

Embryo Adoption as an Ethical Option for Couples Faced With Infertility

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Abstract

Embryo adoption takes embryos that are still forming and introduces them into the uterus of a woman with whom they do not share any genetic material. If pregnancy does ensue and continues without complications, the child that will be born will not share any genes with the woman who carried him or her. In addition, if the child is born to parents who already have other children, the children in the adoptive family will share no biological link to the newborn. Essentially, the child will have two families—a biological family and an adoptive family. This thesis will explore and discuss the different debates and questions that arise with embryo adoption, as well as how different populations perceive embryo adoption.

Embryo Adoption as an Ethical Option for Couples Faced With Infertility

Snowflake adoption, also known as embryo adoption is a method of embryo disposition that allows parents to donate their surplus embryos to infertile couples. The other two methods of embryo disposition are purposeful destruction and donation to stem cell research. Of the three methods, embryo adoption is the only one that offers unused and unwanted embryos the chance to grow and develop. Questions and debates regarding embryo adoption will be discussed, as well as how different populations perceive embryo adoption.

The Basics of Embryo Adoption

Definition of In-Vitro Fertilization (IVF)

In IVF, eggs from a woman's ovaries are collected, fertilized by sperm in the laboratory, allowed to develop into embryos, and are placed into the uterus. If the embryo continues the developmental process after implantation, pregnancy should proceed naturally. Evidence has shown that placing four embryos into the uterus gives the best chance for pregnancy to proceed. However, more than four eggs are harvested and fertilized during IVF. In order to keep the surplus embryos viable in case a pregnancy does not occur, the embryos are stored using cryopreservation techniques. Frozen embryos, sometimes referred to as snowflakes, are generally only stored for a given amount of time. Internationally, the maximum time varies between five and 10 years. In Finland, frozen embryos can only be stored for a maximum of 10 years. Couples give consent for cryopreservation, but the consent will only cover three to five years. If the couple wants their embryos to remain in cryopreservation for longer than their consent covers, they must give consent again. After a total of 10 years have passed, the couple

must decide if they want to donate their embryos to infertile couples or research, or they can opt to discontinue cryo-storage and have them destroyed. In Sweden, the maximum amount of storage time is five years. If there are extenuating circumstances, this period may be extended. However, Sweden only allows couples with excess embryos to donate to research; embryo donation to other couples is not permitted under the current legislation (Davidson, London, & Ladewig, 2012; Keenan, Gissler, & Finger, 2012; Söderström-Anttila, Foudila, Ripatti, & Sieberg, 2001; Wånggren, Alden, Bergh, & Svanberg, 2013).

How Embryo Donation Differs from Conventional Adoption

In what is conventionally referred to as adoption, the age of the adoptee ranges from infancy to 18 years old. In contrast, embryo adoption takes embryos that are still forming and introduces them into the uterus of a woman with whom they do not share any genetic material. If pregnancy does ensue and continues without complications, the child that will be born will not share any genes with the woman who carried him or her. In addition, if the child is born to parents who already have other children, the children in the adoptive family will share no biological link to the newborn. Essentially, the child will have two families—a biological family and an adoptive family. Conventional adoption laws state that adoption of a child cannot take place until after birth. According to the law, an embryo is not a person and does not have legal or human rights. Technically, transferring embryos can be seen as transferring property from one family to another; therefore, donating an embryo for adoption is merely seen as the practical, not legal, equivalent of adoption. This brings up a variety of ethical and legal debates (Clark, 2008; Goedeke & Payne, 2009; MacCallum, 2009; Rae & Riley, 2011; Virzera, 2009).

Why Parents Choose to Donate Their Embryos

Parents may choose to donate their embryos to infertile couples for a variety of reasons. Some choose donation because through natural methods or human assisted reproduction, they have reached their goal number of children. When parents come to this point, they have a few options. They can donate their embryos to research, they can have them destroyed, or they can donate them to an infertile couple. The last option has become more common over the years; parents may view the destruction of embryos as a form of abortion, and view human stem cell research as inhumane. Some parents may want to donate their extra embryos because they were the recipients of gamete donation that resulted in the surplus embryos. If the man or the woman is unable to produce sperm or eggs necessary for IVF, they can utilize a sperm or egg donor. However, the process of IVF almost always results in the production of excess embryos, regardless of the source of the gametes (Frith & Blyth, 2013; Frith, Blyth, Paul, & Berger, 2011; Haimes & Taylor, 2009; Söderström-Anttila, et al., 2001).

The Populations Most Likely to Receive Donated Embryos

There are many indications for receiving IVF with donated embryos. Infertility can occur in both partners. Infertility in the woman includes conditions like premature ovarian failure, or polycystic ovarian syndrome (PCOS). Premature ovarian insufficiency (POI) is the precursor to premature ovarian failure, and is defined by the lack of menstruation for four to six months in a woman less than 40 years old. Premature ovarian failure, also known as premature menopause, occurs when a woman's body ceases producing eggs altogether and the woman stops menstruating for at least one year, before the age of 40. Menopause typically occurs between the ages of 45 and 52; in the United

States, the median age tends to be closer to 51 or 52 years of age. PCOS, another common cause of female infertility, is characterized by infrequent or lack of ovulation, high blood levels of androgens, and the presence of cysts on the ovaries. POI and PCOS can both be medically managed by ovarian stimulation. Unfortunately, since premature ovarian failure involves the complete cessation of ovulation and menstruation, hormone therapy is generally not effective. If the woman is a poor responder to traditional ovarian stimulation via the use of hormones, then she will have problems producing eggs that could be fertilized. Infertility in the man can be caused by disturbances in gamete production, as well as hereditary issues. Severe genetic disorders that are incompatible with life can be the result of abnormalities in both the male and female gamete. If one partner has an abnormal gene, the chances of it being passed down are very likely. After genetic screenings, couples may opt to build a family in a way that does not involve the use of their own gametes and the possibility that a genetic disorder will be passed along and cause significant morbidity in the child. Some couples try to conceive naturally, or try IVF with their own gametes without success, so they turn to embryo donation to build a family (Clark, 2008; Davidson et al., 2012; Katz, 2003; Söderström-Anttila et al., 2001; Wångren et al, 2013).

The Regulations Regarding Choosing Families for the Embryos

Couples with surplus embryos who are considering donating face the decision of whether or not they want to be able to choose who receives their embryo. Some facilities and programs allow families to be able to conduct their own screenings and choose the recipients, much like traditional adoption. Facilities and embryo adoption programs make their own criteria regarding who is and who is not a candidate for receiving a donated

embryo. Some of these regulations include family size, location, and family history. Faith-based organizations may also place regulations on religious preference. There are also limitations on who can donate. Certain regulations including family history and medical history are in place for those who want to donate their embryos. All of the regulations put in place are there to ensure that the donated embryo has the best chance to survive, develop, and thrive in the conditions in which it is placed (Atwood, 2008; Clark, 2008; Frith & Blyth, 2013; Frith et al., 2011; Goedeke & Payne, 2009; Söderström-Anttila et al., 2001; Virzera, 2009; Wånggren et al., 2013; Wånggren, Baban, & Svanberg, 2014).

The Ethics of Embryo Adoption/Donation

Ethical Dilemmas

There are ethical issues surrounding this process because there are really three parties involved—the donating couple, the receiving couple, and the fetus that develops from the donated embryo. The rights of all three are important during embryo donation, which also makes this a legal gray area as well as an ethical gray area for most. Many questions arise when parents begin to consider what to do with their surplus embryos. There are only three options available: destruction, donation to stem cell research, or donation to infertile couples. When does human life begin? To whom do the embryos belong? What happens to surplus embryos if the biological parents die? These are a few of the commonly asked questions that arise when dealing with embryo disposition, and there is no shortage of information when it comes to possible answers (Ayensu-Coker, Essig, Breech, & Lindheim; 2013; Catlin, 2008; Clark, 2008; Ellison & Karpin, 2011;

Frith & Blyth, 2013; Frith et al., 2011; Haimes & Taylor, 2009; Katz, 2003; Virzera, 2009).

Destruction of embryos. Workers in IVF clinics face dilemmas regarding embryo disposition. The practice of compassionate transfer is a commonly used way to end the life of an unneeded cryopreserved embryo. Ellison and Karpin (2011) analyzed this process, and considered the ethics of it. Compassionate transfer involves transferring a surplus embryo into either the woman's vagina, where there is no chance that it will develop further, or into the uterus at a time during her menstrual cycle when implantation is highly improbable, just not impossible. This form of embryo disposition is viewed as the kindest means of disposal. Ellison and Karpin also pondered how people view embryos and their loss. This led into the discussion of other disposition practices and laws regarding embryo status. Embryo death was defined, and the line between death and life was discussed. Ellison and Karpin showed how wasteful the process of IVF really is, but not in a way that makes it seem biased. A few different studies were criticized throughout the discussion, in order to bring up questions about embryo donation that need to be asked. Overall, Ellison and Karpin were very focused on the ethics of what happens after IVF if the embryos are not adopted.

Donation to stem cell research. One of the common arguments for donating surplus embryos for use in stem cell research is the "nothing is lost" argument. Stem cell research always results in the death of the embryo. The nothing is lost argument rationalizes the death of the embryo by pointing out that the embryo would have been destroyed if it had not been donated to research; if death was always going to be the outcome, then the possibility that something may be gained will give meaning to the

death of the embryo. There is always the chance that another person's life may be saved due to the embryos use in furthering research. Another argument to justify utilizing embryos in stem cell research is the sacrifice argument. This argument takes into consideration the possibility that the embryo is a person. Other people have given their lives, whether voluntarily or by force, to benefit others. If embryos are people as well, and their lives are sacrificed for a higher cause, then they die a noble death. The problem with the "nothing is lost" argument is that these embryos do not need to be lost. Donation to stem cell research is essentially embracing the death of the embryo and seeing it as an opportunity to benefit others. The problem with the sacrifice argument is that while a person can sacrifice his or her own life, that same person cannot make the decision to sacrifice the life of another. Sacrifice is a choice that can only be made by the person whose life will be lost (Meilaender, 2013).

Perception of stem cell research. Gucciardo, De Koninck, Verfaillie, Lories, and Deprest (2014) surveyed researchers and medical practitioners in perinatology to determine the extent of background knowledge, as well as perceptions and beliefs on stem cell and tissue engineering (SC & TE). Questions were asked in order to gather demographic information, as well as general information regarding the participants' work environments and educational backgrounds. After completing the initial questions, more specific questions were asked regarding the background knowledge as well as expectations, opinions, and ethical reflections on the application of SC & TE in perinatology. Overall, there was a greater percentage of female participants, and ages ranged from less than 30 years old to older than 50 years of age. The majority of participants were less than 50 years old and worked in either an academic hospital or

research laboratory. A small number were employed in a district general hospital and an even smaller percentage worked in private practice. The results of the survey showed deficits in background knowledge and knowledge regarding the current issues and breakthroughs regarding SC & TE (Gucciardo et al., 2014).

Overall, very few participants considered themselves to be experts on tissue engineering and the application of stem cell research. Approximately 54% indicated their knowledge of stem cell applications was limited, and 58% said they had limited knowledge of tissue engineering. However, a vast majority of the participants stated that they had at least minimal interest in the applications of stem cell research as well as an interest in tissue engineering. When questioned about the existence of specific, operational perinatal stem cell research program and tissue engineering research program, at least 20% were unaware that either existed. Over 75% of participants responded that embryonic stem cell experimentation was acceptable, and almost two thirds believed that the cause of controversy with stem cell research was due to lack of information. About one third of the respondents did convey a sense of worry due to the fetus being unable to offer consent to research. Gucciardo et al (2014) found it interesting that the clinicians had such a high interest in the application of SC & TE, despite their low overall knowledge. They assumed that this interest was due to the perinatologists seeing and appreciating the need for SC & TE as they cared for their fetal patients. The main conclusion of the researchers was the need for promotion campaigns and public education regarding SC & TE. It is important to note that the questionnaire used has not been validated, so it is unknown whether the data collected are reliable and truthful. In order for the questionnaire to be validated, its dependability and ability to produce data that are

true and reliable would need to be assessed (Boswell & Cannon, 2014). In addition, the questionnaire was administered to a highly specific target population, and had a low response rate of 39%. The researchers were somewhat worried about the interest level of the 61% of the target population who did not respond, considering that a similar survey regarding the application of umbilical cord blood for stem cells only had a response rate of 42% (Gucciardo et al., 2014).

Benefits of stem cell research. Stem cells are considered to be undifferentiated. They have not been specialized, they have no specific function, and therefore, they have the potential to differentiate into any type of cell. This potential, also referred to as the plasticity of the cell, is what sets stem cells apart from all other cells in the body. Plasticity is also what makes these cells so valuable and sought after. While plasticity describes the malleability of the cell, potency refers to the number of options for differentiation. Totipotent cells have the ability to become any type of cell in the body; they can also develop into an entirely new being. Zygotes are an example of totipotent cells. If intervention does not occur, these cells will develop into an organism. Pluripotent cells, like embryonic stem cells, have the ability to become any new cell in the body. However, unlike totipotent cells, these cells will not develop into an entirely new being on their own accord. Multipotent cells have the ability to become a limited number of different types of cells, whereas unipotent cells are those with the ability to become only one type of differentiated cell. Adult stem cells are considered to be multipotent, since they can only differentiate to a limited number of cell types. Another property that makes stem cells so valuable is the ability to proliferate or multiply continually, while remaining undifferentiated. These cells are crucial to early embryonic development. Until the

embryo contains enough cells for differentiation to be advantageous, these stem cells will continue to divide. After differentiation does begin to occur, the majority of the cells in the developing embryo will continue to be undifferentiated (Devolder, 2015).

Stem cells remain in the body throughout the lifespan, though the percentage is much higher in infancy than in later life. These stem cells continue to divide and differentiate in order to replace dying cells and tissues in organs that require constant renewal. The different types of blood cells all derive from stem cells, and the process of their regeneration continues until death occurs. The liver also contains a certain percentage of stem cells, which allows it to regenerate when damaged. Other organs, such as the heart, do not have this capacity to renew, repair, and regenerate themselves. However, this is where stem cell research offers its benefits. Though the aforementioned organs are unable to regenerate themselves due to lack of stem cells, injecting compatible stem cells into these organs can result in a certain amount of healing. Bone marrow transplants are an example of the effectiveness and usefulness of stem cell therapy. Isolating stem cells that differentiate into blood cells from the marrow of a healthy individual and injecting it into the body of a patient with leukemia or other blood disorders, does result in the generation of new, healthy blood cells. If the transplant is successful and rejection does not occur, the patient's blood and immune system will be replenished (Devolder, 2015).

Ethical problems with embryonic stem cell research. The majority of the controversy surrounding embryonic stem cell research is derived from the problem outlined by Devolder (2015). Embryonic stem cell research results in the destruction of the embryo. Supporting the research is supporting the destruction of the embryo.

Opposing the research is foregoing any chance that the research could have potential benefits. However, this problem is only relevant if the embryo is thought to be a person; if the embryo were only viewed as a collection of cells, then there would be no moral dilemma surrounding the destruction of the embryo for the sake of research. The main problem with the sacrifice argument is that the people who have given their lives to benefit others have willingly chosen to lay down their lives. People can choose to sacrifice their own lives, but making the choice to sacrifice another's is essentially an attempt to justify murder. Even if the embryos used in stem cell research have been created in a lab, or have been cloned, they are still human persons. The problem with the "nothing is lost" argument is that donating embryos to science is not the only alternative to destruction. These embryos can be adopted; not all paths have to lead to death (Devolder, 2015; Meilaender, 2013).

Stem cells do not have to be obtained from embryos. Besides the bone marrow, other sources of stem cells in the adult body include peripheral blood, the brain, gum tissue, epithelial tissue from the skin and digestive tract, the eyes, liver, teeth, and testes. Placental tissue and umbilical cord blood also contain stem cells. Somatic stem cells are those obtained from adult humans, but stem cells can also be isolated from the gametes, as well as from aborted fetuses. Not surprisingly, obtaining stem cells from the latter source is viewed as controversial as well. During the summer of 2015, uproar occurred regarding Planned Parenthood and abortion as the means of obtaining fetal tissue for research, and the associated monetary transactions. Charo (2015) wrote that humanity has a duty and responsibility to use tissue obtained from aborted fetuses for research. The point was made that the use of fetal tissue to create vaccines for chickenpox, rubella, and

polio has saved the lives of millions of people. There is a moral issue surrounding the means of obtaining the tissue. However, Charo points out that those who claim abortions are evil and immoral may inevitably partake of the vaccines and other treatments that are derived from fetal tissue. In 1988, the Fetal Transplantation Panel concluded that the act of having an abortion and the decision to donate fetal tissues could be distinguished from each other. This conclusion was justified by the rationale that it is common for the organs of homicide victims to be donated and utilized. If homicide is also considered to be immoral the panel wondered why no concern had been raised over the use of organs and tissues procured from a person whose death resulted from a morally evil act. The panel also discussed the fact that the tissues would be discarded unless they were donated to research. However, Meilaender (2013) would bring up the point that donation to stem cell research would essentially be embracing the death of the fetus and seeing it as an opportunity to be taken advantage of. (Charo, 2015; Devolder, 2015)

Scientific problems with embryonic stem cell research. Stem cell research is not without drawbacks. Serious immunological rejection problems have developed during trials and treatment with embryonic stem cells. As with any transplant, the recipient of the stem cells has to take immunosuppressant medication to prevent the body from recognizing that the transplanted cells are not a part of the body and leading to rejection. When organs are transplanted and rejection occurs, the organ can sometimes be removed to prevent further damage. However, transplanted stem cells are incorporated into every tissue in the body, and would be impossible to remove if rejection did occur. There have been proposed solutions to this problem, but their efficacy is either doubtful or morally unacceptable. Drugs could be given to suppress the immune system and prevent the

patient's body from turning against the transplanted cells. However, these medications would have to be given continuously for an indefinite amount of time, which could cause potentially serious side effects or death. Stem cell banks could be implemented and utilized in order to provide recipients with a wide range of options for stem cell lines. This would increase the probability that at least one cell line would be compatible and effective, but it would also require an exceptionally large number of embryonic stem cells to be available at all times. A universal donor line could be generated to match essentially any patient, and then specialized for each specific patient's immune system, but any leftover cells would end up clinically unusable. Stem cells derived from the bone marrow contain no immunological markers. One proposed solution could be to transplant these cells with the embryonic stem cell tissue, and hope that it induces a permanent tolerance to the graft (Devolder, 2015; Meilaender, 2013).

The last option would be to combine embryonic stem cell technology with another form of technology known as somatic cell nuclear transfer (SCNT), or cloning. Combining these would offer the potential to create a line of cells that would be genetically identical to the patient's cells. The process of SCNT involves removing the nucleus of a somatic cell and transferring it into a donated egg cell, or oocyte, that has had its nucleus removed. This new cell is referred to as an enucleated oocyte. Cellular division of the oocyte is then stimulated with an electrical current, resulting in the formation of an embryo. The embryo that forms is virtually genetically identical to the patient that donated the somatic cell. Because the embryo is essentially a clone, any of the stem cells that would be taken from the embryo would also be genetically identical to the patient's cells. Any transplanted stem cells would not stimulate graft-versus-host

disease because the patient's body would recognize these genetically identical cells as its own. It is important to note that none of the aforementioned options have been proven to be both safe and effective, and some have not even been tested. Research into the efficacy of SCNT has just begun. Routine production of embryos via SCNT requires a large supply of good-quality donor egg cells. Without a large enough supply of oocytes, researchers will be unable to learn how to produce and derive stem cells from these embryos (Devolder, 2015).

Another scientific problem with embryonic stem cell research is the potential for teratomas to form. Teratomas are tumors that form and contain more than one type of tissue. Stem cells are impossible to control, and since they are pluripotent, there is always the possibility that they develop into the wrong type of tissue. This is known as the tumorigenic potential. Herberts, Kwa, and Hermsen (2011) point out that stem cells and cancer cells actually share similar features. Both types of cells have a relatively long life span, resist programmed cell death, and are able to replicate undifferentiated and unopposed for a long time. In addition to these similar features, both stem and cancer cells are directed by similar growth regulators and control mechanisms. Teratomas can be lethal, depending on where they form and what tissue they develop into. Herberts et al. reference a case in which a patient developed a brain tumor four years after having neural stem cells transplanted into his brain tissue. Tests revealed that the tumor tissue was derived from at least two donors. The stem cells used in the patient's therapy were derived from tissues obtained from aborted fetuses, and injected either into the patient's cerebrospinal fluid via lumbar puncture, or directly into the patient's brain matter during an open neurosurgical procedure. Typically, the site of teratoma formation is dependent

on the site of stem cell administration. However, the type of tissue that the tumor develops into may or may not be the same type as the tissue it was transplanted into. Teratomas containing fragments of teeth, hair, and nails have all been discovered in locations where these types of tissues are not normally found (Devolder, 2015; Herberts, Kwa, & Hermsen, 2011; Knoepfler, 2009; Meilaender, 2013).

Views of couples asked to donate embryos to research. In the United Kingdom, Haines and Taylor (2009) interviewed couples who went through IVF and were asked to donate their embryos. The goal of the interviews was to investigate the couples' differing views and opinions. Interviews were structured in a way that allowed the couples to shape the discussion about ethical and moral issues in ways that were relevant to their specific experience. The couples interviewed by Haines and Taylor were allowed to express their views in their own words, which gave them the opportunity to attach a variety of meanings to their experiences as well as broaden the scope of research. One theme that recurred, despite the researchers' choice to deliberately forego asking participants about associations between embryos and babies, was talk about babies. Haines and Taylor note that this 'baby talk' emerged without any prompting, proving that these associations do play an underlying role in the views of the interviewees. Two clusters of views about the comparison between an embryo and a baby emerged during the interviews. One cluster considered the possibility that the embryo was a baby, whereas the other cluster ascertained that it was clearly not a baby, merely a grouping of cells. According to Haines and Taylor, these views were not entirely settled. Many interviewees struggled to come to a clear conclusion regarding the status of the entity they were donating (Haines and Taylor, 2009).

After conducting their research at a clinic in the United Kingdom, the researchers wondered how their findings would compare to those in clinics in other countries. Since embryo donation is more common and widespread now, other research studies are being conducted throughout the world. Haimes and Taylor (2009) also wondered if any of this research is exploring the importance of women's reproductive labor in global tissue economies. A few of the questions asked by the Haimes and Taylor could be seen as somewhat biased or viewed as leading questions. Suggestions were made that future debate on embryo donation for human stem cell research should include the views of the embryo donors, and should also consider the social and moral status of the human embryos (Haimes & Taylor, 2009).

Different Views Toward Embryo Adoption

Certain populations have been surveyed and interviewed on their views of embryo adoption.

Views of the biological and adoptive parents of embryos. Parents who have given up embryos for adoption and parents who have received adopted embryos are commonly surveyed populations. The goal of research in these populations is to find out how the adoptive parents view the biological parents and how the biological parents view the adoptive parents. What information, if any, are the biological parents most likely going to want to know about the people receiving their embryos? Do they want to know what the outcome of the donation and treatment was? What information, if any, are the adoptive parents most likely going to want to know about the people who donated the embryos to them? Are they going to want to give the donors any information about the outcome of the donation and treatment? If pregnancy does ensue and results in a birth, do

the adoptive parents want the biological parents to be involved in the life of their child? To what extent should the parents be involved? In addition, the attitudes of couples that have surplus cryopreserved embryos but are not allowed to donate them have also been examined (Ayensu-Coker et al., 2013; Goedeke & Payne, 2009; MacCallum, 2009; Söderström-Anttila et al., 2001; Wånggren et al., 2013).

Views of potential recipients. Goedeke and Payne (2009) interviewed potential embryo recipients in New Zealand to discover how they made meaning of the process of embryo donation. These interviews were conducted to identify the major concerns of the couples. The concerns identified were analyzed thematically to see how perspectives and decision-making regarding embryo donation were affected. Embryo donation was not approved in New Zealand until 2005, and the process follows strict guidelines. Due to this, only a few donations have proceeded. This led to a very small convenience sample being used for this study. In addition, none of the participants had actually participated in the process. They all had vested interest but had not gone through with the process. Goedeke and Payne's study showed that the main concern of many of the participants was the concept of genetic lineage. The majority of the participants viewed the link between the embryo and its biological parents as a permanent link that needed to be recognized. Open-adoption practices within embryo donation were discussed as a means to allow the offspring of the embryo donation to be able to know their heritage. Overall, the study did not seem biased, and the questions asked seemed to be fair (Goedeke & Payne, 2009).

The views of parents who adopted embryos and those who participated in conventional adoption. MacCallum (2009) conducted a series of interviews to find out

how parents who receive embryos from donors view the donors, and how adoptive parents view the birth parents of their children. Their views were then compared and contrasted to see if there were any common trends and differences in attitudes. The questions asked to the parents were focused on assessing the knowledge of the donors or birth parents, frequency of thoughts and discussions about them, and disclosure of the situation to the child (MacCallum, 2009). Due to the design of the article and the study, this article was very different from other studies that deal with the topic of embryo adoption. Because the goal of MacCallum's study was to show how the two situations can lead to differing attitudes towards the birth parents of the child, the data collected showed definite trends. The results of the study revealed that donors are rarely thought about and talked about, whereas birth parents are discussed frequently and may have significance in family life after the adoption takes place. The recipients may not have known anything about the donors of their embryo; this led MacCallum to wonder whether or not this is one aspect of embryo adoption that should be altered.

Views of embryo donors and recipients. After an embryo donation program was completed, Söderström-Anttila et al. (2001) studied the outcomes and attitudes by means of a questionnaire survey. This survey was conducted in order to gain insight into the experiences of the donors and recipients who participated in the embryo adoption program, as well as to obtain information about attitudes regarding ethical issues involved in the treatment. Inclusion and exclusion criteria were used to choose participants. The questionnaire focused mainly on complicated ethical issues that had arisen when discussing the program with donors and recipients. Several questions raised during the study included the following: How strict should the criteria for the selection of

embryo donors be? Which couples should be offered the opportunity to receive donated embryos? How old should the donors and recipients be? Should the child and others be told about the donation? The data collected were highly subjective, but also reliable, because they dealt directly with the attitudes of people who have gone through the process of embryo adoption. The differing responses to the questions asked are evident. In regards to questions regarding proposed age limits, when compared to the data from the embryo recipients, embryo donors were much more in favor of proposing an upper age limit for the recipient men and women. However, both groups agreed that the upper age limits for recipients should be 42-43 years for the women, and 43-47 years for the men. About half of the donor and recipient couples were in favor of proposing an upper age limit for the donor women and agreed on the age range of 38-40 years. Only one third of the total number of participants thought that there should be a proposed age limit for donor men as well - they agreed on 41-47 years (Söderström-Anttila et al., 2001).

Two-thirds of the embryo recipients were in favor of telling the child about how he or she was conceived, but only 29% of the recipients thought that the child should be able to receive information regarding biological parentage. Söderström-Anttila et al. (2001) wondered whether this reflected possible fears that the child would then grow close to the biological parents. On the donor's side, only about half of the women were willing to provide identifying information about themselves. However, due to the male partner's reluctance, only about one third actually followed through and registered this information. Some of the donors did state that they wished to know whether or not their donation had resulted in pregnancy. In one case, the male donor said that the result would determine whether or not he would tell his own children about the donation. Embryo

donation is legal in Finland, and the maximum storage period of frozen embryos in Finland is 10 years. Cryopreservation consent covers three to five years at a time. If the couples choose not to use their own embryos, they can donate them to other infertile couples or to research, or they can decide to discontinue cryopreservation and the embryos will be destroyed. The thoughts of the parents regarding the process and the possible outcomes for their surplus embryos varied widely, but each opinion was valuable to the research (Söderström-Anttila et al., 2001).

Views of people who work in fertility clinics. The attitudes of IVF clinic staff towards donation of surplus frozen embryos have also been examined. The current legislation in Sweden does not permit embryo donation. Swedish couples that have undergone IVF have surplus embryos that are cryo-stored for five years and then have to be discarded. Questions were asked to see how staff would feel about the alternative of having these embryos donated to infertile couples or to research. The focus was more on how these people would feel if embryo donation were legalized. The people who work in the clinic had very clear opinions on what they believed, and they knew why they believed it. A majority of the population agreed that embryo donation should be legalized in Sweden. The overall attitudes were positive concerning embryo donation to infertile couples, as well as towards research (Wånggren et al., 2014).

Views of the general public. The perspectives of the general public on the issue of embryo donation for adoption vary greatly. Some are in support of it, whereas others are opposed to certain aspects of the process for various legal, ethical, and moral reasons. In addition, some people honestly do not know what their position is. Perspectives on embryo donation for research are also diverse. Certain populations have very strong

opinions on whether or not donation to research is an acceptable method of embryo disposition (Atwood, 2008; De Lacey et al., 2012; Murphy, 2011).

An adoption advocate's opinion. An advocate of adoption voiced his opinions and concerns about embryo placement. Atwood (2008) is a member of the National Council for Adoption (NFCA). The NFCA advocates for adoption to be viewed in a positive light. It holds the well-being of children, birthparents, and adoptive parents in highest regard, and promotes many different types of adoption. The NFCA wants to protect the institution of adoption, and has decided not to take a position on embryo placement. However, according to Atwood, it does not agree with the term embryo adoption because the practice has many legal, moral, ethical, and spiritual quandaries attached to it. Atwood presented eight principles and practices regarding adoption and embryo placement. In relation to other articles regarding embryo adoption, Atwood's stands out because he seemed to be more concerned about the name embryo adoption than the process itself. Atwood stated that the NFCA takes no stance on the process, but he seemed to have his own stance on the matter. He did not come right out and say that he does not support embryo adoption, but this article did not make it seem like he would ever consider advocating for it (Atwood, 2008).

The views of a community. The differing views of people in an Australian community about the status and use of embryos were explored by De Lacey et al. (2012). The study sought to find out what the people believed an embryo was, how they thought it should be used, and who should make decisions regarding its disposition. Focus groups and surveys were both employed in gathering data, and the results were recorded. The questions used in the survey created by De Lacey et al. were disclosed within the article.

The majority of the participants understood the questions; many of them were able to offer their opinions about embryo disposition. The study appeared to be conducted in a fair matter. Due to the small number of participants who responded with 'don't know' to questions regarding the description of an embryo, the right way to use an embryo, and who should decide what happens to the excess embryos, DeLacey et al. came to the conclusion that the majority of participants legitimately understood what the questions were asking and were able to provide their honest opinions regarding embryo disposition. De Lacey et al. showed that the majority of the community would rather donate excess embryos to research or for adoption, rather than allowing them to be discarded. According to the participants, embryos have value. They should not be regarded lightly and discarded as if they have no value or use (De Lacey et al., 2012).

Views of those who would donate embryos. Wånggren et al. (2013) examined attitudes of Swedish infertile couples towards different aspects of embryo donation. All of the couples surveyed had surplus cryopreserved embryos. The questionnaire included questions about socio-demographics and opinions towards embryo donation of the surplus embryos. The conclusions were that cryopreserved embryos may be available for donation to other infertile couples, especially if there can be restrictions placed on recipient characteristics. This study showed a different aspect of the embryo donation process. The results showed that couples would be willing to donate their embryos to couples that met the qualifications, which is significant. However, the response rate to the surveys was low, and the questions were purely hypothetical since Sweden does not allow embryo donation to other infertile couples. Like the other study that surveyed IVF workers, this study operated on a principle of what could happen if this were legalized.

Families with surplus embryos have a finite amount of time to decide what to do with them before they are destroyed. This article showed that families would likely donate their extra embryos if they were given the choice (Wånggren et al., 2013)

The view of the Catholic Church. According to *Dignitas Personae*, an encyclical published by the Catholic Church in 2008, all life is precious and should be treated with dignity, regardless of where it falls on the developmental spectrum (Murphy, 2011). The Vatican's position on the conception of embryos outside of marriage, as well as assisted reproduction treatments, is that these practices are not compatible with the overarching need for dignity and respect. Embryo adoption is also rejected and deemed immoral by the Catholic Church, because it invites a third party into reproduction and conception. However, Murphy does give an example of the one time when the Catholic Church would deem it acceptable. If embryo adoption and the corresponding treatments are being used with the sole purpose of saving a life, it cannot be completely rejected. If there are no other viable alternatives, and a life will be saved in the process, then a case can be made for embryo adoption as an ethical choice (Murphy, 2011).

Responding to dissenting opinions. Ethical quandaries related to utilizing conditional embryo donation for building a family need to be explored. The question of whether or not families who have surplus cryopreserved embryos should be the ones who determine which family receives their embryos is an important one to ask. In their discussion of embryo donation, Frith and Blyth (2013) discussed objections to conditional embryo donation, such as personhood of the embryo, what happens if the embryo is placed in detrimental conditions, and how the arrangements and costs should be taken care of. All of these objections to embryo donation were countered, to bring

about the point that there should be no ethical objections to conditional embryo donation. Frith and Blyth gave realistic, effective suggestions to improve the process of embryo donation. Some bias could be seen throughout, as the authors countered common objections to embryo donation. However, their counterarguments showed sound logic and the proposed solutions could improve the current system in place in the United States (Frith and Blyth, 2013).

Research Questions

During the research process, several questions arose dealing with possible gaps in the literature and overall curiosity.

1. According to research, why is embryo adoption considered to be an ethical approach to starting a family for couples faced with infertility?
2. What are some of the main ethical considerations when working with a family that is going through the process of embryo adoption?
3. Is embryo adoption ethical and feasible for parents with a Christian worldview?
4. What are the thoughts and opinions of all parties involved in embryo adoption, and how do those affect the process and outcomes?
5. How have advancements in stem cell research affected the likelihood of couples donating their surplus embryos to another couple rather than to research?
6. Do religious beliefs affect the decision a couple makes when they are trying to decide what they are going to do with their surplus embryos?

Method

Materials

Articles gathered from various medical and law journals, as well a textbook about maternal-newborn nursing and women's health, a textbook about evidence-based practice and research in nursing, and philosophy books on biomedical ethics.

Procedure

Articles were found using the Jerry Falwell Library website. Key words and terms were typed into the search bar and articles were chosen based on relativity to the topic as well as age. Some key words included embryo adoption, embryo donation, and snowflake adoption. Articles were preferred to be no more than five years old; however, some articles that were key to research were six to thirteen years old.

Results

Though a majority of the resources utilized were published within the five-year range, there were 10 that were published between 2001 and 2009. Out of the 27 references gathered, less than half were peer-reviewed articles that employed data collection. For this literature review, there were not enough articles to ensure that at least half involved data collection. All of the data collected in those 10 articles were qualitative due to the nature and purpose of the studies.

Discussion

In the context of nursing, the research gathered may not be relevant to the broad population. However, in maternal-newborn nursing, this is definitely relevant. Knowing the history of the woman's pregnancy is important when it comes to planning care for the mother and the child. This research will also be helpful if a nurse has a patient that is

faced with the dilemma of whether or not she should donate her excess embryos or have them destroyed. Most of the articles found were written in support of embryo adoption as an ethical decision. Only two had dissenting views.

Conclusion

Is embryo adoption ethical? Should infertile couples be able to adopt surplus embryos? The decision to donate surplus embryos to an infertile couple rather than to research is strictly individual. There are no guidelines or restrictions in the United States regarding what you can and cannot do with surplus embryos. However, compared to the other two disposition options, putting surplus embryos up for adoption seems to be the most ethical choice a couple could make. With embryo adoption, these unused and unwanted embryos are not purposefully destroyed or fated to die for the purpose of stem cell research. Choosing to donate excess embryos for eventual adoption is choosing to give the embryo a chance at life. Though there is always the chance that pregnancy will not proceed as expected and a miscarriage will occur, the point remains that embryo adoption offers the embryo the best chance to continue the process of growth and development.

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