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Safeguarding Artificial Womb Technology: An analytical perspective around Singapore's Medical landscape

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In recent years, there is an increasing occurrence of premature births in Singapore that requires warding in highly-expensive neonatal intensive care units (NICU). Due to the rising trend of late motherhood, and increasing uptake of assisted reproduction techniques such as IVF and elective egg freezing by Singaporean women, some local doctors have anticipated that the problem of premature births will be exacerbated in coming years.

The advent of artificial womb technology can potentially provide a novel life-saving platform for extremely premature newborn infants delivered before the 28th week of pregnancy, which are associated with relatively high mortality rates.

The survival rate of premature babies born at 22 weeks of pregnancy is close to zero, but rises to between 80% to 90% by the 28th week. Hence the 28th week of pregnancy is widely considered to be the threshold whereby premature babies are better placed in an artificial womb environment rather than neonatal intensive care unit.

Indeed, it was recently reported that the US Food and Drug Administration (FDA) will very soon approve human clinical trials of artificial womb technology within the United States in the near future.

Nevertheless, in embracing this new “wonder” life-saving medical technology, it is imperative that Singapore should be cautious and implement appropriate regulatory safeguards to assiduously protect the welfare of vulnerable patients and their family members. In particular, there are three major issues that have to be addressed.

Saving lives of premature babies at all costs, even those with high risks of disability

The first issue relates to the cost-benefit assessment of saving lives of extremely premature new-born babies at all costs, even though some of them may be at high risks of severe disability and lifelong health problems.

History has repeatedly demonstrated that new technology platforms are often deficient in some way when first introduced. It can take several years for them to be optimized. The risk is that newly-debuted artificial womb technology at a sub-optimal level might place undue pressure on distressed parents to utilize this new technology platform to save the lives of extremely premature newborns – a form of emotional or moral blackmail.

The development of the offspring may be compromised even though its life is being saved. Particularly vulnerable are the developing lungs and brain of the extremely premature new-born baby.

It is well-known that premature babies are at higher risks of certain medical conditions such as cerebral palsy and hole in the heart (Patent Ductus Arteriosus, PDA).

This could result in severe disabilities and lifelong health problems, imposing heavy financial and care-giving burdens on parents; causing much greater psychological and financial distress than simply losing a child.

Under such circumstances, the use of artificial womb technology would be replacing one harm with another possibly worse harm.

The emotionally-distressing circumstances of premature births might cloud rational decision-making and pondering of long-term consequences by parents. Their basic primal instinct to save their child at all costs will likely kick in, regardless of the risks of disability and hefty medical fees that can put them heavily in debt for years to come.

The situation is made worse by the fact that many cases of extremely premature births are medical emergencies, such as accidental miscarriages caused by traumatic injury, which would require hasty on-the-spot decision-making in putting the newborn on life-support with artificial womb technology. There is basically no time for parents to think and ponder carefully on the long-term consequences of their decision.

It is thus suggested that parents with extremely premature babies on life-support with artificial womb technology should be given an extended termination option beyond 24 weeks of gestation mandated by Singapore law, particularly if it is expected that their child is going to be born with severe congenital deformities and lifelong health problems.

This will give parents more time to carefully think whether they are willing and have adequate family support and finances to bring up a special-needs disabled child.

Perhaps, some parents might later rationalize that it could be better to terminate life support and attempt to conceive another child who may turn out to be healthy, rather than be saddled with years of debt burden together with a disabled child.

With current abortion laws, it may be legally problematic to terminate the life of a disabled child on life support with artificial womb technology, especially if it was prematurely born after 24 weeks of pregnancy. Moreover a premature baby gestated within an artificial womb does not pose any risk to either the health or life of the mother, which could impose yet another legal hurdle to elective termination of life support.

Then, there is also the issue of conscientious objection by medical doctors who are requested to terminate life support of a disabled baby within an artificial womb, particularly those who hold strong religious beliefs. This may thus necessitate an exclusionary clause, similar to that which allow doctors to voluntarily opt out of performing abortions.

Whatever the case, rigorous and comprehensive counseling must be provided to enable carefully-deliberated and informed decisions by parents.

Affordability and accessibility to artificial womb technology by poorer parents

The second issues relates to the high costs of artificial womb technology, which is anticipated to much more expensive than neonatal intensive care units that is already very costly. This could put parents heavily in debt for many years of their working life. Indeed, over the past few years, many of such parents of extremely premature babies warded in neonatal intensive care units have turned to crowdfunding to defray their hefty medical fees.

The question that arises is whether such means of fund raising is sustainable in the long term and can also apply to the utilization of much more expensive artificial womb technology? Because the success of crowdfunding would ultimately depend on public sympathy, which could be highly fickle at times. Moreover, it may be more challenging for crowd funding to defray the much higher costs of artificial womb technology.

A possible solution may be for Singapore's Ministry of Health (MOH) to implement a compulsory national insurance scheme for all expectant parents, to offset the high costs of artificial womb technology for saving the health and lives of extremely premature newborns. This is practical because such occurrences are relatively rare, accounting for not more than one percent of all births. Perhaps to be equitable, MOH can consider pegging the costs of insurance coverage to the income levels of expectant parents, with the rich paying more than the poor, which is consistent with the principle of means testing assessment for medical subsidies at public hospitals.

Future ethical problems with further advancement of artificial womb technology

The third issue relates to future ethical problems upon further advancement of artificial womb technology to support all nine months of pregnancy.

For example, affluent career women might use artificial womb technology to escape the burdens of pregnancy and childbirth. This might lead pathologizing pregnancy and childbirth as a form of "sickness".

Still worse, knowing that women have the option of gestating their children in an artificial womb, employers might pressure them to avoiding taking maternity leave. Large multinational corporations might offer the technology to high-value female employees in senior management.

Yet another controversial issue is gestating children for gay couples, as an alternative to surrogacy. This could be combined with in vitro gametogenesis (IVG) technology to produce a child with two fathers and no mother.

In conclusion, all these are difficult questions that need to be comprehensively addressed by regulatory safeguards enacted by Singapore's Ministry of Health (MOH), to protect the welfare of vulnerable patients and their family members.