

Samantha Benjamin

Sara Levy

James Zyckowski

N290 Group Project

Long Island University

In vitro fertilization (IVF) came to prominence in 1978 when the first “test tube baby,” Louise Brown, was born. However the study of assisted reproduction can be traced back to the middle of the 19th century with a long succession of research leading to the advent of successful reproductive treatments mainly in vitro fertilization through embryo transfer (IVF/ET). Since 1978 over 4 million babies have been born using IVF/ET techniques and a new branch of medicine, assisted reproduction, has been established (Biggers, 2012). Despite the tremendous success of IVF treatments, as with all groundbreaking human mammalian reproductive science a multitude of controversy and ethical dilemmas have come to prominence. The presence of these ethical dilemmas persist leading to serious considerations for modern day nursing. The focus of this paper is to explore the following question: Has the population seeking IVF treatment changed the dynamic of ethical dilemmas related to IVF since its implementation? In order to fully understand the ethical implications of IVF, first one needs a fundamental understanding of the IVF procedure, and an understanding of the inherent risks and probability of success when using IVF/ET.

In essence, IVF refers to a multi stage process that begins with ovary stimulation, generally with the use of medication, which can then allow for egg retrieval by means of transvaginal ultrasound retrieval. Subsequently, fertilization of the retrieved egg is achieved through co-incubation of sperm and eggs for up to 36 hours after which the implantation of embryos should occur within 3 to 5 days, a process known as embryo transfer. The embryo transfer process usually involves multiple embryos to increase the chances of success. However, the entire IVF process is only performed after careful evaluation of candidates and the painstaking monitoring of hormone levels and cycles (Brunner & Smeltzer, 2010).

Research findings have much data pointing to several factors that make IVF a risky

elective form of treatment for infertility. The age for conception has gradually increased and this trend has lead to the need for assisted reproductive technology (ART). In 2011, Seveg et al noted that, “a third of those women who deferred conception until their mid to late 30s or until after age 40 will be unable to conceive spontaneously”. Therefore, as the age of the client increases, the likelihood of complications increases as well.

Maternal complications include ovarian hyper-stimulation syndrome (OHSS), multiple pregnancies, pre-eclampsia, and pre/post psychological complications. OHSS can cause severe manifestations including, a tendency to develop thrombosis, renal and liver dysfunction and acute respiratory distress syndrome, causing serious morbidity (Gelbaya, 2010, p.20). Its most severe form occurs in 0.1-2% of all ovulation induced cycles (Gelbaya, 2010, p.20). Multiple pregnancies comprised the deaths of 2.5 times more women than single pregnancies (Gelbaya, 2010). Although ART births only comprise about 1% as of 2006, (Bromer et al, 2011) only “18% of those births were multiple births and 48% of all ART neonates born were products of multiple gestation.” Pre-eclampsia (PET) can also be a complication, with its contribution more likely with any preexisting conditions, such as diabetes or even increased age. In 2010, Gelbaya noted that through a meta-analysis using 8 studies it was found, “There is an increased risk of PET with IVF”. The psychological complications can take place pre and post use of ART. Assisted conception treatment may be associated with stress, problems with self-image and a sense of loss of hope, hence the importance of providing these couples with access to programs that provide training in stress management and coping strategies (Metwally & Ledger, 2011, p.81). These complications are both maternal and paternal.

When discussing risk factors there is also the inclusion of the risks to the neonate. Some risks to the neonate are a higher risk of low birth weight, congenital malformations, neurological

impairment, and poor growth and development in childhood (Metwally & Ledger, 2011). This poses a very serious consideration for the client, as well as those health care providers. In 1996 (Bromer et al, 2011) research found that, “one in five triplet pregnancies and one in two quadruplet pregnancies result in at least one child suffering a significant long-term handicap.” One can see that there is a significant correlation, as IVF is a direct means multiple births. Additionally, cerebral palsy (CP) is significantly more prevalent in multiple gestation born babies due to strong association between premature delivery and CP (Bromer et al, 2011). Based on these findings, the big question is, “*What is the financial implication to the healthcare system?*” In terms of the financial implications, research found that \$51,600 (in 2008) was the mean value of incurred costs for the first 5 years of life of a preterm infant (Bromer et al, 2011). Furthermore, from 2001 to 2006 the estimated total healthcare cost was over \$5 billion for preterm infants in the USA as a result of multiple births via IVF (Bromer et al, 2011). It is clear that amidst the overall goal of conceiving and birthing a child, the long term implications have been overlooked.

As previously stated, since the first IVF “test tube baby” Louise Joy Brown was born on July 25 1978, many of the original ethical questions about IVF still are current. Some of these issues are: human cloning, creating the superior race, sex determination, and interfering with the work of God. The one ethic issue that has changed can be referred to as the “*Business of baby manufacturing in the global economic market.*” Indeed, the ethical dilemmas of pricing, supply and demand, and the global market model, which is similar to the Wal-Mart business model, pertains to the outsourcing of baby making to third world countries.

The development of intracytoplasmic sperm insertion (ICSI), where a single sperm cell can be injected into an egg cell, has led to a decrease in demand for sperm. Single women,

lesbian couples, and men with no sperm count at all are the only ones interested in this donation. The price of sperm donation has dropped in the last 8 years. The current price range is \$250 for the “your guess is as good as mine as long as it is not a blood relative” donation to \$600 for someone you know who will have a genetic screening done (The Hastings Center, 2008).

Egg “donors” are utilized in up to 12% of IVF cycles mostly by women in their forties who cannot conceive with their own eggs. With 52,000 IVF infants born each year, it is possible that 6,200 children were born through egg donation (The Hastings Center, 2008). Egg donation is a big market. All over Ivy League school campuses there are advertisements for women to donate their eggs for a fee. Young Asian women are highest in demand as donors. They can receive as much as \$10,000 to \$20,000 a donation. The price will increase to \$50,000 if they are 100% Chinese, graduated from an Ivy League school with a degree in mathematics and fertilization was successful with their first donation. Young Jewish women are second in demand with the price range for egg donation a little lower than Asian women with the same academic credentials. African-American, Hispanic, and White women get around \$6,000 for each donation (Li, 2012).

Surrogate or Contract Motherhood is a method used least but most hotly debated. It is used when a woman can produce her own eggs but is unable to carry a pregnancy to term. In the U.S there are many unresolved legal issues as to rights and responsibilities of both contracted parties. It is outright illegal in many states. It consists of less than 1% of the assisted reproductive industry. Where legal in the U.S, the fee for surrogate runs around \$50,000. With the high price and legal confusion in the U.S., couples had opted to go oversea to India, where an IVF travel agent will set up everything from medical facility, medical team, a young surrogate woman and a

tour of the country for \$10,000 to \$12,000 dollars a session (The Hastings Center, 2008). The baby market has gone global.

Despite the strength of the research presented there are several weaknesses which need to be addressed. First, there seems to be some disconnect regarding adequate collection of initial data and information before ART. An assessment should include a thorough medical questionnaire with special attention to risk factors, medications, and family history (Segev et al, 2011). This is most essential for older women considering any form of ART and is recommended by the American College of Obstetrics and Gynecologists (ACOG). Second, we were unable to obtain long term research findings to further confirm much of the short term research presented in this paper.

Despite these limitations, the ethical implications of the research are unchanged. While a discussion on medical ethics will be inherently limited due to the evolving nature of ethical standards, as well as the subjectivity in setting measurements for ethics in general, this paper compensated for these limitations by presenting a comprehensive overview of the impact, both medical and economic, of IVF, with the understanding that this impact portrays varying levels of ethical dilemmas to different factions of society. The most alarming findings revolve around the danger to mother and neonate, the monetary impact of IVF babies on the domestic and global economy, and the dehumanization of the medical miracle of IVF to a mere business proposition.

Despite the myriad ethical dilemmas associated with IVF, it is of utmost importance for the nurse to support the couple in their decision irrespective of personal feelings and ethical concerns. While the ethical issues surrounding IVF are certain to continue to evolve, the nurses responsibility to educate and support patients decisions will remain unchanged. Furthermore, the role of the nurse in contact with potential clients of IVF is pivotal in obtaining information. Of

utmost importance, the nurse must be sure to obtain a thorough history and physical assessment in order to help identify and prevent complications. This contribution to the well being of the client portrays the importance regarding nursing practice and the evaluation of potential IVF patients.

Indeed, the further expansion of nursing practice seems necessary in order to prevent the long term side effects which could possibly be avoided by a more in depth nursing history. Ultimately we can expect the fertility nurse to span both the role of nurse and researcher. Will nurses play a larger role documenting and influencing the approach to treatment? These are potential considerations that nursing practice has to address as the truth unfolds regarding IVF and its impact on women's health and society.

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