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AN EMPIRICAL STUDY ON THE POSSIBLE ACCEPTANCE OF ARTIFICIAL WOMB TECHNOLOGY OVER TRADITIONAL METHODS OF PREGNANCY

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Abstract

Recent advancements in embryology and non-human animal research are paving the way for exciting new possibilities in the field of reproductive science. On one hand, experiments in embryology are pushing the boundaries of in vitro embryo sustenance. On the other hand, developments in non-human animals are redefining the threshold of viability. When taken together, it is clearly evident that these developments are narrowing the time that a child needs to gestate in the maternal womb. Ectogenesis, through the use of "Artificial Womb Technology (AWT)", seeks to completely terminate the entire time a child requires to gestate and grow inside a human body. This concept presents a paradigm shift in human reproduction as it involves the complete gestation or development of human fetuses outside the maternal womb, totally segregating the idea of childbirth from woman's body. The research paper aims to analyse the awareness about the Artificial Womb Technology (AWT) in the society. It also seeks to examine the awareness, in the people, of the problems associated with pregnancy and childbirth and its consequences on a woman's body and life.

Keywords: reproduction, IVF, artificial womb, ART

INTRODUCTION

Artificial wombs raise fascinating ethical questions that can surely excite radical ethicists as they challenge traditional notions of reproduction, autonomy, and the beginning of life. But the pace of modern and technical advancements in the field of bio-technology strongly suggests a future with babies born out of "full ectogenesis" or "artificial wombs". Giulia Cavaliere in her work, "Gestation, equality and freedom: ectogenesis as a political perspective", describes a world where full ectogenesis (hereafter "ectogenesis") is a medical reality. She writes,

"Imagine for a moment that it is possible to beget children without placing any kind of burden on women. Imagine a world where the health-related risks associated with pregnancy and childbirth have become obsolete. A world where the dietary and lifestyle changing behaviours necessary to maximise the chances of having healthy

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¹ Giulia Cavaliere, "Gestation, equality and freedom: ectogenesis as a political perspective" 46 *Journal of medical ethics* 76-82 (2020).

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pregnancies would no longer be necessary. A world without the financial losses associated with maternity leave, and where the obstacles to career advancement that women currently face to gestate and give birth to children have disappeared. This arguably desirable state of affairs is what full ectogenesis, namely, the gestation of human fetuses outside the maternal womb from conception to 'birth', may be able to deliver."²

Currently, this desirable state of affairs created by the introduction and subsequent development of ectogenesis is not technically possible but it would never become a reality would be an understatement. This manifestation gets significant support from the works of Peter Singer and Deane Wells, based on which one can argue that "the period in which it is necessary for the human fetus to be in its mother's womb is shrinking." The development of artificial placenta and womb technology aiming to replicate the functions of the placenta and provide a womb-like environment has a great potential to revolutionize the field of obstetrics.⁴

Alongwith a revolution in the field of reproduction and childbirth, AWT tends to change the social as well as economic position of a woman in the society and to eradicate various repercussions associated with the child bearing process i.e. physical, mental and economical challenges i.e. providing equality and freedom to a woman as same as enjoyed by a man. In this regard, Cavaliere gives two sets of arguments that have been made from a female perspective to support ectogenesis.

I. Ectogenesis as equality-promoting: Undoubtedly, there are "fundamental inequalities" between men and women⁵ and among women⁶. Many of these

² Giulia Cavaliere, "Gestation, equality and freedom: ectogenesis as a political perspective" 46 *Journal of medical ethics* 76 (2020).

³ Singer P, "Ectogenesis WD" in Gelfand S, Shook JR (eds.), Artificial womb technology and the future of human reproduction 9-25 (NL: Rodopi, Amsterdam).

⁴ Felix R., De Bie et al., "Artificial placenta and womb technology: Past, current, and future challenges towards clinical translation" *Prenatal Diagnosis*, 2021, at pp. 145–58.

⁵ Evie Kendal, Equal Opportunity and the Case for State Sponsored Ectogenesis, Basingstoke, UK:Palgrave, 2015.

Anna Smajdor, "The moral imperative for ectogenesis" 16 Cambridge Quarterly of Healthcare Ethics (2007), at pp. 336–45.

Anna Smajdor, "In defense of ectogenesis" 21 *Cambridge Quarterly of Healthcare Ethics* (2012), at pp. 90–103. ⁶ Evie Kendal, *Equal Opportunity and the Case for State Sponsored Ectogenesis*, Basingstoke, UK:Palgrave, 2015.

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inequalities rise because of their biological differences and women's exclusive capacity to reproduce. According to this perspective, women bear all the burdens associated with biological reproduction. These include the physical strains of pregnancy and childbirth⁷, the possibility of poor physical and mental health during and after pregnancy⁸, the possibility of complications during childbirth that can and often do result in death⁹, the exposure to external control, monitoring, and choice-restricting measures, and the likelihood of threats to one's bodily integrity and privacy.¹⁰ Where a woman has to go through a lot of risks, a man becomes a natural or biological father without experiencing any such complications. Evie Kendal gives the best argument in this regard and states:

"When added to the unequal distribution of the physical, social and financial burdens associated with pregnancy and childbirth, the claim that reproductive difference constitutes a fundamental inequality between the sexes becomes especially convincing."

Ectogenesis would promote equality as it would allow women to have children in the same manner as men, enjoying the advantages of genetically related offspring without having to deal with the difficulties of pregnancy and delivery. It would further equal the position of men and women in the childrearing process too which at present time is mostly attributed upon the women. Additionally, ectogenesis would address gender disparities by granting women the same opportunities to participate in the labour market, pursue careers that may expose them to substances that may be teratogenic,

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⁷ JULIEN S. MURPHY, "Is Pregnancy Necessary? Feminist Concerns About Ectogenesis" 4 *Hypatia* (1989), at pp. 66–84.

⁸ Susan Garthus-Niegel et al., "The impact of subjective birth experiences on post-traumatic stress symptoms: A longitudinal study" 16 Archives of Women's Mental Health (2013), at pp. 1–10.

⁹ World Health Organization. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, world bank group and the United nations population division. Geneva, CH: World Health Organization, 2015. http://www.who.int/ reproductivehealth/publications/monitoring/maternal-mortality-2015/en/

¹⁰ Anna Smajdor, "The moral imperative for ectogenesis" 16 *Cambridge Quarterly of Healthcare Ethics* (2007), at pp. 336–45.

¹¹ Evie Kendal, Equal Opportunity and the Case for State Sponsored Ectogenesis, Basingstoke, UK:Palgrave, 2015.

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and fulfil roles that are physically impossible for women to fulfil while carrying a child. Finally, the argument for ectogenesis is that it would advance equality for infertile, lesbian, transgender, and fertile women. Ectogenesis gives women the opportunity to bear children in the same way as fertile women—that is, with genetically related offspring—despite their current inability to conceive and give birth due to societal or biological causes. This would level the playing field for these various groups' reproductive potential.

Ectogenesis as freedom-promoting: Ectogenesis can also be considered as a II. suitable way of freeing women from all the risks and burdens associated with "gestating, birthing and rearing children". 12 As Firestone puts it, it would be a means of "freeing women from the tyranny of their sexual-reproductive *roles*". ¹³ Evie Kendal emphasises how pregnancy significantly compromises a woman's physical integrity and how the social, financial, and health-related constraints of pregnancy limit a woman's freedom. These limitations imposed by pregnancy and childbirth can be removed by the method of ectogenesis. Cavaliere proposes another argument where AWT could promote a woman's freedom i.e. by providing an expansion in the range of options to pursue parenthood.¹⁴ An alternative way to childbirth would represent an "enhancement of individual freedom" and would be "in the best interests of women". 15 For example, women who find childbirth to be extremely dangerous or perhaps fatal could employ ectogenesis to satisfy their dreams of becoming parents. Ectogenesis is deemed to have valuable effects on and enlargement of women's reproductive freedom (to decide to have or not to have children and especially how to have them). The freedom, however, must

¹² Shulamith Firestone, *The Dialectic of Sex The Case for Feminist Revolution Bantman*, 1971.

¹³ Ibid.

¹⁴ Maureen Sander-Staudt, "Of Machine Born? A Feminist Assessment of Ectogenesis and Artificial Wombs" *Ectogenesis*, 2021.

¹⁵ Gregory Pence, 'What's So Good about Natural Motherhood? (In Praise of Unnatural Gestation),' in *Ectogenesis: Artificial Womb Technology and the Future of Human Reproduction*, eds Scott Gelfand and John R. Shook (New York: Rodopi, 2006), 85.



not be taken in negative sense i.e. for women who want to take on pregnancy for their own procreative desires, they can happily take upon it but they ought not to have to undertake gestational work for the fulfilment of other people's procreative desire or just to prove her "womanhood" in the society.

These arguments envisioning equality and freedom for women manifest a bright future for the society at large but it also raises important questions about the limitations of such arguments. For eg. Disparities between women belonging to different communities and countries based upon distribution of burdens and risks involved in pregnancy, their financial and social status etc. shall affect the reach of such a technology.

Further, the entire concept of ectogenesis involving the gestation of human fetuses outside the maternal womb, has also sparked significant Bioethical discussions. The acceptance of full ectogenesis through artificial womb technology in society requires a comprehensive understanding of the scientific, ethical, and legal dimensions of this innovation. In comparing AWT with other existing assisted reproductive technologies, there is a notable major issue. While the latter have formed new family structures and enhanced new ways of determining "social" and "biological" ties but they have never challenged the "existing order" or the value of the "genetic tie" as the childbirth always takes place inside a woman's womb, the former tends to challenge the root idea behind the concept of "genetic tie" i.e. separation of childbirth from maternal womb. The discussions on ethical considerations of AWT often involve the rights and autonomy of the mother, the moral status of the developing fetus¹⁸, and the implications for reproductive rights¹⁹. The potential implications of ectogenesis on the abortion debate as well as on other legal frameworks associated with childbirth and personhood are also a significant point of contention. There is a long list of multitude considerations that needs to be addressed before making Ectogenesis an actual medical reality

²⁰ Ibid.

¹⁶ Danielle Griffiths, "The (Re) Production of the Genetically Related Body in Law, Technology and Culture: Mitochondria Replacement Therapy" 24 *Health Care Analysis* (2016).

¹⁷ Daniela Cutas, "Nothing if not family? Genetic ties beyond the parent/child dyad" 37 *Bioethics* (2023).

¹⁸ Nick Colgrove, "Subjects of ectogenesis: Are gestatelings' fetuses, newborns or neither?" 45 *Journal of Medical Ethics* (2019), at pp. 723–6.

¹⁹ Bruce P. Blackshaw and Daniel Rodger, "Ectogenesis and the case against the right to the death of the foetus" 33 *Bioethics* (2019), at pp. 76–81.

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and as the clinical availability of ectogenesis approaches, we see an acceleration in these discussions and debates.

The idea of AWT, as envisioned by JBS Haldane in 1923 and later on extensively supported by feminist activists like Firestone, Gene Corea and Peter Singers, while being thoroughly discussed in the area of bioethics and extensively experimented in order to make it a reality simultaneously, has currently gained popular public attention due to a AWT concept developed by a Yemeni molecular biologist and science communicator, Hashem Al-Ghaili. His video titled "Ectolife: The World's first Artificial Womb Facility" has garnered significant views on various platforms introducing general public about the scientific and technical process of child birthing. While the video speculates some very serious questions about the actual operation of such a technology, it has provided new hopes to women and couples who are bearing the suffering of "childlessness".

AWT, being a medical magic, has the potential to revolutionise the process of pregnancy and childbirth but alongwith other bioethical questions, another important question that lies is: whether the society is ready for a technology like this or would people use such a technology if it was available as an alternative method to natural or traditional pregnancy? Also, what does the general public think about the changes that AWT can bring in the society? This study tries to find answers to these questions.

OBJECTIVE OF THE STUDY

The research aims to analyse the awareness about the Artificial Womb ²¹Technology (AWT) in the society. It also seeks to examine the awareness, in the people, of the problems associated with pregnancy and childbirth and its consequences on a woman's body and life. The study also reveals the awareness about and possible social acceptance of AWT (if it was an option now) over traditional methods and existing methods of pregnancy and to know what changes people think it can make in the power relations and gender roles in society.

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²¹ The term "Artificial Womb" has been used in the research study referring only to the process of "Full Ectogenesis". This fact has been made clear to the respondents with the help of small description in the questionnaire.



RESEARCH QUESTIONS

- i. What is the awareness among the people about woman's pregnancy and problems associated with it?
- ii. Whether the society is ready to disassociate the idea of childbirth from a woman's body?
- iii. Whether the society is aware of the new emerging AWT?
- iv. Whether AWT can make new revolutions in the field of reproductive and medical field?
- v. What impact AWT will have on the problem of infertility and connected social stigma?
- vi. What is the scope of acceptance of AWT in society over traditional or natural methods of pregnancy?
- vii. What changes can AWT bring in the reproductive sector of the medical field and also to the gender roles in society?

RESEARCH METHODOLOGY

The present study is an empirical (non-doctrinal) research to understand the attitude of people towards the new emerging concept of "Full ectogenesis" or "artificial wombs" and has been done in a very limited time period. The research has been conducted with an intention to collect data about the possible social acceptance of AWT in the society. The data was collected through a questionnaire consisting of 16 close-ended questions and 01 open-ended question sent to the respondents in the format of google forms through Whatsapp. Given the paucity of time, I have used the tool of purposive sampling to select the respondents. The responses received have been analysed and produced in a structured form. Short interpretation of data collected has been made alongwith the analysis. The study ends with a conclusion drawn from the data collected and analysed followed by some suggestions recommended for the implementation of AWT.

Universe and sample size

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To know the actual attitude of the society towards AWT, I have selected people (both male and female) from various occupational fields. The age of the respondents ranged between 18 to 40 years and includes married as well as unmarried people. Given the paucity of time, a total number of 132 people were selected for the study and the questionnaires were forwarded to them through WhatsApp.

Limitations of the research

- ☐ The research has been conducted among 132 people primarily residing in the city of Lucknow and it consists only of people aged between 18-40 years. The selected age-range implies the idea of including people who are yet to marry or are married and are potentially going to be involved in the process of childbirth.
- ☐ The research has been completed in a very limited time-frame.
- ☐ The research has been conducted in the city of Lucknow and among people belonging to a specified age-group. Hence, the responses gathered could vary if it is collected from other parts of UP or India and also variation can be seen if it includes people above the age-group included in the study.

DATA COLLECTION

The data is collected from the respondents by sending the questionnaire in the format of Google forms through WhatsApp. The questionnaire consisted of 17 questions and a small description of the topic to inform the respondents about the research study they are being a part of. It was completely upon the respondent to fill or not to fill the questionnaire. The collected data is accordingly analysed and interpreted.



DATA ANALYSIS AND INTERPRETATION

The first five questions of the research were attributed towards the demographic characteristics of the respondents i.e. their name, age, occupation, gender and marital status. As promised by the me, the names of the respondents are kept confidential.

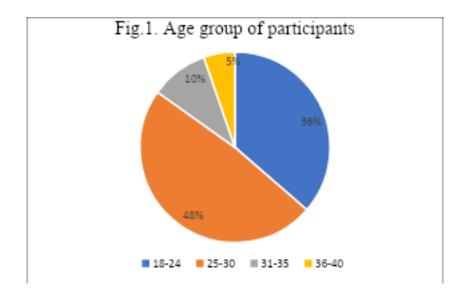


Fig.1. represents the age group of the respondents who participated in the research study. Almost half of the respondents, 49%, belong to the age group of 25-30 years. 39% belong to the age group of 18-24 years. 10% belong to the age group of 31-35 years and the lowest representation of 5% belong to the age group of 36-40 years. The variation in ages of the respondents enhance the quality of the ultimate finding of the research where the opinion of a person of 18 years will go hand in hand with that of person of 40 years.



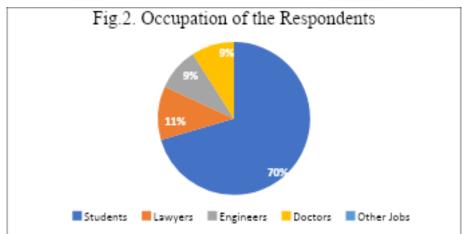


Fig.2. shows the occupation of the respondents. The occupation varies from respondent to respondent. The majority of the participants, 47%, are students pursuing different courses, from law to medical. 8% of the participants are lawyers who provided some insightful data about the legal and ethical considerations of AWT. 6% of the total are engineers and equally 6% are doctors. Data provided by the doctors are the result of their experience in the medical field. 33% of the participants are engaged in various other jobs, from housewives to bankers and from government officers to private job employees. The opinions of people coming from different occupational background added a lot of value to the findings of the study. What people, employed in different sectors think, about AWT was necessary to know to derive a fruitful conclusion.

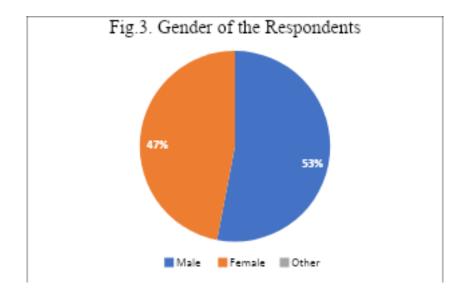




Fig.3. represents the percentage of gender-division between the participants. Interestingly, 53% of the respondents are male whereas 47% of them are female. It was good to see more men becoming a part of such research studies. A child-bearing process mutually and equally involves the contribution of both the partners (husband as well as wife), hence the combined opinions of both men and women will help in drawing an efficient and valuable outcome of this study.

While many men appreciated and supported the cause behind this study, there were a few who asked me to only ask women to fill such questionnaires as women can know better about these issues. This shows that still there are men who associate pregnancy and childbirth to a woman only.

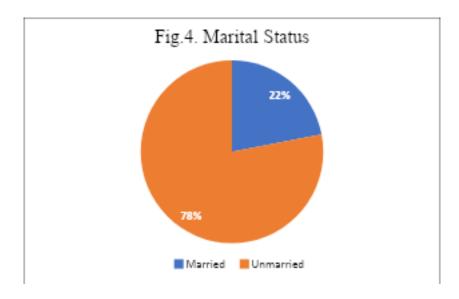


Fig.4. depicts the last demographic assessment of the respondents i.e. their marital status. Out of 132 participants, 22% are married and 78% are unmarried. The intention of collecting data about the marital status of the respondents is based upon the kind of society we are living in. In a society like ours, where traditions and cultures are given a lot of value and utmost importance, marriage and pregnancy are two concepts which are so intermittently linked that latter cannot have any separate existence without the former. With marriage comes the obligations which make spouses duty bound to act upon and one such mandatory obligation is



the procreation of a child. Though, a lot of advancements in the legal and social framework²² of the society has led to dilution in the idea that pregnancy and child-birth is associated only to the institution of marriage, yet the on-ground reality is still the same i.e. only a person who is married is entitled to have a child. This fact has been recently emphasised by the Hon'ble SC itself in a case where a provision of the Surrogacy Act 2021, prohibiting a single or unmarried woman to avail the benefits of surrogacy, was challenged on the ground of being arbitrary and discriminatory. The SC, while upholding the sanctity of the institution of marriage, remarked:

"It is a norm here to become a mother within the institution of marriage. Being a mother outside the institution of marriage is not the norm. We are concerned about it. We are speaking from the point of view of child's welfare. Should the institution of marriage survive or not in the country? We are not like western countries. Institution of marriage has to be protected. You can call us and tag us conservative and we accept it." 23

Although there might come a day where childbirth and childcare will not be only associated with the institution of marriage but that day is a far-dream, especially in a country like India.

The Hindu Adoption and Maintenance Act 1956 entitles a single or unmarried person (man or woman) with the right to adopt a child of their own. The Assisted Reproductive Technology (Regulation) ACT 2021 and The Surrogacy (Regulation) Act 2021, enables a single or unmarried woman to have her own child through the process of IVF with donor sperm and extends the right to a woman, who wants to be a mother and is a widow or a divorcee between the age of 35-45 years, to avail the facility of a surrogate mother, respectively. An important point to be mentioned here is that none of the above-mentioned rights under the ART and Surrogacy Act is

provided to a single or unmarried man. Also, the right under the Surrogacy Act provided exclusively to women

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excludes women who are not or never had been married.

²³ Supreme Court prodding triggered tweak in surrogacy law, The Times of India. Available@ https://timesofindia.indiatimes.com/india/supreme-court-prodding-triggered-tweak-in-surrogacy-law/articleshow/1 https://timesofindia.indiatimes.com/india/supreme-court-prodding-triggered-tweak-in-surrogacy-law/articleshow/1 https://timesofindia.indiatimes.com/india/supreme-court-prodding-triggered-tweak-in-surrogacy-law/articleshow/1 https://timesofindia.indiatimes.com/india/supreme-court-prodding-triggered-tweak-in-surrogacy-law/articleshow/1 https://timesofindia.indiatimes.com/india/supreme-court-prodding-triggered-tweak-in-surrogacy-law/articleshow/1 https://timesofindia.indiatimesofindiatimesofindia.indiatimesofindia.indiatimesofin



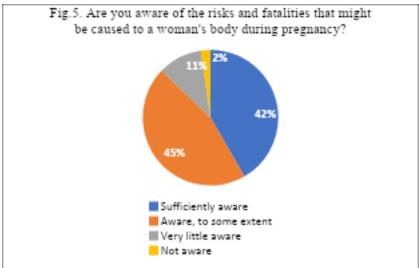


Fig.5. shows the level of awareness among the respondents about the risks and fatalities that might be caused to a woman's body during pregnancy. The data gathered shows that 42% of the participants are sufficiently aware about the respective risks and fatalities whereas 45% are aware but only to some extent. 11% participants are very little aware and only a small number of participants, just 2%, are not aware of any such risks and fatalities.

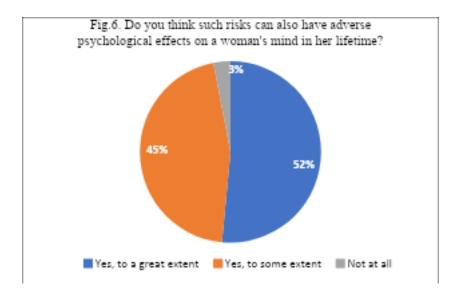


Fig.6. illustrates the awareness among the respondents regarding risks related to pregnancy having psychological effects on a woman's mind in her lifetime. A majority of the



respondents, 52%, believe that such risks affect a woman's mind to a great extent whereas 45% of the participants think that it affects a woman's mind but only to some extent. Only 3% of the total are of the view that there is no such effect.

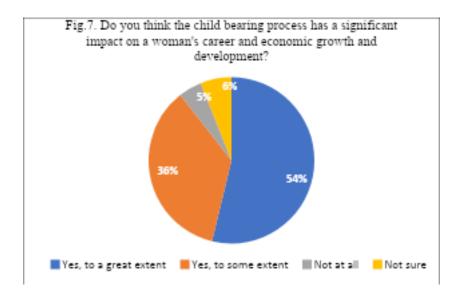


Fig.7. illustrates the pattern of thinking of the respondents as to whether the child bearing process has a significant impact on a woman's career, economic growth and development or not. Interestingly, 54% of the participants think that it makes an impact to a great extent whereas 36% believe that it does impact but only to some extent. 4% consider that there is no such impact and around 6% are not sure whether it makes any impact or not.



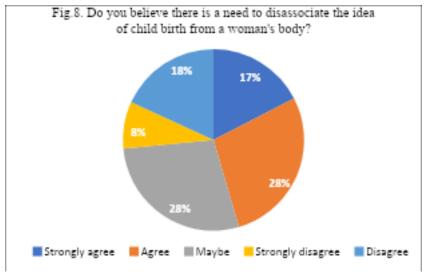


Fig.8. shows the opinion of the respondents as to the disassociation of child birth from a woman's body. This question was necessary to be asked in order to know whether the society is ready to welcome any technique ("Artificial Womb" in this study) which would completely segregate the process of child birth from a woman's womb and will be something totally against the current setting of the society. Only 18% of the respondent strongly agreed that there is a need to disassociate the idea of childbirth from a woman's body. 28% only agree to the need of any such idea whereas a same proportion of people, 28%, believe that maybe there is any such need. 18% disagreed to this question and only 8% strongly disagreed.

During the study one of the respondents, in the feedback section of the questionnaire, made a remark on the complete disassociation of childbirth from a woman. The respondent, a lawyer by profession, said:

"A woman's anatomy is engineered for birth from the functioning of the brain, to the structuring of the bones, everything. Moreover, after childbirth there are certain hormonal releases in the body which gives rise to the maternal instinct. I think it is a terrible idea to challenge nature to such great extent. investment should be made to have a safer delivery and not to have a womb outside the body. I also think this won't be successful and susceptible to a lot of infections. Even after this artificial womb concept, the responsibility to bring up the child would be on the parents. Also, the respect that women have in society is also deeply linked to the sacrifice she makes to



be a mother, so it will eat up that as well. I am vehemently opposed to the idea."

Another respondent, also a lawyer by profession, made a similar comment on this discussion. She said:

"I strongly believe this is against nature and should not be promoted. Only in the cases where there is no alternative for any mother to have baby through natural and other process like surrogacy. I would highly promote adoption rather than artificial womb. This will lead to mass production of babies leading to global impact and may also have genetic impacts in future."

A respondent, though conditionally accepting the idea of AWT, remarked on the sanctity of the notion of mother. A doctor by profession, she said:

"Artificial Womb can prove to be helpful to some extent in the future, some diseases which can get complicated during pregnancy, in such a condition artificial womb can prove to be helpful. Artificial womb may someday help a premature baby survive. But it has some limitations. Motherhood remains The Divine Mission, given exclusively to women, and it plays a crucial role in society. It serves as an example of the relationship and bonding between the mother and her child in the long run to society."



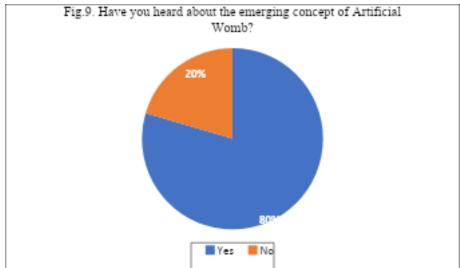


Fig.9 shows that 80% of the respondents have heard about the emerging concept of Artificial Womb whereas only 20% are unaware of any such concept.

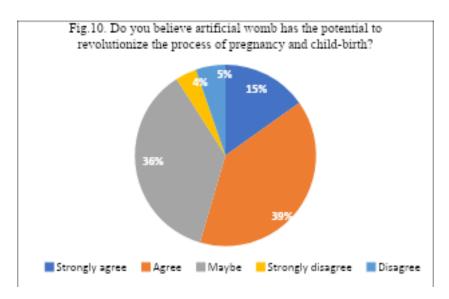


Fig.10. shows that only 15% of the respondents strongly agree to the idea that artificial womb has the potential to revolutionise the process of pregnancy and child-birth. Though 40% only agree to this agree, 36% believe that it may or may not be able to do so. Only 4% strongly disagreed to the question whereas 5% just disagree.



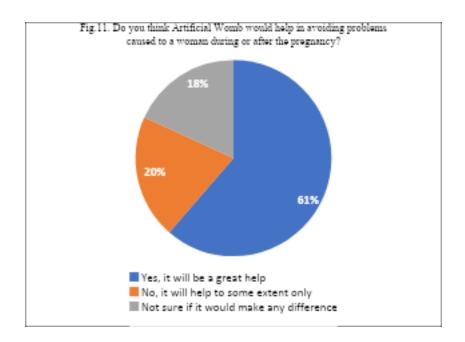


Fig.11 reveals that majority of the participants, 61%, believe that Artificial Womb would greatly help in avoiding problems caused to a woman during or after her pregnancy. 21% think that it would help but only to a certain extent. Lastly, 18% feel that it would not make any difference. The thought behind the notion that artificial wombs will not make any difference arises out of the social and economical setting of our society where still most of the people come from middle-class background. If any such technology ever comes in the medical market and given the type of technique involved in the process, it is expected that only people with heavy economic resources will be able to use it until and unless it is made reachable to every needy person. Hence, the feeling that it would not make any difference is actually true for the current scenario.



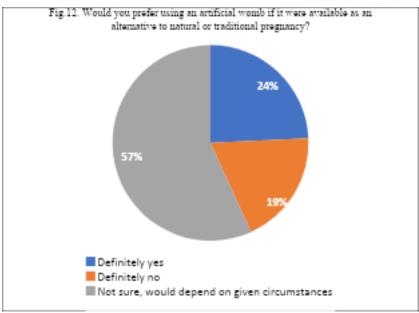


Fig.12. shows the answers to a very important question related to this study i.e. "Would you prefer using an artificial womb if it were available as an alternative to natural or traditional pregnancy?". The question was farmed with an intention to know that would the respondents use AWT as an alternative if it was available in the present time. Most of the respondents i.e. 57% are not sure whether they will use any such technology or not, they believe their decision would depend on the given medical conditions. 24% of the respondents answered that they will definitely be using AWT whereas 19% are sure about not using any such technology. I want to mention here an interesting fact about the gathered data. Out of the 132 respondents, it was mostly the men who answered in affirmation to use the AWT in order to have a child. This shows how the trends of society is being shifted and men are becoming more sensitive about the sexual and reproductive health of a woman. Not many women agreeing to the usage of AWT as an alternative to natural pregnancy has its reasons in their social and cultural upbringing where she believes becoming a mother is an essential part of her life. It is also because the concept of child-birth and the feeling of motherhood is deeply interlinked in a society like ours. It is considered that only a woman who gives birth to a child can possess the feeling of motherhood truly.



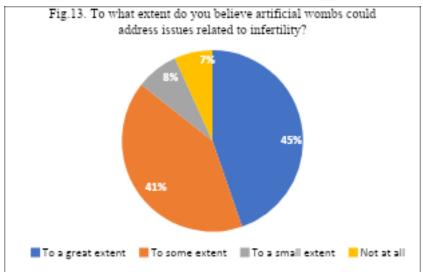


Fig.13. shows the pattern of answers to another important question, "To what extent do you believe artificial wombs could address issues related to infertility?". The primary reason behind the use of any Assisted Reproductive Technology procedures (ARTs) to conceive pregnancy is the problem of infertility in either of the spouses or in both. One of the most used ART procedures in India i.e. the IVF technique offers an average success rate around 32-35%.²⁴ The low rate of success depends on many factors including complications and weakness in a woman's body undergoing an IVF treatment which makes her incapable of carrying on the pregnancy, resulting in non-conception or miscarriage. Such situations terribly affect a woman's mind and body. With the development of a technology like AWT where there is no involvement of a woman's womb and body and also, there can be a constant check on the status and health of a child, success rates are expected to be better than that of existing ART procedures. 45% of the respondents feel that AWT could address issues related to infertility to a great extent whereas 41% believe that it would help infertile couples to have a child of their own only to some extent. 7% each think that the help will be only to a small extent or it will not be able to help at all respectively.

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²⁴ In Vitro Fertilization Success Rate in India. Available@ https://omyafertility.com/ivf-success-rate-in-india/



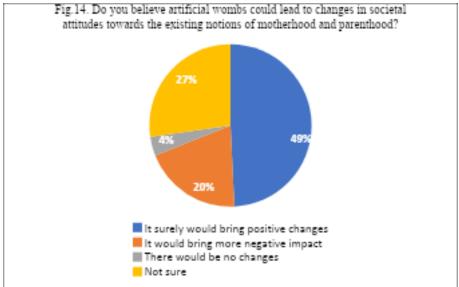


Fig. 14. shows that almost half of the respondents i.e. 49% believe that artificial wombs have the potential to change societal attitudes towards the existing notions of motherhood and parenthood. It means that the development and eventual implementation of AWT has the tendency to catalyze profound shifts in societal attitudes towards motherhood and parenthood. By offering an alternative pathway to gestation outside the human body, artificial wombs could challenge traditional notions of gender roles and biological parenthood. This technology may lead to a broader understanding of parenthood, wherein individuals or couples who are unable to conceive or carry a pregnancy to term through traditional means have expanded options for starting a family. Additionally, the availability of artificial wombs could prompt society to reevaluate long-held beliefs and norms surrounding reproduction, family structures, and the roles of mothers and fathers. The widespread adoption of artificial wombs could contribute to more inclusive and diverse understandings of what it means to be a parent and reshape societal perceptions of motherhood and fatherhood.

20% of the participants feel that there would be more negative impact in the society by the introduction of AWT. The ability to gestate a fetus outside of the human body could lead to the further commodification of reproduction, potentially devaluing the physical and emotional aspects of pregnancy and childbirth. This technology might reinforce existing inequalities by perpetuating the idea that only certain individuals or couples with access to artificial womb technology can experience parenthood. It could also contribute to the erosion of traditional



family structures and roles, as the separation of gestation from the maternal body challenges long-held beliefs about the importance of maternal bonding and the role of the mother in child-rearing. Being "born of woman" refers to more than just being born via a specific method, one that may work well now but may eventually be surpassed by human creativity. Charles Krauthammer made the following argument persuasively at the October 2003 meeting of the President's Council on Bioethics:

"Why do we want the embryo to be housed in its mother? One of the reasons is that it creates an innate connection between the child and the mother, and the mother becomes uniquely protective and attached. That's human nature. It's even animal nature as well... And it's not the mixing or the "yucking" that's at issue here. It may be severing the connection between the child and the mother, which is a way of protecting that child by giving him a belonging hood to someone who will care. Once you put him in an animal, which is a thing for these purposes, or a machine, which might happen in the future, you create a completely atomized and defenceless creature, and that opens the way to all kinds of tyrannies, social control, and lack of autonomy, which we would not want."²⁵

While 27% of the respondents are not sure about what impact AWT would have on the existing societal attitudes towards motherhood and parenthood, 4% believe there will be no changes.

²⁵ Christine Rosen, "Why not artificial wombs? 3 New Atlantis (Washington, D.C.) (2003), at p. 73.



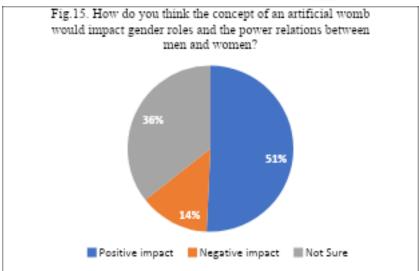


Fig.15. shows that upto 51% of the participants feel that the advent of AWT has the potential to significantly impact gender roles and power relations between men and women in the society. By enabling gestation outside the female body, artificial wombs could challenge the traditional association between women and childbirth, potentially shifting societal expectations and norms surrounding motherhood and caregiving. This may contribute to greater gender equality by offering women more freedom to pursue career opportunities and personal goals without the constraints of pregnancy. However, it could also raise questions about the role of men in reproduction and caregiving, potentially reshaping notions of fatherhood and shared parental responsibility.

During the study, one of the respondents, a law student, made a very significant remark and said:

"The idea of artificial womb would not only be a boon to womanhood but it will also change the public perception about how people see a woman. Nothing can be more tragic than the occurrence of death because of the sole reason that two heterosexual people decided to bring a baby in the world. It is like a trade of life in exchange of death, and such transaction must be prevented as Article 21 of our constitution mandates to preserve the life of a person. Moreover, I will personally find myself in an unforgiven situation if my other half faces any life-threatening injury just because I wanted a child which

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could have been achieved by re-coursing to some prescribed medical technologies."

While 35% of the respondents are not sure about the answer to this question, only 14% think that AWT will put negative impact on the existing gender roles and power relations between men and women in society.

In the feedback section of the questionnaire, many respondents commented on the legal and bio-ethical issues which would arise with the introduction of AWT and also against the commodification of childbirth with the arrival of such a technology.

RESULTS OF THE RESEARCH AND FURTHER DISCUSSIONS

The primary objective of this empirical research was to find out the awareness and the scope of awareness towards a technology like AWT. The data collected in the research presents a hopeful future where people are ready to welcome a system like "Full Ectogenesis" to procreate children. But the fact which remains true is that the development of AWT to achieve full ectogenesis is only a "science fiction" by now and might take several more decades to become a medical reality.²⁶ Hence, there will be numerous factors which will actually determine whether people and society eventually accept, tolerate, or reject the AWT. A recent study by Evie S Kendal²⁷ highlights some factors which would ultimately affect the reception and acceptance of AWT-

i. Functionality: Whether it can be demonstrated that the technology is safe, or at the very least, no more hazardous than current treatments for premature infants. Although full ectogenesis is a different story, early neonatal usage successes will provide evidence of efficacy that may eventually meet these safety requirements as well. The success rates of AWT in producing a healthy child will also determine its acceptance in the society.

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 $[\]frac{https://theconversation.com/artificial-wombs-could-someday-be-a-reality-heres-how-they-may-change-our-notions-of-parenthood-217490$

²⁷ Evie S. Kendal, "Form, Function, Perception, and Reception: Visual Bioethics and the Artificial Womb" 95 *Yale Journal of Biology and Medicine* (2022).

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- ii. Form: The public's aversion to pictures of artificial gestation or their association of the technology with unfavourable fictional portrayals could impede its adoption and acceptance. Leon Klass in this regard claims, "feelings of disgust can often stand in for moral intuitions we are unable to articulate". These instincts, however, do not provide ethical justifications in and of themselves, and it is crucial to keep in mind that societal norms might shift to tolerate behaviours and innovations that were once deemed inappropriate. For instance, in order to prevent creating what Kass refers to as the "yuck factor" designers might purposefully avoid any resemblance to The Matrix's pods. He are the societal norms of the societal norms of
- iii. Financial and legal status: Choosing AWT as an alternative to other ARTs would also depend on the financial status of a person wanting a child by the use of such technology. This would greatly impact the acceptance of AWT at a large scale. Also, legal status of people (especially homosexual couples and single people) can affect the widespread "accessibility" of AWT. The law has been far slower to adapt as science and technology have advanced to create more opportunities for various family structures, and it has frequently continued to restrict access to these technologies for marginalised populations who most need or want them.³¹
- iv. Family bonds: One of the characteristics of AWT is that parents would be able to watch their fetus in "real time" developing into a full-grown child. Where it is thought to expand the bond between the child and the parents, it might lead to a feeling of repulse, guilt and inadequacy. AWT suggests a whole different case than that of incubators. Parents of infants in neonatal intensive care units (NICUs) often feel a

https://www.progress.org.uk/artificial-womb-technology-the-implications-of-ectogestation-as-a-reproductive-choice/ "For example, in some European countries homosexual individuals are still prohibited from accessing assisted reproduction to start a family, and those who seek surrogacy abroad face hostility at home. And in the UK, until 2008, the law still enforced heteronormative values about the nuclear family in the regulation of IVF with legislation citing 'the need for a father'."

²⁸ Leon R. Kass, "The wisdom of repugnance" *The New Republic* (1997).

²⁹ Ibid.

³⁰ The Matrix Movie, 1999.

³¹



constant sense of duty and obligation to be close to their struggling infants.³² In future scenarios involving full ectogenesis, where gestation occurs outside the body, parents may experience even more stress, detachment, and guilt. While some may find comfort in monitoring the fetus's development in real-time, others may feel alienated from the traditional process of pregnancy and childbirth.³³

Also, the idea of totally separating the concept of "childbirth" from a woman's body seems to be a difficult goal given the importance attached to the institution of childbirth with a woman.³⁴

The research also shows the awareness amongst people about the risks, dangers and fatalities associated with pregnancy and how the process of childbirth affects a woman's mental health as well as her career. Hence, the study points towards three consequences of reproduction on a woman and her body: *Physical, Mental and Economic consequences*. Pregnancy certainly presents several risks and potential fatalities to a woman's body due to physiological changes and complications that can arise during this period. These risks include maternal mortality, severe morbidity, and adverse health outcomes. As per the WHO, almost 800 women die every day because of issues relating to pregnancy and childbirth which means that in almost every 02 minutes, a woman succumbs to maternal death. The data suggests that these deaths are occasioned due to some reasons which with the help of appropriate technologies can be prevented. ³⁵ It further highlighted that out of the total deaths of about 287000 women in 2020 following pregnancy and childbirth, almost 95% alone occurred in "low and middle-income countries" and most in cases where it could have been prevented. 87% of these deaths

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³² Aagaard H, Hall EO. Mothers' experiences of having a preterm infant in the neonatal care unit: a meta-synthesis. J Pediatr Nurs. 2008. Jun;23(3):e26–36. See also: Obeidat HM, Bond EA, Callister LC. The parental experience of having an infant in the newborn intensive care unit. J Perinat Educ. 2009;18(3):23–9; Ferrari RM, McClain EK, Tucker C, Charles N, Verbiest S, Lewis V, et al. Postpartum Health Experiences of Women with Newborns in Intensive Care: The Desire to Be by the Infant Bedside as a Driver of Postpartum Health. J Midwifery Womens Health. 2022. Jan;67(1):114–25.

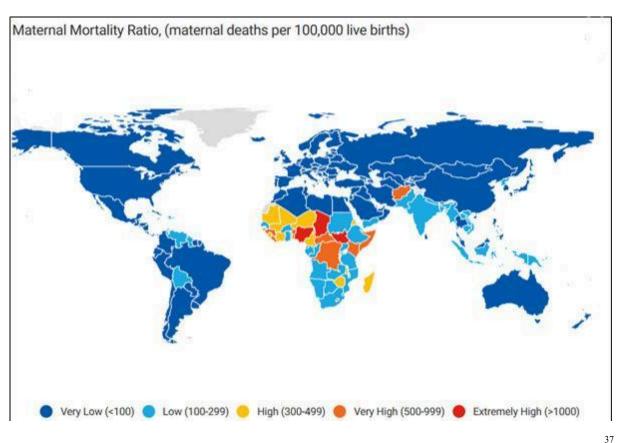
³³ Evie S. Kendal, "Form, Function, Perception, and Reception: Visual Bioethics and the Artificial Womb" 95 *Yale Journal of Biology and Medicine* (2022).

³⁴ Christopher M. Stratman, "Ectogestation and the Problem of Abortion" 34 *Philosophy and Technology* (2021).

³⁵ Maternal Mortality. https://www.who.int/news-room/fact-sheets/detail/maternal-mortality "Global MMR of 223 deaths per 100000 live births".



occurred in Sub-Saharan Africa and Southern Asia regions, accounting for 202000 and 47000 maternal deaths respectively. It shows the inequalities in "access to quality health services" between the rich and poor as the MMR of low-income countries was 430 per 100000 live births in comparison to 13 per 100000 live births in high income countries.³⁶ The figure below shows the pattern of MMR globally.



In India, as reported by the UNICEF, "Maternal Mortality Ratio (MMR) of India for the period 2018-20, as per the latest report of the national Sample Registration system (SRS) data is 97/100,000 live births, declining by 33 points, from 130/100,000 live births in 2014-16." Several studies have shown that conditions such as domestic violence during pregnancy³⁹, acute aortic dissection i.e. "a serious condition in which a tear occurs in the inner layer of the

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³⁶ Ibid.

³⁷ World Health Organization, UNICEF, United Nations Population Fund and The World Bank, *Trends in Maternal Mortality: 2000 to 2020* WHO, Geneva, 2023.

³⁸ https://www.unicef.org/india/what-we-do/maternal-health

³⁹ Marianna Mazza et al., "Caring for mothers: A narrative review on interpersonal violence and peripartum mental health" *International Journal of Environmental Research and Public Health*, 2021.



body's main artery (aorta). Blood rushes through the tear, causing the inner and middle layers of the aorta to split (dissect). If the blood goes through the outside aortic wall, aortic dissection is often deadly"40, gestosis, preeclampsia⁴¹, and uterine rupture⁴² have led to fatal outcomes for both the mother and the baby.⁴³ Another study shows that the physiological changes in a woman's body during pregnancy can impact various systems such as cardiovascular, respiratory, endocrine, renal and musculoskeletal systems, potentially leading to complications and adverse health effects.⁴⁴

The physiological impact of body image changes during pregnancy can affect a woman's mental health and well-being, potentially leading to depressive symptoms and other health risks⁴⁵. Alongwith the body changes, women go through several mental and emotional changes during the course of pregnancy and childbirth which too affect their mental health. Antepartum and Postpartum Depression are significant mental health concerns affecting women during and after pregnancy.

Antepartum depression: It characterised by symptoms like low mood, feelings of worthlessness, and changes in appetite,⁴⁶ affecting upto 10% of pregnant women globally and reaching upto 15.6% more in developing countries.⁴⁷ Studies have shown that it can lead to adverse pregnancy outcomes, such as low birth weight infants⁴⁸ and

⁴⁰ https://www.mayoclinic.org/diseases-conditions/aortic-dissection/symptoms-causes/syc-20369496

⁴¹ Aleksandra Krupa et al., "Impact of COVID-19 on pregnancy and delivery - Current knowledge" 91 *Ginekologia Polska* (2020). See also: Nguyen Huc Dung, "Pregnancy Preeclampsia in Patients with a History of Chronic Disease and Complications" 3 *Journal La Medihealtico* (2022).

⁴² Kolala S. Gurudut et al., "Spontaneous Rupture of Unscarred Gravid Uterus" 56 *Journal of Forensic Sciences* (2011).

⁴³ Andreea A. Creanga et al., "Maternal mortality and morbidity in the United States: Where are we now?" 23 *Journal of Women's Health* (2014).

⁴⁴ Fábio Farias de Aragão, "Pregnancy-related lumbosacral pain" 2 *Brazilian Journal Of Pain* (2019). See also: S. V. Kalent'eva and N. A. Barbarash, "Chronobiological characteristics of the development and course of gestosis during the first pregnancy" 31 *Human Physiology* (2005).

⁴⁵ Dianne Duncombe et al., "How well do women adapt to changes in their body size and shape across the course of pregnancy?" 13 *Journal of Health Psychology* (2008).

⁴⁶ Pavarisa Choosuk, Jarurin Pitanupong and Chitkasaem Suwanrath, "Prevalence and Factors Associated with Antepartum Depression: A University Hospital-Based" 73 *Siriraj Medical Journal* (2021).

⁴⁷ Ola Abdelmoniem Mostafa et al., "Assessment of antepartum depression and its effect on pregnancy outcome in two primary health care units in qaliobia governorate, Egypt" 9 *Open Access Macedonian Journal of Medical Sciences* (2021).

⁴⁸ Bizu Gelaye et al., "Association of antepartum depression, generalized anxiety, and posttraumatic stress disorder with infant birth weight and gestational age at delivery" 262 *Journal of Affective Disorders* (2020).



it also has been associated with a higher likelihood of developing postpartum depression emphasising the importance of early detection and intervention.⁴⁹

Postpartum depression (PPD): It is associated with "after birth" mental and physical health problems for women. More than just "baby blues", postpartum depression is a serious health concern affecting a large number of women across the globe. Factors like fear of childbirth, 50 cesarean birth, preterm birth, major congenital anomalies 51, changes in sleep patterns 52 and prenatal attachment 53, etc., have been linked to the development of PPD symptoms. Studies have shown that postpartum depression can persist, with women being twice as likely to experience depression even four years after childbirth. 54 A study highlights the prevalence of PPD with an overall rate of 17.22%, ranging from 6% to 61% globally which also signifies the unequal balance of PPD rates throughout the world. 55

⁴⁹ V. K. Sita and . Meenakshi, "A Cross Sectional Study on Prevalence of Postpartum Depression among Recently Delivered Women in a Tertiary Care Hospital, Chennai, India" *Journal of Pharmaceutical Research International* (2021)

⁵⁰ Sari Räisänen et al., "Fear of childbirth predicts postpartum depression: A population-based analysis of 511 422 singleton births in Finland" 3 *BMJ Open* (2013).

⁵¹ James C. Eisenach et al., "Severity of acute pain after childbirth, but not type of delivery, predicts persistent pain and postpartum depression" 140 *Pain* (2008).

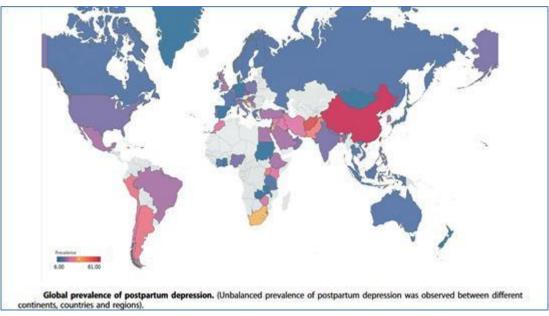
⁵² Beth A. Lewis et al., "The effect of sleep pattern changes on postpartum depressive symptoms" 18 BMC Women's Health (2018).

⁵³ Meltem Kaydırak et al., "The relationships between prenatal attachment, maternal anxiety, and postpartum depression: A longitudinal study" 58 *Perspectives in Psychiatric Care* (2022).

⁵⁴ Fatemeh Abdollahi and Mehran Zarghami, "Effect of postpartum depression on women's mental and physical health four years after childbirth" 24 *Eastern Mediterranean Health Journal* (2018).

⁵⁵ Ziyi Wang et al., "Mapping global prevalence of depression among postpartum women" *Translational Psychiatry*, 2021.





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The figure above shows the unbalance PPD prevalence which is not based about the financial status of a country or a region. In India too, PPD qualifies as a major depressive condition for women and despite being known by the health professionals, the reproductive health policies of India do not include measures for prevention and treatment of PPD.⁵⁷ Also, researches in this regard are weak in India, unlike in countries like USA and UK.⁵⁸ PPD can affect any women from any strata of the society. Where it is thought that such depression may only affect women belonging to low income or middle-income families, cases of serious PPD amongst women from high income and rich class families have changed this notion. For instance, the death by suicide of Dr. Soundarya Neerja, granddaughter of Karnataka's former Chief Minister BS Yediyurappa, has sparked the discussions and debates related to the prevalence and ignorance of PPD in India.⁵⁹ Cases of woman, suffering from PPD, killing her

⁵⁶ Ziyi Wang et al., "Mapping global prevalence of depression among postpartum women" *Translational Psychiatry*, 2021.

⁵⁷ Aditi Shelke and Swarupa Chakole, "A Review on Risk Factors of Postpartum Depression in India and Its ManagemenT" *Cureus* (2022).

⁵⁸ https://thewire.in/health/postpartum-depression-mothers-violence

Postpartum depression in spotlight after SoundaryA'S DEATH. https://www.deccanherald.com/india/karnataka/bengaluru/postpartum-depression-in-spotlight-after-soundaryas-death-1076075.html



child followed by her own suicide have also been reported signifying the worseness of this mental problem. ⁶⁰

Apart from physical and mental repercussions, pregnancy and childbirth also affects the career and economic development of a woman. Research indicates that stereotypes associated with pregnancy can lead to decreased career encouragement and influence women's work performance. 61 The timing of childbirth often results in career interruptions, which can lead to wage penalties for women. 62 Moreover, many women feel that childbirth has a more substantial effect on their careers than marriage. 63 The challenges women face in sustaining their careers after childbirth are evident, even in apparently supportive environments with maternity leave and career advancement opportunities.⁶⁴ A report recently published by the Economist highlights the problem of motherhood hurting careers and calls it "the motherhood penalty". While 95% of men between the ages of 25 and 54 are employed globally, only 52% of women in the same age range are employed. The average percentage that a woman's likelihood of finding employment decreases over the ten years following the birth of her first child is what the authors refer to as the "motherhood penalty." In the first year of employment, women often drop out at a rate of 24%. Of them, 17% are still missing after five years. 15% are after ten years. 65 In India where motherhood is considered to be the highest attainment in a woman's life, pregnancy and childbirth puts a great impact on a woman's career. Here, among other perks, companies are permitted to provide expectant women with up to 26 weeks of paid leave under the terms of the Maternity Benefit Act of 2017. However, maternity benefits deterred many businesses in important industries including aviation, education, real estate, IT, and e-commerce from hiring women, according to 2018 research by HR services provider TeamLease. Jyotsna Uttamchandani, the executive director of Syska Group, refers to this as the "motherhood penalty." She asserts that prejudice and comparison between new moms and

⁶⁰ https://edition.cnn.com/2022/05/04/uk/as-equals-post-partum-depression-intl-cmd/index.html

⁶¹ Samantha C. Paustian-Underdahl et al., "Pushed out or opting out? Integrating perspectives on gender differences in withdrawal attitudes during pregnancy" 104 *Journal of Applied Psychology* (2019).

⁶² Dumauli, M. T. (2019). The timing of childbirth and the child wage-penalty in japan. International Journal of Social Economics, 46(12), 1369-1386.

⁶³ Chun, S. E., Lee, J. H., Lee, J. E., Lee, S. M. K., Leem, J., & Kim, H. (2019). Impact of gender on the career development of female traditional korean medicine doctors: a qualitative study. BMJ Open, 9(8), e030390.

⁶⁴ Nagayama, R. and Sato, F. (2024). Careers in "woman-friendly" occupations: investigating the role of beauty consultant in the era of neoliberalism. Japanese Journal of Sociology, 33(1), 27-41.

⁶⁵ https://www.economist.com/interactive/graphic-detail/2024/01/30/how-motherhood-hurts-careers



other women also exist. "In a lot of the workplaces, notions still exist that women returning from maternity leave will be less productive or mothers are less competent and committed than non-mothers," Uttamchandani stated.⁶⁶

The development of a technology like AWT seeks to end all these repercussions (physical, mental as well as economic) associated with pregnancy by totally disintegrating the idea of childbirth from a woman's womb. It will be a boon for woman who are not healthy enough to give birth to a child or who, under some mental or career-oriented circumstances, want to abstain from this process.

The research also shows that AWT could be an effective way to reduce the problem of infertility in comparison to other existing ARTs. While traditional ART methods like in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) have been instrumental in addressing infertility, ectogenesis offers a unique approach by potentially eliminating the need for a human uterus in the reproductive process. This innovation has the potential to redefine the landscape of reproductive medicine by providing an alternative pathway to pregnancy and childbirth. Compared to conventional ART techniques, ectogenesis offers distinct advantages. It could mitigate certain risks associated with traditional pregnancy, such as maternal health complications and fetal abnormalities. Additionally, ectogenesis may provide a solution for individuals facing challenges related to infertility, offering a novel option for achieving pregnancy. The technology also opens up possibilities for individuals who may not be able to conceive through traditional means, such as same-sex couples or individuals with medical conditions that affect fertility. By utilizing artificial uteri, ectogenesis can offer a controlled and monitored environment for fetal development, potentially reducing the risks associated with natural gestation.

⁶⁶ https://economictimes.indiatimes.com/magazines/panache/the-motherhood-penalty-its-not-fair-to-punish-women-professionals-for-having-a-baby/articleshow/91412350.cms?from=mdr

⁶⁷ Okesanya, O. (2024). Ectogenesis: understanding opportunities, implications, concerns, and ways forward. International Journal of Surgery Global Health, 7(1).

⁶⁸ Segers, S. (2021). The path toward ectogenesis: looking beyond the technical challenges. BMC Medical Ethics, 22(1).

⁶⁹ Okesanya, O. (2024). Ectogenesis: understanding opportunities, implications, concerns, and ways forward. International Journal of Surgery Global Health, 7(1).

⁷⁰ Segers, S. (2021). The path toward ectogenesis: looking beyond the technical challenges. BMC Medical Ethics, 22(1).



Lastly, the research also shows that AWT can be a significant step in achieving complete equality and freedom⁷¹ for women at large by freeing them from the "tyranny of reproduction".⁷² The ideals of equality and freedom, as enshrined in the Constitution of India⁷³ and various other Human Right treaties⁷⁴ mostly focussing on the reproductive freedom of women (including their right to choose when to reproduce, how many to reproduce and how to reproduce), can only be achieved when women are completely devoid of discrimination on any ground including their reproductive structure.

CONCLUSION

"If there was a technology like this at present, I would have not lost my aunt on the childbed. She was diagnosed with severe complications during her pregnancy which ultimately led to a fatal end."

A respondent, saddened by her aunt's death, told me this while filling the questionnaire. The story of her aunt is actually a story of many women who lose their lives on childbed. Even in cases where the complications are detected at a very early stage, people don't consider the option of abortion given the importance attached to the institution of childbirth. This has to be stopped as there's a popular saying in this regard: "Worse than aborting is birthing in instability". AWT tends to develop such a system which would elevate the role and status of women in the society, from a role primarily associated with their reproductive framework to a role focussing more on her personal choices and intellect.

In conclusion, this study on the social acceptance of Full Ectogenesis illuminates a nuanced landscape where attitudes towards this emerging technology are in flux. The findings underscore a shifting paradigm in societal perceptions of reproduction and parenthood, with a notable segment expressing openness or enthusiasm towards Full Ectogenesis. However, ethical considerations loom large, with concerns ranging from implications for human identity and family structures to the potential commodification of life. Cultural and religious

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⁷¹ Giulia Cavaliere, "Gestation, equality and freedom: ectogenesis as a political perspective" 46 *Journal of medical ethics* (2020).

⁷² Shulamith Firestone, *The Dialectic of Sex The Case for Feminist Revolution Bantman*, 1971.

⁷³ Article 14 and 21. Constitution of India 1950.

⁷⁴ International Conference on Population and Development (ICPD), CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women).

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influences play a significant role, shaping both acceptance and skepticism towards the technology. Moving forward, there is a pressing need for educational initiatives to foster informed discourse and comprehensive regulatory frameworks to address ethical, legal, and social concerns. By navigating these complexities with sensitivity and foresight, society can harness the potential of Full Ectogenesis while safeguarding individual rights and well-being.