation and fetal placental detachment share common evolved physiological processes dependent on progesterone withdrawal. *BioEssays*, 41(6). <https://doi.org/10.1002/bies.201800232>
- Tjahyadi, D., & Tjandraprawira, K. D. (2022). Poor in vitro fertilisation outcomes in genital tuberculosis – Case report. *Annals of Medicine and Surgery*, 81. <https://doi.org/10.1016/j.amsu.2022.104438>
- Underwood, C., Kamhawi, S., & Nofal, A. (2013). Religious leaders gain ground in the Jordanian family-planning movement. *International Journal of Gynecology and Obstetrics*, 123(SUPPL.1), e33–e37. <https://doi.org/10.1016/j.ijgo.2013.07.006>
- Valizadeh, F., Mohammadbeigi, A., Chaman, R., Kashefi, F., Nazari, A. M., & Motaghi, Z. (2021). Sexual and reproductive health challenges in temporary marriage: A systematic review. *Journal of Research in Health Sciences*, 21(1). <https://doi.org/10.34172/jrhs.2021.42>
- Velez, L. M., Seldin, M., & Motta, A. B. (2021). Inflammation and reproductive function in women with polycystic ovary syndrome. *Biology of Reproduction*, 104(6), 1205–1217. <https://doi.org/10.1093/biolre/ioab050>
- Zhang, Y., Liu, Y., Li, Z., & Guan, Y. (2023). Comparison of reproductive outcomes in subclinical hypothyroidism women with high-normal versus low-normal thyroid-stimulating hormone levels after treatment with levothyroxine. *Clinical Endocrinology*, 98(3), 426–435. <https://doi.org/10.1111/cen.14802>