**Lifting the ban on 14 day old Embryo- is it a ban or boon?**

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**Introduction**

Science and scientific research help lay the roadmap for development and well-being of humanity. Fundamental or basic research have benefitted human health and there is continued scientific pursuits to better human well-being with the changing environment. Procreation is one of the most important aspects of human reproduction and health. With advanced technology of assisted reproduction human lives have attained a new dimension. There is a transition from sex with babies to babies without sex. The first In Vitro Fertilization (IVF) baby Lousie Brown and babies born out of IVF have given life and meaning to thousands of parents all over the world. In certain countries infertility is considered as one of the reasons for divorce. Many marriages are saved because of such methods. In other words artificial methods of reproduction have given new meaning to life and living.1-2

**Artificial Methods of Reproduction**:

These methods have been standardized to become a protocol in the practice of gynecology. The development of these methods is due to the basic research work carried on human sperm and human embryo. The initial stages of research was restricted to experimental animal and animal models. The difficulty in extrapolating animal research to humans had many difficulties of understanding early human development and developmental disorders. The amalgamation of basic research and clinical research paved way for Human Reproduction to become the most beneficial research for humanity. 3

Basic research had brought out the importance of gonadotrophic hormones and gonadal hormones in the development of Graffian follicle or Spermatocyte maturation. It not only helped to understand the basic biochemical and physiological processes of early human development but also helped to determine the role of these hormones in vitro. 4The results of these fundamental research expanded the understanding of the formation of spermatozoa, its density, maturation, transit in the female genital tract, acrosome reaction, fertilization and implantation. T

**Embryo Research**

The development of basic fundamental research laid the foundation for human embryo research and its regulation. 6The production of excess embryos, its storage and disposal created the need for regulations and special guidelines to deal with these ethical concerns. 6The presence of excess embryos and the need for understanding the process of early human development led to conducting research on human embryos.7 The purpose of doing such research is not only to understand the process of reproduction and development but also to decipher the genetic abnormalities associated with it. 8

The HFEA Code of Practice stresses ‘that only fresh or frozen … embryos not required for treatment can be used for research’, it makes no mention of the important decision-making process that results in an embryo being labelled ‘spare 8-9

*An embryo the creation of which was brought about in vitro must not be kept in storage unless there is an effective consent, by each relevant person in relation to the embryo, to the storage of the embryo and the embryo is stored in accordance with those consents.10*

The point when it is decided that an embryo is ‘not required for treatment’, a couple will be consenting to that embryo's disuse in treatment*.*

*It is important that patients decide to donate embryos for research only after they have decided not to continue storing their embryos. Making separate decisions about no longer using embryos and donating them for research guards against pressure being placed on patients to donate embryos. … Using only frozen embryos for research ensures that time passes between the creation of embryos for conception and their donation for research.11*

**Embryo’s moral Status**:

It is said that stating that human embryos are “human beings” or “persons” cannot be agreed, because philosophies and approaches differ, awarding them statuses from full human to property. 8Human chromosomal disorders, developmental anomalies and fetal malformation have been cited as scientific reasons to conduct research on human embryos. 12

The advocates of sanctity of human life and reverence felt that manipulating human embryos will lead to religious transgressions and will result in a new human order. 13

The earliest research scientists to do research on embryos gave definitions for probable person, person including newmart ( a human kept alive on heart-lung machine). Warnock’s committee on human reproduction had allowed research up to 14 day old embryos, the 14th day being considered as the day where electrical activity of brain is recorded. 14-2

The Eugenic movement had given the world of scientists a warning that embryo research may lead to engineered babies ( designer babies) and manipulation of human genome. With the world advancing towards artificial intelligence, machine learning and robotics, a path that leads to new world order whether the data generated from embryo research may be used to refine and create better robots to bring in precision and efficient digital health governance. 15.

The question whether the 14 day old rule has to be continued or extended to say 28 days old embryos for doing research has brought human developmental scientists to seek relaxation of the 14 day rule. The most probable reason cited for such a demand is to understand babies born with cardiac problems. It is said the fetal heart development is completed by the end of 18th day of fetal life and starts to bear by day 22 of fetal life. 16

Human gene mutations are reported to be the cause of cardiac hypertrophy, dilation apart from hypertrophic modeling defect reported as left ventricular hypertrophy with diminished systolic function leading to hypertrophic cardiomyopathy or dilated cardiomyopathy. 17

The birth babies of with such cardiomyopathies as well as to prevent early pregnancy loss, teratogenesis and the development of organs possibly from pluripotent stem cells seem to suggest whether the moratorium of embryo culture beyond 14 day old embryos can be lifted. The lifting of such a ban on embryo culture will help more about early human development.14

Why 14 day limit is set for doing embryo research invitro. It is said that 14 days is the last stage in development at which twinning can occur and therefore represents the point of individuation, founding cells of the nervous system have not been specified prior to this stage, substantial embryo loss from the time of fertilization up to this point, and until the process of implantation is complete, the embryo has no potential for further development. 18

**To lift the ban on 14 day Embryo or not?**

Some researchers think that human embryo as a human being from the moment of its conception and attains human dignity ensuring the right to life of the embryo. Most of them base such an argument that instrumentalization of a human being for means other its own existence is a flaw in the concept of human life and dignity. 18

Human embryo with its genome carries blue print of its development into a human with intrinsic built in value system. UNESCO guidelines recommends that research should be respectful of human dignity, but may be motivated to relieve the indignity of limitations and suffering due to preventable or treatable illness or disability. 19

The need for understanding early human development and avoid genetic aberrations of fetal developments researchers seek lifting of ban on 14 day rule. They want to extend it say upto 28 days opening the way for doing more research.

**Conclusion:**

Time limit for doing embryo research in vitro will never be a simple discussion based on science and ethics. It is true that the fetus begins to feel pain at some stage after 8 weeks of development. It is not certain whether the fetus is self-aware say later than 20 weeks. Viability beyond 20 weeks say between 22-24 weeks is possible. These stages represent major increases in the moral status, and we should recognize these points in our attitude to ethical questions involving the human embryo. Research is dynamic and therefore more research is needed to understand early human development. If proper guidelines are kept in place with regulations without affecting the human dignity a critical overview of the ban on research on 14 old embryos needs an introspection, reflection and then, a proper scientific action. 21

As long as human race exists the will to better life, to provide better medical skills and procedures will remain. In such pursuits of practice of medicine, today's relaxation in limiting or defining the boundaries of research may affect human dignity in a high-tech world.

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