

ECTOGENESIS, GENDER ROLES AND BEYOND: LOOKING THROUGH THE LENSE OF ISLAMIC DISCOURSE

*(Ektogenesis, Peranan Jantina dan Ke Hadapan: Melihat Melalui Kanta Wacana
Islam)*

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ABSTRACT

Ectogenesis, the development of embryos in artificial wombs, holds transformative potential in reproductive technology, challenging traditional gender roles and biological functions which calls for developing bioethical discourse beyond conventional deontological ethical frameworks. This paper is a synthesis review. It explores the implications of ectogenesis through an Islamic perspective, focusing on its impact on the family system and the role of women. It examines how this technology intersects with and potentially redefines gender dynamics within both secular and Islamic frameworks. By decoupling childbirth from the female body, ectogenesis prompts a re-evaluation of conventional gender roles and societal responsibilities historically assigned to women. Using Islamic theological texts, al-Quran, and Hadith, the study investigates concepts such as extracorporeal gestation, purposes of marriage, and gender roles to understand their alignment or conflict with ectogenesis. This research contributes to the dialogue on how cutting-edge and disruptive reproductive technologies necessitate evolving faith-based bioethical frameworks.

Keywords: Artificial womb; ectogenesis; Islamic discourse; Islamic family system

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ABSTRAK

Ektogenesis, perkembangan embrio dalam rahim tiruan, mempunyai potensi transformasi dalam teknologi reproduktif, mencabar peranan jantina tradisional dan fungsi biologi yang mana memerlukan pembangunan wacana bioetika melangkaui rangka kerja etika deontologi konvensional. Kertas ini adalah ulasan sintesis. Ia meneroka implikasi ektogenesis melalui perspektif Islam, dengan memberi tumpuan kepada kesannya terhadap sistem keluarga dan peranan wanita. Ia mengkaji bagaimana teknologi ini berinteraksi dan berpotensi untuk mendefinisikan semula dinamik jantina dalam kedua-dua kerangka sekular dan Islam. Dengan memisahkan kelahiran daripada tubuh wanita, ektogenesis mendorong penilaian semula terhadap peranan jantina konvensional dan tanggungjawab masyarakat yang secara sejarah ditugaskan kepada wanita. Menggunakan teks-teks teologi Islam, al-Quran dan hadis, kajian ini menyiasat konsep-konsep seperti kesucian kehidupan, tujuan perkahwinan, dan peranan jantina untuk memahami keselarasan atau konflik mereka dengan ektogenesis. Penyelidikan ini menyumbang kepada dialog tentang bagaimana teknologi reproduktif memerlukan kerangka bioetika yang berkembang, menggabungkan perspektif yang diinspirasi oleh kepercayaan dan sekular.

Kata kunci: *Rahim buatan; ektogenesis; wacana Islam; sistem keluarga Islam*

INTRODUCTION

Recent advancements in reproductive technologies have the potential to change the way we see and perceive the classical notion of motherhood and its associated paradigms. Innovative methods such as synthetic embryogenesis, which involves creating embryos from embryonic or pluripotent stem cells (also referred to as synthetic embryos) utilizing various bioengineering techniques (Deglincerti et al. 2016) and the use of artificial womb technology for non-natural gestation of a foetus in a biobag (extracorporeal gestation) are leading this paradigm shift (Partridge et al. 2017), raising several important ethical, social, and epistemological questions about the procreation, future of children and the parental roles and responsibilities. Before exploring these sociopsychological implications, it is however, essential to understand the fundamentals of these two technologies including their underlying mechanisms, technical viability and immediate clinical implications:

Artificial Womb Technology (AWT)

Artificial womb technology, also known as ‘ectogenesis’ or ‘extracorporeal gestation’, refers to the process of gestating a foetus outside the uterus within an artificially

designed womb known as a ‘biobag’. It involves simulating the uterine-like milieu (biochemical, hormonal and physiological conditions) in order to support the growth and development of embryos or preterm neonates outside the mother’s body.

While this concept may seem futuristic, its roots trace back to early science fictions. Speculative narratives such as Aldous Huxley’s *Brave New World* (1932) envision a world where human reproduction can be fully managed through artificial methods, featuring “Hatcheries” that can gestate foetuses in synthetic womb, igniting discussions about individuality and personal autonomy (Huxley 1992). Conversely, earlier thinkers such as J.B.S. Haldane in his 1924 essay ‘Daedalus: Science and the Future’ explored ectogenesis as a means to free women from the burdens of childbirth. Nevertheless, these stories have sparked vital conversations about the delicate balance between scientific progress and ethical implications, raising various concerns about how technology might shape human existence.

With that being said, significant progress toward this concept began in the mid-twentieth century when A.S. Parkes, a British researcher, first empirically demonstrated in 1932 the feasibility of using external womb-like environments to support the growth of foetuses when he successfully kept alive lamb foetus in a fluid-filled tank (Parkes 1932). Subsequent milestones included creating a ‘Biobag’ device to maintain preterm lambs in an artificial womb, simulating the intrauterine environment for many days (Unno et al. 1990; Bulletti 2017). These achievements suggested that mammalian foetuses could thrive successfully outside of their mothers’ bodies. Following that, significant efforts were made, culminating in 2016 with the successful maintenance of human embryos alive in a highly controlled artificial environment. Nevertheless, there remain a lot of obstacles, like having an impeccable regulatory system that can supply the proper amounts of oxygen, hormones, and nutrients, as well as amniotic fluid, which protects the developing embryo from harm, promotes the development of the musculoskeletal system, maintains a steady temperature, and more. However, in actuality, this technology is opening up new avenues for women who are unable to carry a foetus to term or who do not have a functioning family. Its main goals are to improve prenatal care and raise the survival rate of extremely premature newborns (Hornick et al. 2019). There are two distinct technological aspects of this process:

1. **Partial Extracorporeal Gestation:** The term ‘partial ectogenesis’ refers to the process of transferring a partially developed embryo or premature foetus from the female body to an external womb to complete the remaining stages of gestation. To put it another way, ‘partial ectogenesis’ simulates methods that are already widely used in neonatology, such as the use of incubators to keep premature babies alive (Räsänen, & Smajdor 2020).

2. Complete Extracorporeal Gestation: It is the process wherein the entire pregnancy, from conception to delivery, could take place outside of the human body.

LIMITATIONS OF ARTIFICIAL WOMB TECHNOLOGIES

Despite significant progress, the objective of creating an artificial womb that perfectly mimics the natural womb environment remains unmet. The existing prototypes not only have a number of technical shortcomings and snags but there are considerable constraints and concerns about the ethical and legal framework and cultural acceptability:

The Gestation Phase

Although artificial wombs have aided in the development of premature animal foetuses for short periods of time, they have not yet reached the level of competence required to support the full gestation period comparable to that of a natural womb (De Bie et al. 2021).

The Difficulty of Replicating Natural Processes

The natural womb is an incredibly complicated organ that provides and supports complex interactions involving the immune system, hormone regulation, and an intricate nurturing environment for the mother and foetus that promotes postnatal attachment, psychological and emotional growth etc., so it is challenging to completely replicate these intricate processes outside of the human body.

Maturation of Organs

While artificial womb prototypes have sustained some aspects of foetal development, ensuring the proper maturation of all vital organs, especially the lungs, brain, and the immune system, is still a stumbling block.

Ethical and Legal Consideration

Aside from technical challenges, ethical and legal issues surrounding artificial womb technology or synthetic embryogenesis, such as safety, the rights of the unborn, and the technology's long-term effects on society, need to be carefully considered before clinical service for humans.

SYNTHETIC EMBRYOGENESIS

Synthetic embryogenesis, also known as ‘Artificial Embryogenesis’, involves creating embryo-like structures that mimics key aspects of natural embryos using embryonic stem cells, pluripotent stem cells (iPSCs) (other than sperm and egg) or various bioengineering techniques. In this approach, stem cells are essentially stimulated to self-organize and create 3 dimensional structures that typically resemble early-stage embryos (Ewen et al. 2014, Deglincerti et al. 2016, Clark et al. 2021). Subsequently, researchers in Israel and the United Kingdom achieved a significant milestone in this field by successfully creating and sustaining human embryos ex-utero (artificial womb) for 13 days using an engineered extracellular matrix (Hanna et al. 2023). Nevertheless, the experiment could empirically be continued for a few more days but was halted to align with bioethical concerns about the possibility of the formation of the primitive streak a pivotal developmental milestone associated with gastrulation and the emergence of organismal individuality. This breakthrough has opened the window both for and against this technology. For instance, bioethicists raise concerns about crossing moral boundaries, creating life solely for experimentation, alongside concerns about the potential misuse in reproductive cloning or genetic manipulation. Conversely, proponents (developmental biologists) argue that this achievement could offers an unprecedented opportunity to explore the early stages of human development, often referred to as the ‘black box’ period an elusive and poorly understood phase. Moreover, despite facing ethical challenges, researchers are tirelessly advocating for regulatory updates, emphasizing that extending the research timeline could provide a critical window into the bases of genetic diseases, epigenetic dysregulation, infertility and biological causes of recurrent miscarriages, etc. (Warnock 1984; Rivron et al. 2023).

On the flip side, this success has caught the attention of researchers, clinicians, and the publishing industry alike. Most notably, media outlets, academic journal, popular magazines sparks sensationalism, all aimed at boosting readership, by printing provocative narratives over nuanced scientific discourse. For instance, headlines such as ‘Artificial wombs: the coming era of motherless births’ (Genetic Literacy Project 2022), ‘World’s first artificial womb facility is a creepy glimpse of pregnancy in the future, see what it is’ (Economic Times 2022), ‘That Artificial Womb Video Isn’t Real, But Scientists Say It Could Be’ (Huffington Post 2022) and ‘Synthetic human embryos created in groundbreaking advance’ (The Guardian 2023) exemplify this trend.

Optimistically, such coverage beyond doubts democratized awareness of the technological developments, it frequently glosses over its technical complexities, moral quandaries and societal ramifications, reducing debates to polarized extremes. This eventually resulted in two different outcomes. On one hand, sensationalism rekindles

new hope in the eyes of the disheartened women who either lack a functional womb or cannot otherwise bear a foetus or face life-threatening pregnancy complications, Secondly, it is encouraging and placing psychological pressure on scientists to continue their research and advance these methods in preparation for potential use in tackling issues with human reproduction. And now that the public response has been overwhelmingly positive, scientists are more driven than ever to to accelerate their research (Partridge et al. 2017; Zaami 2021). Apart from that, these technologies have, however, antithetically, stirred up a desire in men's hearts who wish to become fathers without engaging in traditional heterosexual relationship further destabilizing notion of family system.

For all intents and purposes, these two technological concepts are (earlier with surrogacy) challenging the traditional perception afresh about the eminence of family systems, conception, ex-utero gestation, and childbirth processes, prompting ethical quandaries regarding the definition of life, personhood, potential epigenetic harm, the psychological and emotional implications both on the child and the mother of gestating a foetus outside the mother's body, and the possibility of misuse or abuse in research etc. (Segers 2021; De Bie et al. 2023; Werner & Mercurio 2022; Olalekan 2024). Beyond secular concerns, synthetic embryogenesis markedly intersects with theological principles, particularly in Islam, where human dignity and relational ethics are deeply rooted in theological anthropology. For instance, believers are entwined in the web of relationships connected with Allah the almighty at the highest node and bonded with other human beings on an equal footing with regards to their rights, valuing dignity and much more. Therefore, innovations that disrupt 'natural' procreative processes may conflict with Islamic principles of kinship (*nasab*), stewardship (*khalifah*), and the sanctity of life (*hurmah*), necessitating rigorous faith-based scrutiny to guide adherent's engagement with such technologies.

METHODOLOGY

This article adheres to the PRISMA extension guidelines (Tricco et al. 2018), detailing a literature search for peer-reviewed articles published in English conducted between July and August 2024, utilizing appropriate search terms. The initial search employed broader Medical Subject Headings (MeSH) related to assisted reproductive technology, and gender role within the Medline/Pubmed database, yielding a substantial number of articles. Subsequently, a more focused literature search was performed, expanding the search to other pertinent platforms such as Google Scholar, Scopus, and JSTOR to uncover additional relevant literature. The key terms utilized included 'Synthetic Embryo', 'Ectogenesis', 'Assisted Reproductive Technology', 'Human Embryology', 'Fetal Developmental Stages', 'Maternal-Fetal Interaction', 'Extracorporeal Gestation', 'Islamic Bioethics', 'Gender Role vs. Islam', 'Quran on Childbearing and

Giving Birth’, ‘Hadiths on Seeking Medical Treatment’ and ‘Legal and Ethical Issues of Contemporary Advanced Reproductive Technologies’, among others.

For the literature search, specific inclusion and exclusion criteria were established to refine the selection of peer-reviewed articles. The inclusion criteria were as follows:

1. Peer-reviewed research articles published from 1932 to 2024.
2. Standard texts consulted for the Islamic perspective.
3. Articles that directly address the research question.

Conversely, the exclusion criteria included:

1. Unpublished grey literature.
2. Research articles published in languages other than English.
3. All blog posts were excluded from consideration.

In the screening and selection process, the initial search using broader terms yielded a significant number of articles; however, only 25 articles were shortlisted based on their titles and abstracts for comprehensive reading. The selected articles comprised peer-reviewed research articles, review papers, commentaries and reports.

CAN ECTOGENESIS, OR ARTIFICIAL EMBRYOGENESIS, BECOME A VIABLE OPTION IN PLACE OF SURROGATE-FREE CONCEPTION?

The answer is ‘Yes’, both ectogenesis and synthetic embryo technologies if advances sufficiently have the potential to mitigate or could also play a role in reducing reliance on surrogates or even entirely eliminate the need for a surrogate mother in certain reproductive scenarios.

ARE WOMEN IN THE FAMILY MORE THAN JUST CHILD INCUBATOR? REDEFINING WOMEN’S IDENTITY BEYOND REPRODUCTIVE EXPECTATIONS

The philosophical discourse surrounding gender identity, womanhood or motherhood is inherently complex, multifaceted and dynamic topic, especially in the backdrop of current technological and social modernization that are pushing change to become more non-discretionary and involuntary. Within secular ethical frameworks, critiques arise regarding the erosion of individual agency in selecting values, institutions, and lifestyles, particularly as they intersect with biological determinism. While radical feminists see women’s biological makeup as one of the barriers to achieving equality. And this frame of mind can still be seen today in the denial of certain career opportunities, promotions, or equal pay owing to reproductive obligations, or

selecting to prioritize family over profession. Against this sociopolitical backdrop, the emergence of ectogenesis or synthetic embryogenesis technology poses a risk of weakening the allegedly strong link between biology and women, indirectly benefiting or promoting trans-inclusionary radical feminism (TERFism) ideology while also challenging dominant power dynamics within the family.

There are numerous philosophical and ethical debates over the potential risks and benefits of introducing this technology in clinical settings. More specifically, if supported and promoted, it has the potential to fundamentally alter and reconceptualize not only female reproductive function as an independent entity but will break it down into three completely distinct components: ‘woman’, ‘mother’, and female biology. It can also call into question traditional fatherhood, or, more specifically, the patriarchal family structure, as well as raise legal concerns for children. For example, Singer and Wells advocate for artificial womb technology as a means of promoting sexual equality. This argument revolves around the idea that “ectogenesis could lead to gender equality by redefining the ‘mother’ role and freeing women from their unequal status as primary bearers and caregivers for children” (Singer & Wells 1984). And that it could potentially relieve women of the burdens and risks associated with pregnancy, abortions, and childbirth, thereby levelling the reproductive playing field for both men and women (Simkulet 2020). They all are of the opinion that ectogenesis should be supported as a replacement for all-natural pregnancy methods, including surrogacy. If this happened, there would be no reproductive boundaries that can differentiate between ‘complete/perfect’ and ‘incomplete/imperfect’ women, and any infertile women would have no reason to feel like or label as ‘incomplete’ women. Women, children, and men of all genders will be free in a capitalist-free society, however, opponents contended that rather than a symbol of women’s liberation, this would represent a new form of exploitation.

Furthermore, they contend that ectogenesis the process of conceiving children in a lab and appointing parents against the will of the child has the ability to transfigure women’s eminence into passive entities. If an infant is not likely to be ‘carried’ or ‘birthed’ in the traditional sense, then the act of carrying and giving birth will no longer be regarded as important attribute of a woman or mother. In addition, it is believed that these emerging technologies have opened up a conceptual space for the philosophers, theologists and secular ethicist for a much deeper comprehension regarding the dynamics of ‘parent: child’ and ‘parent’ actuality since the child isn’t naturally born here; instead, it is decanted from an artificial womb. which raises the very important question of who will assume the primary caregiving responsibilities? Because it will reinforce the notion that being a ‘mother’ or ‘father’ is only a societal obligation at that point, rather than identities determined primarily by biology, emotional bonds, responsibilities, sacrifices etc. Historically, these roles, on the other

hand, were theologically constituted and traditionally established based on who gave birth to them and are fundamentally related to the roles of specific caregivers.

At this critical juncture, it is imperative to determine the societal framework we seek to construct plus address few key questions surrounding the very notion of familial institution. In particular, should the role of women and men be restricted to mere providers of gametes, then whatever loaded meanings are philosophically ingrained in the terms ‘mother’ and ‘father’ will automatically become obsolete, as pregnancy was not gestated and all the hardships and sacrifices a woman endured or a man faced during this phase was not experienced, and so instinctively psychological or emotional bonds among the triad (mother, child and father as a whole) remain unformed. Conversely, if the traditional model is supported and preserved, wherein everyone’s role is fully defined and emotional boundaries are respected as well as valued then it will lead to the establishment of a strong family unit. Moreover, if the feministic idea of gender equality is accepted, then the parental dynamics of caregiving require negotiation, especially in cases where the term ‘mother’ needs to be legally defined in terms of biology because mothers are more morally and legally liable for various issues. For instance, they have the right to inquire about a child’s legal and biological status, especially if the child is adopted or belongs to a same-sex couple. Similarly, a child can be asked who are their ‘real’ parents or mother or father.

HOW DOES AN ISLAM-INSPIRED DISCOURSE REGARD SUCH TECHNOLOGIES AND ITS MOST IMPACTED SYSTEM “THE FAMILY SYSTEM”

How so ever the term ‘family’ remains subject of extensive debate surrounding its definition and structure in Eurocentric literature; the majority of the global population still lives in the family unit. There is a plethora of literature exploring the realm of family dynamics, systems and Islamic perspectives, yet a significant lacuna exists in scholarly discourse addressing the intersection of emerging reproductive technologies and Islamic standpoint with regard to its ethical, legal and social implication. Within Islamic epistemology, the family unit is viewed as the cornerstone of a harmonious and prosperous society, essential for instilling values, promoting stability, and functioning as a primary vehicle for transmission of the moral integrity and social stability of the community. This framework diverges markedly from the secular paradigms that often prioritize more on the individual gratification or libertarian notion of freedom which may conflict with the Islamic principles of collective responsibility and divinely ordained balance (*mizan*). This principle is reflected in the guidance offered by both al-Quran and the Prophet Muhammad (peace be upon him), both emphasize a societal structure rooted in mutual respect, ethical stewardship, and the preservation of lineage

(*nasab*) for instance, Quranic injunctions like Surah al-Rum 30:21 underscore the theological significance of marital and familial bonds as manifestations of divine wisdom. Similarly, prophetic teachings (hadiths) advocate for marriage and progeny as mechanisms for spiritual and social cohesion, reinforcing the imperative to safeguard familial integrity:

“And one of His signs is that He chose mates from among yourselves for you, so that you may find peace with them”. “And He placed love and compassion between you. Surely, there are signs for those who reflect in this” (al-Rum 30:21).

or

“O young people! Whoever among you is able to marry, should marry, and whoever is not able to marry is recommended to fast, as fasting diminishes his sexual power” (al-Bukhari Hadith 3).

This philosophy underscores Islam’s proactive strategy of channelling human’s basic instincts in an ethically constructive manner. Marriage is presented not only as a spiritual bond but also as a means to build a stable foundation for family and society, curbing the chaos of hedonism and the pitfalls of a culture dominated by unrestrained sexual desires. By advocating for marriage and, when necessary, promoting fasting as a form of self-discipline, Islam aims to elevate human conduct, aligning it with higher moral and spiritual aspirations.

Moreover, this framework reflects Islam’s commitment to create an ideological society that is profoundly dedicated to, morally aware of, and purposefully aligned with the ideal of *Khalq* (the Islamic concept that everything in the universe is created by Allah SWT). *Abd* (literally translated as servant, the Islamic concept that Muslims are the ones who surrender their free will to the Almighty Allah) and *khalifah* (the concept of stewardship: Where all humans are stewards of the Almighty Allah knowingly or unknowingly) in all aspects of human behaviour.

The other ultimate goal of Islam is to safeguard the family and enable it to positively contribute to the development of human civilization. Furthermore, the code of conduct, rather than being imposed, is the result of each individual’s fervour for Islamic principles and values. Islam explicitly sets forth the responsibilities and rights of each member of the family (a husband and wife) towards one another as well as the duties and rights of children to their parents, taking into account the sacrifices and compromises they made, for example, al-Baqarah 2:228:

“And due to the wives is similar to what is expected of them, according to what is reasonable. But the men have a degree (*Darajah*) over them [in responsibility and authority]. And Allah is Exalted in Might and Wise” (Maududi 1984).

These verses encapsulate a profound balance of rights and responsibilities within the marital relationship, highlighting the complementary roles of men and women in building a harmonious family and society. Nevertheless, the term *Darajah*; which is often misrepresented as a license for patriarchal dominance, in truth denotes an added layer of responsibility and sacrifice. This responsibility reflects the husband’s role as a provider, protector, and caretaker, ensuring that the family thrives in a supportive and nurturing environment. His role demands effort, compromise, and often prioritizing the needs of the family over personal desires. It is a privilege coupled with accountability, not a tool for oppression or abuse.

Interestingly, the Quranic concept of *Darajah* resonates well with the unparalleled status Islam accord to mothers. Their sacrifices, nurturing roles, and central role in the maintaining family dynamics place them in a position of eminence. This comparison illustrates Islam’s commitment to fairness and recognition of contributions, irrespective of gender. Just as men shoulder the burden of provision and protection, women’s sacrifices in childbirth and child-rearing earn them a revered status in both the family and society.

For instance, al-Quran in Surah al-Ahqaf 46:15 recognizes the emotional, psychological and physical difficulties that mothers face during pregnancy and childbirth.

“And We have enjoined upon man, to his parents, good treatment. His mother carried him and gave birth to him under difficult circumstances...” (Maududi 1984).

Similarly, in Surah Luqman 31:14, al-Quran emphasizes the importance of mothers, particularly in nurturing and raising children:

“And We have enjoined upon man [care] for his parents. His mother carried him, [increasing her] in weakness upon weakness, and his weaning is in two years. Be grateful to Me and to your parents; to Me is the [final] destination” (Maududi 1984).

These verses evidently demonstrate the enormous sacrifices that mothers endure throughout the journey of pregnancy, childbirth, and the early years of nurturing their

children, particularly during the first three years. Which is the most critical period in the child's life, when they need a true caregiver the most because, in many ways, after three years, they start to become less physically dependent on their mother. In recognition of these sacrifices, Allah SWT has elevated the status of mothers in the eyes of their children, honouring their dedication and commitment.

However, it is important to note that Islam's major focus is building a resilient family unit which goes beyond a woman's reproductive potential. Islam has not confined the woman's role to just motherhood; rather, it encompasses far broader responsibilities because each position serves a unique purpose. As a result, each individual will be assessed on how successfully they carry out their assigned responsibilities. So, instead of playing antagonistic roles or feeling bad about not being a mother or father, they should play complementary roles, focused on making the family or society stronger and more resilient above all else. This wonderful model underlines that the family's function goes beyond childbearing; it is a place for moral growth and the basis for an orderly and just community.

ROLE OF WOMEN: THE ISLAM-INSPIRED TRANSCENDENTAL PARADIGM CUTTING ACROSS CULTURE AND BEYOND SOCIAL CONSTRUCTION

In the ethical framework and social organization of Islam, the respect and status granted to women are fundamentally independent of their reproductive roles. Central to Islamic teachings is the principle of justice and equality, which asserts that men and women hold equal intrinsic worth and dignity in the eyes of Allah. This notion of equality transcends cultural context and goes beyond the social construction of 'agency' and 'role', al-Quran explicitly refutes in Surah An-Nisa 4:1, firstly any idea that one gender is inherently superior to the other by highlighting the fact that both men and women share a single soul.

O men! Fear your Lord Who created you from a single being and out of it created its mate; and out of the two spread many men and women. Fear Allah in Whose name you plead for rights, and heed the ties of kinship. Surely, Allah is ever watchful over you (Maududi 1984).

Or in Surah al-Isra 17:70

Indeed, We honoured the progeny of Adam, and bore them across land and sea and provided them with good things for their sustenance, and exalted them above many of Our creatures (Maududi 1984).

and secondly, Islam emphasizes that a person's value is determined by their actions and faith rather than their reproductive or physical prowess. Surah An-Nisa 4:124 strongly reinforces this ideology.

Whoever does good and believes -whether he is male or female - such shall enter the Garden, and they shall not be wronged in the slightest (Maududi 1984).

In fact, the Islamic belief system, does not envisage infertility as a personal shortcoming or a reason for less respect, but as a spiritual challenge set by Allah (SWT). It is recognized as part of divine will (*Qadr*), showcasing Allah's profound wisdom and the intricate plan that humans may not fully grasp. However, Muslims are encouraged to pursue lawful medical solutions and earnestly work to overcome infertility guided by the principle of *tawakkul* (trust in Allah) alongside proactive efforts (*tadabbur*) they are also reminded to practice patience (*sabr*) and accept Allah's will. This viewpoint nurtures resilience, humility, and dependence on divine mercy, upholding the dignity of individuals regardless of their situations. Islam highlights the importance of compassion for those enduring such challenges, encouraging communities to offer support without judgment, as every trial presents a chance for spiritual development and a closer connection to the Creator. There are several verses in al-Quran that quite often discuss this notion such as Surah al-Shura: 49-50.

The dominion of the heavens and the earth belongs to Allah. He creates whatever He pleases. He grants females to whomever He pleases and males to whomever He pleases, or grants them a mix of males and females, and causes whomever He pleases to be barren. He is All-Knowing, All-Powerful (Surah Al-Shura: 49-50, Maududi 1984).

Your possessions and your offspring are nothing but a trial for you. And there awaits a great reward for you with Allah (Surah At-Taghabun 64:15, Maududi 1984).

These concepts serve to remind believers of the transient nature of material possessions and reorienting believers to prioritize their spiritual development while responsibly utilizing socio-economic resources including progeny, wealth and assets to benefit both individual and collective welfare in temporal and eschatological contexts. Men and women are urged to help one another through these difficulties in order to create a community that values compassion, empathy, and understanding. Historical exemplars like prophet Muhammad's (peace be upon him) compassionate engagement with women experiencing infertility underscore normative ethical conduct. His advocacy for equitable treatment illustrate the imperative to transcend reductive biological valuations of women's societal roles.

Throughout history, Muslim women, including those without biological offspring, have occupied pivotal roles across intellectual, educational, and economic spheres. Their contributions as scholars, jurists, teachers, business leaders, and innovators documented in classical and contemporary sources demonstrate the recognition of female agency beyond their ability to bear children. Figures such as Fatima al-Fihri (founder of the University of al-Qarawiyyin) and scholars like Aisha bint Abu Bakr exemplify this legacy, challenging deterministic correlations between fertility and societal value. In light of this, it is essential for modern Islamic societies to uphold the rights and dignity of women who cannot conceive. Pejorative labels (e.g., ‘barren’) and comparative social narratives detrimentally impact psychosocial well-being, often precipitating distress-driven pursuits of fertility interventions in hopes of motherhood. Instead of pursuing paths that could compromise their identity, Islam encourages women to seek fulfilment within the boundaries set by Allah SWT, thereby preserving human potential and family integrity. Appraising below are the myriad ways women can influence their families and communities, beyond just motherhood, is of utmost importance to regant the lost status.

SPIRITUAL PARITY

Islam teaches that both men and women are equal in the sight of Allah SWT, both having equal spiritual worth and the capacity to become closer to Him via strong faith and good deeds.

“O mankind, indeed We have created you from male and female and made you peoples and tribes so you may know one another”, al-Quran says in Surah al-Hujurat 49:13

“Verily the noblest of you in the sight of Allah is the most God-fearing of you. Surely Allah is All-Knowing, All-Aware” (Maududi 1984).

This verse nevertheless reminds both believing men and women that piety and awareness of Allah SWT are the highest standards of one’s worth. However, women in particular, by recognizing this spiritual parity, can not only work diligently in their personal acts of worship but also in their roles within the family, community and society. As an educator or mentor of upcoming generations, they can enhance the spiritual and moral fabric of the ummah, establishing a virtuous society. Their impact as wives, sisters, daughters, and mentors produces a ripple effect, enriching a culture of devotion and morality.

RIGHTS AND PROTECTIONS

Islam provides women with a comprehensive set of rights and protections. These include the right to education, inheritance, employment, ownership of property and the right to choose a spouse. Islam also prohibits the mistreatment and abuse of women and emphasizes the importance of kindness, respect and equity in all interactions. Surah An-Nisa 4:19, for instance, explicitly supports this notion.

Believers! It is not lawful for you to become heirs to women against their will. It is not lawful that you should put constraint upon them that you may take away anything of what you have given them; (you may not put constraint upon them) unless they are guilty of brazenly immoral conduct. Live with your wives in a good manner. If you dislike them in any manner, it may be that you dislike something in which Allah has placed much good for you (Maududi 1984).

The aforementioned verse highlights the ban on coercion or exploitation of women, emphasizing the inclusive outlook of Islam in elevating the status of women and restoring and safeguarding their honour, which was gravely abused prior to Islam.

Islam's focus on the right to education guarantees that women acquire knowledge, allowing them to perform their roles as individuals, professionals and contributors to society. The right to inheritance acknowledges women's financial autonomy and security, which was a groundbreaking idea at the time of its revelation. Moreover, Islam's guidelines on fair employment and property ownership enable women to engage actively in both economic and social domains.

In the context of marital relationships, Islam emphasizes peaceful coexistence and mutual caring, as illustrated by the directive to 'live with your wives in a good manner'. It stresses that even in difficult situations, believers must treat women with respect, as Allah may bestow significant blessings in circumstances that require patience and understanding. This includes emotional, financial and moral support, establishing a foundation of love and peace within families. The prohibition of abuse reinforces the sanctity of women's rights, ensuring their protection from exploitation.

EQUAL CONTRIBUTOR AND PARTNER

Women in Islam are considered equal partners in relationships, sharing decision-making, emotional support, and responsibilities. Through cooperation, respect for one another and teamwork in many facets of family life, they are expected to enhance the well-being of the family unit.

Surely for Muslim men and women, believing men and women, devout men and women, truthful men and women, patient men and women, humble men and women, charitable men and women, fasting men and women, men and women who guard their chastity, and men and women who remember Allah often for all of them Allah has prepared forgiveness and a great reward (Surah al-Ahzab 33: 35, Maududi 1984).

FINANCIAL PROVIDER

Despite gender norms, Muslim women are increasingly working today outside the home or starting their own businesses to support their families financially. Their financial contributions undeniably help improve the family's financial stability and offer more options for healthcare, education and general well-being. Khadijah, the first wife of the Prophet Muhammad, is celebrated for her wisdom, business acumen, and unwavering support for the early Muslim community. Moreover, during Caliph Umar RA's reign, Shifa binti Abdullah RA was appointed the market manager of Makkah (Abu Shuqa 2018).

ROLE OF WOMEN AS A WIFE

A Companion

Islam places a strong emphasis on the idea of marriage as a sacred commitment between a husband and wife, built on a foundation of affection, respect, and companionship. According to al-Quran Surah al-Baqara 2:187, a couple's relationship is like "garments" for each other, signifying their intimacy, safety and commitment towards one another.

They are your garment, and you are theirs (Maududi 1984)

Source of Comfort and Support

Wives are urged to provide their husbands with mental, physical, and spiritual support and this is equally true for men as evident from above verse.

The Prophet Muhammad said that "the best men are those who are the best to their wives", (Riyad-as-Salihin, hadith 278) emphasizing the value of kindness, affection and understanding in marriages is not one way it has to be both ways.

Caregiver to Extended Family

Women frequently take on the caregiving responsibilities of elderly relatives, siblings, or other loved ones who require assistance in addition to their immediate family. By

offering practical, emotional, and physical care, they support the general well-being and cohesiveness of the extended family system. They can also serve as mentors and role models for younger family members, teaching them valuable life lessons. Their accomplishments, tenacity and leadership traits can inspire family members, instilling values and goals that contribute to the family's success and collective identity. Both al-Quran and Hadith emphasize the integral supporting role that women play for their families. The following are some relevant references with respect to the above discussion from al-Quran and Hadith:

Do good to your parents, to near of kin, to orphans, and to the needy, and to the neighbour who is of kin and to the neighbour who is a stranger, and to the companion by your side and to the wayfarer, and to those whom your right hands possess. Allah does not love the arrogant and the boastful (An-Nisa 4:36, Maududi 1984).

or

So, give his due to the near of kin, and to the needy, and to the wayfarer. That is better for those who desire to please Allah. It is they who will prosper (al-Rum 30:38, Maududi 1984).

Narrated Abu Huraira: "Allah's Messenger said, 'The best among you are those who are best to their families, and I am the best among you to my family'" (Al-Bukhārī, Hadith 64).

Decision-making and Consultation

Nevertheless, Islam recognizes the husband as the head of the household, but it also places a strong emphasis on spouses working together and consulting one another when making decisions that eventually impact the family's integrity and bonding. As a general rule al-Quran in Surah Ash-Shura 42:38 instructs its believer for consultation. This general rule can be extended to the spouses.

who conduct their affairs by consultation (Maududi 1984).

Advocacy for Justice and Equity

Islam encourages both men and women to work to institute justice, fairness, and equality in society for instance, in Surah An-Nisa 4:135 believers are profoundly instructed to uphold justice.

Believers! Be upholders of justice, and bearers of witness to truth for the sake of Allah, even though it may either be against yourselves or against your parents and kinsmen, or the rich or the poor (Maududi 1984).

Therefore, women were not only expected to enact the same but they were historically been noticed as active advocates for social justice, addressing issues such as poverty, discrimination, and oppression.

Community Engagement

Women in Islam are encouraged to actively participate in their community's work and contribute to the betterment of society. This could include volunteering, participating in charitable activities, and supporting initiatives that promote social welfare and development. In fact, both the Meccan and Madinian society has written records of such community engagement for example Khadijah binti Khuwaylid, the Prophet Muhammad's first wife, was a prosperous businesswoman both before and after their marriage. She ran a successful caravan business and engaged in trading (Ibn Saa'ad, al-Bukhārī, Muḥammad, Hadith 164). Asma binti Abu Bakr was known for community service during Hijra or wartime (al-Bukhārī, Hadith 27). Even Rufaida Al-Aslamia was also known for her valour and assistance during wartime, such as serving water and providing medical attention to injured soldiers (al-Osaimi 2004, Roded 1994, Kasule 2003, al-Bukhārī, hadith 21).

Education and Empowerment

Educated women are seen as more empowered to make meaningful contributions to society, enabling them to advocate for their rights and tackle social issues with knowledge and perspective.

Islam places a strong emphasis on the significance of education for both genders, viewing it as a fundamental right and obligation. Throughout history, there have been numerous instances that demonstrate how educated women have played a crucial role in uplifting society by sharing knowledge. Among the most notable are the women who took on the role of teachers (Mudarrisaat) in three of the most revered mosques in Islam: a) Masjid ul Haram, where Umm Sarah binti Abdurrahman taught; b) Masjid un Nabawi, with Ummul Khair and Umm Muhammed Fatima binti Ibrahim as educators; and c) Masjid ul Aqsa, where Umm Darda contributed her knowledge. These examples illustrate the essential contributions of women in safeguarding and disseminating Islamic teachings, highlighting the religion's dedication to gender-inclusive education.

Support System for Other Women

Women offer their families and larger social circles support and unity. They promote a sense of sisterhood and empowerment by providing support, understanding and mentoring to help people navigate life's obstacles.

Ectogenesis, Reading Through Societal and Ethical Concerns

The adoption of synthetic embryos and artificial womb technology could potentially improve reproductive healthcare, reduce infertility and offer alternatives for couples facing fertility issues. However, there is a need to assess the impact of these technologies on society by and large and in particular on societies practising Islamic faith. This impact could be multifaceted, encompassing familial, cultural, religious, and ethical dimensions. Here are some potential societal impacts these technologies might have, including on Islamic communities.

Changing Family Dynamics

By changing the customary roles and dynamics within families, these technologies have the potential to undermine traditional family structures. For example, the ability to gestate embryos outside of the mother's body may challenge societal expectations of what it means to be a 'mother' or 'father'.

Shift in Gender Roles

Gender roles and expectations are clearly established in the Islamic belief system. Artificial womb technology and synthetic embryos have the potential to shift childbearing, caregiving and familial responsibilities. This may spark discussions and debates not only about the roles of men and women in child rearing and household management but also about children's responsibilities and duties towards their parents, as bestowed by Islam.

Cultural and Societal Norms

The prevailing cultural norms and beliefs regarding childbirth, pregnancy, and family may be challenged by these technological advancements. Social perspectives on conception, pregnancy and childbirth are subject to change, which can impact how people view and feel about the process of creating a new life.

Rights of the Child

What rights would those children have if they were gestated through ectogenesis?

Individuals/Couples Facing Fertility Issues

Individuals or couples who cannot conceive or carry a pregnancy due to infertility, medical conditions, or health risks associated with pregnancy might use ectogenesis to potentially bypass the need for a surrogate.

CONCLUSION

This paper has examined the profound implications of ectogenesis, the development of embryos outside the woman's body in artificial wombs, through the lens of Islamic discourse. Grounded in Islamic teachings and the central role of the family system, this thematic approach revealed how this transformative reproductive technology intersects with and potentially redefines gender dynamics within both secular and Islamic frameworks.

Ectogenesis presents a radical decoupling of childbirth from the female body, prompting a re-evaluation of traditional gender roles and the societal responsibilities historically assigned to women due to their reproductive capabilities. This decoupling opens up a multitude of questions regarding gender, agency and the manifestation of roles within the context of family and society.

Islamic theological texts, including al-Quran and Hadith, provide a basis for exploring the implications of ectogenesis. Concepts such as inherent agency and role of women supported by the basic text of Islam, the purposes of marriage through a transcendental lens, and the distinct roles of men and women are scrutinized to understand how they align or conflict with the possibilities presented by ectogenesis.

The analysis reveals that while Islam values the family system and the unique roles of each member, it also emphasizes justice, equality and the inherent dignity of every individual, regardless of their reproductive capabilities.

This paper contributes to the ongoing dialogue and existing body of knowledge on the ethical and bioethical frameworks necessary for navigating the challenges posed by cutting-edge reproductive technologies. It critically emphasizes the need for a bioethical framework that not only respects secular humanistic ethics but also incorporates the values and principles of faith-based perspectives.

Islamic discourse provides a balanced perspective that values both technological advancements and the preservation of ethical and moral integrity within the family system. And provides principles which may be used to evolve altogether a new philosophy and framework for bioethical decisions one can make in evolving such technologies which impact the way we reproduce.

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