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# **Legitimacy of the Legal Storage Limits for Frozen Embryos in South Korea**

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**ABSTRACT:** In South Korea, the Bioethics and Safety Act sets a five-year embryo storage limit and does not allow for an extension of the storage period upon embryo creators' requests. No legislative document states the intent of this restrictive law, and no academic paper has assessed whether it is reasonable. In a 2010 decision, the Constitutional Court of Korea declared that this law's restrictions on embryo creators' will is legitimate. The court provided four reasons frequently raised to support such restrictions in other countries: the increased social burden of maintaining frozen embryos, embryos' post-thawing viability, remaining embryos' misuse risks, and similar legislations in other countries. This article challenges this position based on an analysis of the Korean context and technological developments. It finds that, by allowing embryo creators to extend the storage beyond the five-year limit, Korea's social burden—the costs related to infertility treatments and the low birth rate—may be reduced. It also reports that biotechnology advancements have addressed post-thawing viability-related issues; furthermore, embryo misuse risks can be addressed via other regulatory options. Moreover, this article lists other legislation that allow for extensions of the embryo storage period based on the creators' will and these laws' legislative intent. Thus, this article concludes that the Bioethics and Safety Act should be revisited based on Korea's current social context and up-to-date technologies' adaptability. **Keywords:** frozen embryo, storage limit, law, social context, South Korea

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## Introduction

Since 1978—the year Louise Brown, the first baby conceived through in-vitro fertilization (IVF), was born in the United Kingdom (UK)—IVF has been assisting many infertile couples in their quest to become parents.<sup>1</sup> There has been a rapid increase in the number of IVF-conceived babies, which had reached 8 million worldwide by 2017.<sup>2</sup>

The widespread use of IVF has raised many policy questions that have not been asked in the context of natural conception. The remaining embryos resulting from the IVF process constitute one of the critical topics. In many cases, the IVF process creates supernumerary embryos, which may be stored for nearly an indefinite period of time using cryopreservation technology. These embryos may be used in the next IVF cycle, thus saving women from having to repeat the super-ovulation process. In some cases, this allows IVF patients to attempt conception again in the future. Researchers and policymakers have long debated what constitutes the appropriate storage period for remaining embryos and who has the authority to determine when an embryo's storage should be terminated. Many researchers and policy makers have viewed these questions from a practical perspective: Will longer terms for embryo storage bring any positive or negative consequences for individuals and society, and if so, should the law set limitations for the remaining embryo storage?

Considering these practical concerns, many countries have formulated laws to determine the appropriate embryo storage period and decide what should be done with the embryos after the storage period limit has been reached.<sup>3</sup> Depending on the unique situation of each country, research has been conducted on the validity and legitimacy of these laws. This article assesses the Korean law's legitimacy based on the Korean context.

The Korean law is noteworthy in that it sets the storage limit at five years and prohibits any extension, even in cases in which the embryo creators request their embryos to be stored based on their own financial support. In Korea, the Bioethics and Safety Act was revised in 2005 to strictly impose a five-year limit on embryo storage, and few exceptions were made. The law makes it mandatory that remaining embryos are destroyed after the deadline unless the embryos are donated for research purposes, hence making it impossible to donate those embryos for conception. No legislative document has been produced to explain the reasons for the Korean law's highly restrictive policy. Usually, in

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<sup>1</sup> Mark Hudspeth, *Test tube baby Louise Brown and the birth of IVF*, CBS News (Sep. 14, 2018, 8:10 PM), <https://www.cbsnews.com/news/test-tube-baby-louise-brown-and-the-birth-of-ivf/> (last visited Jul. 10, 2019).

<sup>2</sup> Susan Scutti, *At least 8 million IVF babies born in 40 years since historic first*, CNN (Jul. 3, 2018, 10:04 PM), <https://edition.cnn.com/2018/07/03/health/worldwide-ivf-babies-born-study/index.html> (last visited Jul. 10, 2019); European Society of Human Reproduction and Embryology, *More than 8 million babies born from IVF since the world's first in 1978: European IVF pregnancy rates now steady at around 36 percent, according to ESHRE monitoring*, Science Daily (Jul. 3, 2018) [www.sciencedaily.com/releases/2018/07/180703084127.htm](http://www.sciencedaily.com/releases/2018/07/180703084127.htm) (last visited Jul. 10, 2019).

<sup>3</sup> *Infra* Section III.D.

Korea, when the National Assembly enacts or revises a law, records provide the reasons for the enactment or revision; and they usually elaborate on the intentions underlying the changes made to the law. However, in the case of the Bioethics and Safety Act, the National Assembly did not produce any document demonstrating the necessity of the five-year limit.<sup>4</sup> In addition, no explanations have been provided for some amendments, especially with regard to the introduction of two narrow exceptions—chemotherapy and treatment that affects the gametes.<sup>5</sup> The minutes of the National Assembly meetings, which reviewed the bills related to the storage limitation and the exceptions made to the five-year limitation, do not include any rationale either.<sup>6</sup> Therefore, based on the legislative documents alone, it is difficult to fathom why the lawmakers decided to include this limitation or the exceptions and whether it is within reason.

The Constitutional Court of Korea made an ex-post analysis of the legitimacy of the law. In its May 27, 2010 decision (22-1(B) KCCR 275, 2005Hun-Ma346), the Constitutional Court reviewed several practical concerns regarding the embryo storage limitations that are commonly debated in other countries.<sup>7</sup> The Constitutional Court acknowledged that the law restricts embryo creators' rights significantly. However, it concluded that certain practical concerns do justify the law's five-year storage limitation, regardless of the embryo creators' will. As a result of this decision, which is legally binding in Korea, the law is still in effect.<sup>8</sup>

Although the law has been compromising many couples' wishes to maintain their embryos for the past 15 years, there has not been a single research study on the legitimacy of the law until now, even after the Constitutional Court of Korea released its de-

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<sup>4</sup> Bill Information, <http://likms.assembly.go.kr/bill/main.do> (last accessed on July 11, 2019) (in Korean).

<sup>5</sup> *Id.*

<sup>6</sup> National Assembly Minutes, <http://likms.assembly.go.kr/record/> (last visited Jul. 11, 2019) (in Korean).

<sup>7</sup> The common points of practical concern were severalfold. First and foremost, the long time-gap between embryo creation and use may result in abandoned embryos. There is a risk that people who have had a successful conception may become indifferent to the remaining embryos, which may then be abandoned and become burdens on the storing institutions. Furthermore, couples may break up or one party may pass away, thus leaving medical institutions burdened with such unclaimed embryos indefinitely for years. Therefore, it may be necessary to set a storage limit to allow medical institutions to discard unclaimed embryos after a certain period. The second issue that worries people in this regard is that the sheer number of embryos and an indefinite or long storage period may raise their maintenance costs, which could increase the likelihood of their misuse. Thus, unclaimed embryos can become a social burden. Third, because of certain limitations on embryo freezing technology and thawing, they may not remain viable for implantation beyond a certain storage period. Thus, old embryos could be considered as a waste of social resources. For these reasons, the Law may therefore set rules for the storage termination of embryos that are no longer considered viable for implantation. For a summary of the discussion, see Stuhmcke, Anita & Eloise Chandler, *Storage limits of gametes and embryos: Regulation in search of policy justification*, 22 J. L. MED. 121 (2014).

<sup>8</sup> The Constitutional Court Act Article 75 states that “[any] decision to uphold a constitutional complaint shall bind all the State agencies and the local governments.”

cision in 2010. Therefore, the Constitutional Court's reasoning about practical concerns remains the only source of argument for the law's legitimacy. This study suggests other perspectives on the issues surrounding embryo storage, which the Constitutional Court neglected to consider. It particularly points to the realities of the Korean situation and concludes that the law does not have the rationale to impose a five-year limit on embryo creators' storage decisions. The study also draws implications from the laws of other countries to support the conclusion.

The article is organized as follows. Section II presents the Bioethics and Safety Act of Korea and the rationale behind the Constitutional Court decision; Section III introduces new facts and arguments about each point of the concerns raised in the Constitutional Court decision. Finally, Section IV presents the conclusion that the law should be revisited to respect embryo creators' decisions about their remaining embryos.

## **The Constitutional Court Decision on the Bioethics and Safety Act**

### *The Bioethics and Safety Act*

The current Bioethics and Safety Act in Korea states that embryos can be created exclusively for the purpose of pregnancy (Article 23). Even in the case of embryos created for pregnancy, Article 25 of the current law states that frozen embryos can only be stored for a period of less than five years. When the law was first enacted, there was no exception to this storage limit. The 2013 revision (Bill no. 11690) delegated the power to determine any exceptions to the Ministry of Health and Welfare. Article 21 of the Regulation of the Ministry of Health and Welfare now provides two narrow exceptions to this five-year limitation: (1) the recipient is receiving chemotherapy, and (2) the individual in question is receiving a treatment that the institutional committee perceives as being able to affect gametes. The Ministry of Health and Welfare monitors whether medical institutions storing embryos discard any embryos older than five years.<sup>9</sup>

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<sup>9</sup> The Bioethics and Safety Act authorizes the Ministry of Health and Welfare to set out guidelines for medical institutions and to monitor the institutions' compliance with the law:

Article 28 (Compliance of Medical Institutions Producing Embryos) (1) A medical institution producing embryos shall comply with the following rules:

1. A medical institution producing embryos shall comply with the terms and conditions of the written consent obtained pursuant to Article 24 in handling of embryos, ova, or spermatozoa;
2. A medical institution producing embryos shall strictly adhere to the Ordinance of the Ministry of Health and Welfare in preserving, handling, discarding, and managing residual embryos or ova;
3. Other rules prescribed by the Ordinance of the Ministry of Health and Welfare as necessary to ensure bioethics and biosafety.

(2) In order to appropriately manage consents with regard to the production of embryos, the Minister of Health and Welfare shall determine guidelines for the standard operation of medical institutions producing embryos and advise such institutions to comply therewith.

## ***The Constitutional Court Decision***

### ***Facts and arguments of complainant***

Complainants 3 and 4 are a married couple who provided his sperms and her oocytes for the purpose of pregnancy, and Complainants 1 and 2 are embryos generated through these fertility treatments. Complainants 3 and 4 claim that Sections 1 and 2 of Article 16 of the Bioethics and Safety Act set a maximum embryo storage period of five years and require the disposal of all embryos after the storage period has ended. They claim that these provisions directly restrict their right to self-determination by not allowing the complainants to store the embryos for more than five years or for an indefinite period.

### ***Decision***

The Court delivered a negative decision regarding whether Article 16 of Sections 1 and 2 of the Bioethics and Safety Act, which requires the disposal of embryos after five years, restricts the embryo creators' right to self-determination regarding the embryos.

### ***Rationale (excerpts from the court decision)***

The provisions of Article 16 (Sections 1 and 2) of the Bioethics and Safety Act require the disposal of all embryos after five years unless they are to be utilized for research purposes. This is a direct restriction on the embryo creators' right to self-determination, as this storage period has been set by the legislature without considering the embryo creators' voluntary intent.

Creating embryos through in-vitro fertilization can be recognized as a part of the freedom to give birth and the freedom to live a fulfilling life by forming a family. Therefore, in the case of embryos created with the consent of the relevant parties, it is desirable to store the embryos for as long as possible, so that the embryos can be made available for implantation when the embryo creators need them. Longer storage periods would respect their decision, rather than allowing the State to unilaterally determine the disposal of such embryos.

Nevertheless, in-vitro fertilization, which, in its most common form, is conducted by producing a large number of fertilized embryos at once in order to improve pregnancy rates, inevitably produces many remaining embryos. ... In this regard, the embryo creators' right to self-determination with regard to the embryos, despite its nature as a personal right, is a type of fundamental right, which can be restricted when it clearly runs against the constitutional values enshrined in the legal protection of embryos.

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An unlimited storage period may overburden medical institutions with increased management costs, thereby potentially resulting in ineffective management of the remaining embryos. Furthermore, if the embryos remain frozen for a long period, they will not remain viable for pregnancy after thawing. Even in the case of a limited storage period, if the embryo's disposal is dependent on the

decision of its creators, it may be subject to inappropriate use in situations where the embryo creators do not or cannot exercise their right to determination, which often leads to poor management of the embryos. Therefore, the legislative purposes of the provisions in question, which stipulate the disposal period and the duty to dispose of all remaining embryos at their storage period's termination are legitimate, and the means of achieving these purposes are appropriate.

On reviewing the provisions stipulating the five-year storage period limit and the disposal of remaining embryos at this storage period's termination, it seems difficult to conclusively state that there were clearly less restrictive means. With regard to providing those who want to have children with some opportunity to use the embryos, the five-year storage period is not clearly unreasonable, and we can find similar legislations in other advanced countries such as France and the UK. It seems that the disadvantages suffered by embryo creators because of the restrictions imposed on their right to self-determination cannot dwarf public interests, which are related to decreasing the social costs of maintaining increasing numbers of remaining embryos and preventing the possibility of improper research. Considering the above-mentioned facts, the court finds that Article 16 (Sections 1 and 2) of the Bioethics and Safety Act are not in violation of the principle of least restrictive means nor against the principle of balance between legal interests.

### *Summary of the court decision*

The court concluded that the law in question had legitimate reasons for restricting embryo creators' rights regarding embryo storage for longer than five years. The main points of the arguments were as follows: (1) the social burden of keeping embryos, (2) the possibility of embryos' misuse, (3) the decreased value of embryos for pregnancy purposes after a longer storage period, and (4) similar legislations in other countries. These four common issues are often raised when researchers and policymakers discuss what should be done with remaining embryos; other countries have discussed these issues extensively when they designed their laws.<sup>10</sup> The next section reviews the legitimacy of the law based on these four points.

## **Review of the Four Reasons to Place a Strict Five-Year Limit on Embryo Storage**

### *The Social Burden of Storing Embryos in Korea*

The Constitutional Court stated that allowing institutions to store embryos beyond five years "may overburden medical institutions with increased management cost, thereby potentially resulting in ineffective management of the remaining embryos."<sup>11</sup> The court stresses that such a social burden is not desirable and that the law should prevent it by establishing the five-year limit.<sup>12</sup>

<sup>10</sup> See *supra* note 7 for the concerns of other countries.

<sup>11</sup> 22-1(B) KCCR 275, 2005Hun-Ma346, May 27, 2010 Decision (in Korean).

<sup>12</sup> *Id.*

The court was right to factor social burden in when deciding on the legitimacy of the law. However, the way the court assessed the social burden is unconvincing. First, the court, in its decision, assumed that the increased number of embryos in institutions result in strain on medical institutions. Is this assumption accurate? The storage of embryos beyond the five-year limit could overburden medical institutions in some cases. This may occur when medical institutions lose contact with embryo creators, thus being left to bear the costs of embryo maintenance. However, if the institutions are able to remain in contact with embryo creators to verify their decision and obtain payment for storage costs, there is no reason why the institutions would be overburdened while keeping embryos for longer periods. Medical institutions may face space constraints, but in that case they may find solutions by outsourcing the storage system or limiting the period of storage to the extent that they find feasible. Therefore, it is presumptuous for the court to conclude that the larger number of embryos would necessarily overburden the medical institutions, thereby increasing social burden.

In addition, the court did not consider other essential elements beyond the potential burden on medical institutions to accurately assess the social burden on Korean society. In the current Korean context, low birth rate is one of the most critical social problems that the law should take into consideration. Policies to address the low birth rate problem include lowering the barriers to fertility treatments, including IVF, for the growing number of infertile couples. Hence, the law on storage limit should consider the effects on IVF access. It must also weigh the societal burden at the level of the individuals who will be affected by this; they may be limited in the number of children they can have, and also may need to spend additional time and money to have another IVF cycle because they were forced to discard their embryos.

To elaborate, it is worth mentioning that IVF is a highly effective yet costly treatment in Korea. Korea's IVF success rate is reported to be around 36%, whereas artificial insemination brings success at around 10-15%.<sup>13</sup> Due to its effectiveness, IVF can be an alluring option for infertile couples; still, IVF is not an easy option because of its cost. Although IVF costs in Korea often depend on the selected clinic and the health condition of the patient, on average, one IVF cycle costs about 3,000-5,000 USD, which is more than the average monthly income in Korea.<sup>14</sup>

This high cost may be substantially lowered when the IVF process utilizes frozen embryos, as the patient can avoid several costly procedures: medication for inducing super-ovulation, numerous ultrasounds to monitor egg growth, blood work, treatments for extracting and collecting mature eggs, and so on. In addition, using frozen embryos instead of undergoing super-ovulation can reduce the health care costs incurred from treating side effects. During the super-ovulation process, many women experience men-

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<sup>13</sup> Lee, G. H., Song, H. J., Choi, Y. M., & Han, H. D., *The status of assisted reproductive technology in Korea in 2012*, 44(1) CLINICAL & EXPERIMENTAL REPROD. MED. 47, 47-51 (2017); *CHA Fertility Center Seoul Station, IUI Clinic*, <https://seoul.chamc.co.kr/en/clinic/artificial.aspx> (last visited Jul. 10, 2019).

<sup>14</sup> GNI (Gross National Income) per capita of Korea was 30,600 USD in 2018, meaning that average monthly income was around 2,550 USD. World Bank, *Korea, Rep.*, <https://data.worldbank.org/country/korea-rep> (last visited Jul. 31, 2019).

tal difficulties, such as depression and stress,<sup>15</sup> as well as physical health problems, such as ascites and ovarian hyperstimulation syndrome.<sup>16</sup> Compromised health and health care costs to treat the symptoms increase the cost of the super-ovulation process, which can be eliminated using frozen embryos.

Considering how costly a new super-ovulation process may be, forcing infertile couples to start a new cycle of super-ovulation treatment may discourage them from trying IVF again. This barrier to IVF access may, in turn, lead to further declines in the Korean birth rate, considering that currently, six out of 100 babies are born through IVF in Korea.<sup>17</sup> One study found that over one-fourth (27.8%) of women who began infertility treatments but ceased participation without completing the process cited financial burdens as the main reason for stopping their treatments.<sup>18</sup> This financial barrier can have negative effects on Korea's rapidly decreasing birth rate.

The Korean birth rate is one of the lowest in the world, and Korea's total fertility rate was the lowest in the world in 2018, being lower than 1.0 (0.98).<sup>19</sup> One of the main reasons for this low birth rate is late marriage and its accompanying infertility issues;<sup>20</sup> the average age of women who want to conceive has increased.<sup>21</sup> As of 2019, 220,000 married couples have been clinically diagnosed with infertility issues, and a larger num-

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<sup>15</sup> Zivaridelavar, Maryam, Ashraf Kazemi & Gholam Reza Kheirabadi, *The effect of assisted reproduction treatment on mental health in fertile women*, 5 J. EDUC. HEALTH. PROM. 9, 9 (2016).

<sup>16</sup> Fidler, Anne T., & Judith Bernstein, *Infertility: from a personal to a public health problem*, 114 PUB. HEALTH REP. 494, 502-03 (1999).

<sup>17</sup> Joonki Hong, *6 out of 100 newborns, born through fertility treatment*, Chosun Ilbo (Oct. 11, 2018, 03:01 AM), [http://news.chosun.com/site/data/html\\_dir/2018/10/11/2018101100254.html?utm\\_source=naver&utm\\_medium=original&utm\\_campaign=news](http://news.chosun.com/site/data/html_dir/2018/10/11/2018101100254.html?utm_source=naver&utm_medium=original&utm_campaign=news) (in Korean).

<sup>18</sup> Korea Institute for Health and Social Affairs, *2015 Major Findings of National Fertility and Family Health, Welfare Condition Survey*, 4, 5 (2016) (in Korean). In addition, 40% of women diagnosed with infertility issues did not take any treatment, and 13% of those who had never tried infertility treatments cited financial burdens as a reason for giving up on the idea of taking such treatments. *Id.*

<sup>19</sup> The Total Fertility Rate (TFR) is measured using the average number of children born per woman over a lifetime (considering the current age-specific fertility rates and assuming no female mortality during reproductive years). The 2018 rate was even lower than the 2017 rate, which was 1.052. In most countries of the Organisation for Economic Co-operation and Development (OECD), the total fertility rate is between 1.4 and 1.9 children per woman, with rates falling as low as 1.3 in Italy and Spain and 1.1 in Korea. Only three OECD countries (Israel, Mexico, and Turkey) have a current TFR at or above 2.1 children per woman, which is necessary for population replacement. At 3.1, Israel has the highest TFR in the OECD. OECD—Social Policy Division—Directorate of Employment, Labour and Social Affairs, *SF2.1: Fertility rates*, Jun. 3, 2019, [www.oecd.org/sdd/37962718.pdf](http://www.oecd.org/sdd/37962718.pdf) (last visited July 10, 2019).

<sup>20</sup> Korea Institute for Health and Social Affairs, *supra* note 18. at 4 The Korea Institute for Health and Social Affairs reported that 18% of married women aged between 30 and 34 years and 27.5% of married women aged older than 35 years experienced infertility; women aged younger than 30 years had an infertility rate of as low as 9.5%.

<sup>21</sup> The average age for women to get marriage increased from 28.1 years in 2007 to 30.4 years in 2018. Korean Statistical Information Service, *Average age for first marriage in 2000-2018*, [http://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=INH\\_1B83A09&conn\\_path=I2](http://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=INH_1B83A09&conn_path=I2) (in Korean).



ber of women are estimated to have infertility issues as they try to conceive at older ages.<sup>22</sup> Given this situation, the government has provided significant social resources to address the low birth rate problem, including support for IVF treatments. The government plans to spend 18,400,000 USD this year to support fertility treatments.<sup>23</sup> Given this background, the potential social impact of the embryo storage limit cannot be accurately assessed without considering its impact on IVF access and utilization.

Overall, the question of whether the law should allow infertile couples to keep their embryos beyond the five-year limit should also be viewed while keeping in mind the major social costs that such a law imposes on society. Whereas the Korean court reasoned that a more liberal policy would increase the social costs, this study finds that a more liberal policy may help to alleviate a significant proportion of South Korea's current social problems. A review of the financial losses incurred because of recurring cycles of super-ovulation, the health burdens imposed on infertile couples, and the urgent social need to assist infertile couples to access as many infertility treatments as possible supports the argument that a law that respects the embryo creators' decision may not necessarily increase the social burden; rather, it may even help to lessen it.

### ***The Possibility of Embryo Misuse Regardless of the Storage Period***

With regards to the stored embryos, the court had reasons to be cautious about the risk of their misuse. These are human embryos and only nine months short of becoming fully developed babies. Therefore, discarding embryos may have no qualitative difference from abortion.<sup>24</sup> Furthermore, embryos and embryonic stem cells derived from embryos can be used to conduct research that is highly unethical and controversial, such as human cloning and eugenic attempts. Thus, the use of embryo or embryonic stem cells is permitted only under specific circumstances in Korea.<sup>25</sup>

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<sup>22</sup> Yoonjong Kim, Miji Lee, Seunghoon Sung, *220000 patients at fertility clinics... Half success will result in 30% increase in newborns*, Donga.com (Aug. 2, 2017 11:14 AM), <http://www.donga.com/news/article/all/20170802/85626824/1> (in Korean).

<sup>23</sup> Ministry of Health and Welfare, *Financial burden of fertility treatment to be reduced this year!*, Jan. 6, 2019, [http://www.mohw.go.kr/react/all/sal0301vw.jsp?PAR\\_MENU\\_ID=04&MENU\\_ID=0403&CONT\\_SEQ=347302](http://www.mohw.go.kr/react/all/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&CONT_SEQ=347302) (last visited Jul. 10, 2019) (in Korean).

<sup>24</sup> Schenker, Joseph G., *Assisted reproduction practice in Europe: legal and ethical aspects*, 3(2) HUMAN REPROD. UPDATE 173, 173-184 (1997); ESHRE Task Force on Ethics and Law, *The moral status of the pre-implantation embryo: ESHRE Task Force on Ethics and Law*, 16(5) HUMAN REPROD. 1046, 1046-48 (2001); Roberts, Elizabeth FS, *Extra embryos: The ethics of cryopreservation in Ecuador and elsewhere*, 34(1) AM. ETHNOLOGIST 181, 181-99 (2007).

<sup>25</sup> The Bioethics and Safety Law (Article 29-32) states that embryos can be used only for certain research purposes admitted by the law, such as development of treatment for rare incurable diseases and only before primitive streak appears. The law states that when research using embryo has a possibility of endangering bioethics or biosafety, research institutions must suspend the research immediately. Embryonic stem cell research is heavily regulated as well (Article 33-35). Embryonic stem cells must be registered and research using the cells are allowed in limited circumstances under oversight of institutional committees.

When we admit that embryos' misuse should be cautiously prevented, the next question is how we can do so. The current Korean law takes the regulatory approach of discarding all embryos older than five years. The assumption behind that approach seems to be that older embryos have an increased likelihood of being misused. However, it is questionable whether the duration of storage is the best measure to assess the risk of misuse. The court, in one part of its decision, also acknowledged that it is not the storage duration, but the embryo creators' willingness to exercise their rights that makes the difference in misuse risk. The court stated that "[e]ven with a limited storage period, if the disposal of the frozen embryos is dependent on the embryo creators' decision, the embryos may be subject to inappropriate use in situations where the embryo creators *do not or cannot exercise their right to determination*, which often leads to the poor management of the embryos" (emphasis added by the author).

The possibility of embryos' misuse primarily involves cases in which the embryos are abandoned or unclaimed after a long storage period. Unclaimed embryos often form a "blind zone" for law enforcement, because there is a substantial likelihood that embryos that lack the attention of their creators may be misused for illegal purposes. On the other hand, embryo creators who ask for their embryos to be stored may be more likely to pay attention to how their embryos are stored and used. In such cases, there is no qualitative difference, in terms of embryo misuse risk, between the embryos kept for less than five years and those kept longer. The risk of embryos' misuse is linked to how closely its use is monitored, and the best monitoring agents are the embryo creators. Therefore, if the purpose of the limit is to prevent misuse, the standard should be based on whether the embryo creators' decision can be verified, not on the duration of storage.

### ***The Decreased Value of Stored Frozen Embryos Beyond Five Years***

One of the key challenges in using frozen embryos is the embryo's viability after thawing. As in many other countries, the Korean court also expressed concern in this regard. The court stated that "if the embryos remain frozen for a long time, they will not be viable for pregnancy after thawing." In other words, the court posits that frozen embryos that are stored for more than five years will have a lower probability of success after the thawing process.

However, this up-to-five-year viability argument is not valid anymore. Recent developments in infertility medicine have enabled the successful implantation of embryos older than 20 years; such frozen embryos have the same probability of pregnancy success.<sup>26</sup>

In fact, the five-year standard was not necessary even when the law was formulated. Around that period, in 2004, a published report described a case of a frozen embryo

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<sup>26</sup> Susan Scutti, The embryo is just a year younger than the mother who birthed her, CNN, Dec. 21, 2017, <https://edition.cnn.com/2017/12/19/health/snowbaby-oldest-embryo-bn/index.html>; Riggs, R., Mayer, J., Dowling-Lacey, D., Chi, T. F., Jones, E., & Oehninger, S., *Does storage time influence postthaw survival and pregnancy outcome? An analysis of 11,768 cryopreserved human embryos*, 93 FERTILITY AND STERILITY 109, 109-15 (2010).

that had been stored for 12 years; it was successfully thawed and led to the healthy delivery of twins.<sup>27</sup> In 2010, it was demonstrated that the storage of frozen embryos for longer periods—well over 20 years—had no effect on any resulting post-thawing survivals, implantation rates, clinical pregnancies, miscarriages, or live births.<sup>28</sup> This study emphasized that the storage duration did not affect the survival or pregnancy outcome.<sup>29</sup>

Due to the technological development, the countries that limit embryo storage length usually adopt a 10-year standard these days.<sup>30</sup> The countries that employ stricter limits have other reasons beyond technological limitations, such as negative stances on IVF itself and respect of embryos as quasi-human, which is discussed in the following section. In this regard, the Korean law's five-year limit is scientifically groundless.

### Legislation in Other Countries

In its decision, the Constitutional Court justified the five-year limit by referencing other countries with similar legislations. The court specifically mentioned the laws of the UK and France. As there is not much discussion or research on the embryo storage law in Korea, it is worthwhile to examine other countries' legislations. However, a close examination provides different implications than what the court drew.

First, the court reviewed the legislations with time limitations on embryo storage but neglected to mention that many countries do not set any legal regulation on the storage period. The United States of America does not place any time limitations on the storage of embryos.<sup>31</sup> Canada and China also do not have any legal restrictions in this regard.<sup>32</sup> Japan does not have a legal limit either, and the storage duration is left to self-regulation by professional society. The Japanese Society of Obstetrics and

<sup>27</sup> Revel, A., Safran, A., Laufer, N., Lewin, A., Reubinov, B. E., & Simon, A., *Twin delivery following 12 years of human embryo cryopreservation: case report*, 19 HUM. REPROD. 328, 328-29 (2004).

<sup>28</sup> Susan Scutti, *supra* note 26; Riggs, *supra* note 26, at 113-14; Dowling-Lacey, D., Mayer, J. F., Jones, E., Bocca, S., Stadtmauer, L., & Oehninger, S., *Live birth from a frozen-thawed pronuclear stage embryo almost 20 years after its cryopreservation*, 95 FERTILITY AND STERILITY 1120-e1 (2011); Herrero, Leyre, Mónica Martínez, and Juan A. Garcia-Velasco, *Current status of human oocyte and embryo cryopreservation*, 23 CURRENT OPINION ON OBSTETRICS AND GYNECOLOGY 245-50 (2011); Sarah Zhang, *A Woman Gave Birth From an Embryo Frozen for 24 Years*, *The Atlantic* (Dec. 21, 2017), <https://www.theatlantic.com/science/archive/2017/12/frozen-embryo-ivf-24-years/548876/> (last visited Jul. 10, 2019); Aflatoonian, N., Pourmasumi, S., Aflatoonian, A., & Eftekhar, M., *Duration of storage does not influence pregnancy outcome in cryopreserved human embryos*, 11 IRAN J. REPROD. MED. 843 (2013).

<sup>29</sup> *Id.*

<sup>30</sup> *Infra* Section III.D.

<sup>31</sup> Rich Vaughn, *Legal Time Limits On Egg Storage Creates New "Biological Time Clock,"* International Fertility Law (Oct. 11, 2018 17:05 PM), <https://www.iflg.net/legal-time-limits-egg-storage-creates-new-biological-time-clock/> (last visited Jul. 10, 2019).

<sup>32</sup> As for Canada, see Pereira, M., Samorinha, C., Alves, E., Machado, H., Amorim, M., & Silva, S., *Patients' views on the embryo storage time limits*, 31 REPROD. BIOMED. ONLINE 232, 233 (2015); Cattapan, Alana & Françoise Baylis, *Frozen in perpetuity: 'abandoned embryos' in Canada*, 1 REPROD. BIOMED. SOC. 104, 107-10 (2015). As for China, Fitzgerald, R. P., Legge, M., Rewi, P., & Robinson, E. J., *Excluding indigenous bioethical concerns when regulating frozen embryo storage: An Aotearoa New Zealand case study*, 8 REPROD. BIOMED. SOC. ONLINE 10-22 (2019).

Gynecology (JSOG) regulates that embryo storage is permissible “until the end of the woman’s reproductive life (without a definite age or clear definition),”<sup>33</sup> however, most institutions in Japan have a set storage period because of maintenance and storage costs.<sup>34</sup> At the time of cryopreservation, patients are obliged to provide their consent for embryo disposal if they cannot be contacted after a set storage period and in the case of divorce or death of a partner.<sup>35</sup> At the end of the storage period, the patients must choose between three options: continue the storage by paying an additional cost, discard the embryo, or donate it to research.<sup>36</sup> In these countries, embryo creators’ decisions are fully respected.

In countries with storage limitations, the common trend is to set a 10-year limit. For example, in the UK, the recommendations regarding frozen embryo storage began as part of IVF regulations. The UK’s Warnock Committee was established in 1982, and it recommended a 10-year limit in 1984,<sup>37</sup> stating that there should be “a maximum of ten years for the storage of embryos.”<sup>38</sup> Based on this recommendation, the UK’s Human Fertilisation and Embryology Act 1990 was revised to set the embryo storage period at 10 years.<sup>39</sup>

Several other countries also accepted the Warnock Committee’s recommendation.<sup>40</sup> Australia, for example, has been following this 10-year recommendation since 1982,<sup>41</sup> although there have been some variations within state laws. Victoria, for instance, follows a five-year limitation based on the Waller Committee’s recommendation.<sup>42</sup> However, the Waller Committee still “recommends that where a couple consents to long-term storage, the consent shall be reviewed after five years, and may then be renewed.”<sup>43</sup> The legislation imposing a five-year limitation made a specific reference to the Rio couple and their “orphaned embryos,” which had received international media

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<sup>33</sup> Japan Society of Reproductive Medicine, *Guidelines for modern ART* (2nd ed. 2003) (in Japanese).

<sup>34</sup> Shizuko Takahashi, Misao Fujita, Akihisa Fujimoto, Toshihiro Fujiwara, Tetsu Yano, Osamu Tsutsumi, Yuji Taketani & Akira Akabayashi, *The decision-making process for the fate of frozen embryos by Japanese infertile women: a qualitative study*, 13 BMC MED. ETHICS 9 (2012).

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> United Kingdom, Department of Health and Social Security, *Report of the Committee of Inquiry into Human Fertilisation and Embryology* 56 (1984) (hereinafter, Warnock Report).

<sup>38</sup> *Id.*

<sup>39</sup> Joyce Harper, Kylie Baldwin, Lucy Van de Wiel & Jacky Boivin, *Campaign for UK Parliament to extend the 10-year storage limit on egg freezing*, Bionews 1 (Apr. 23, 2018), [https://www.bionews.org.uk/page\\_135507](https://www.bionews.org.uk/page_135507) (last visited Jul. 10, 2019).

<sup>40</sup> Stuhmcke, *supra* note 4, at 123; NSW Law Reform Commission, *Report 58 – Artificial Conception: In Vitro Fertilization* (1988).

<sup>41</sup> *Id.* at 125.

<sup>42</sup> Bangsboell, Susanne, et al. *Patients’ attitudes towards donation of surplus cryopreserved embryos for treatment or research*, 19 HUM. REPROD. 2415, 2415-19 (2004).

<sup>43</sup> The Victorian Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization (hereinafter, the Waller Committee), *Report on the Disposition of Embryos Produced by In Vitro Fertilisation* [2.13] (1984).

coverage; however, the committee clearly acknowledged that the storage period could be extended based on the couples' consent.<sup>44</sup>

The analysis of other countries' laws shows that the laws either avoid setting a storage limitation, thereby fully respecting the decisions of the embryo creators, or set a long storage limit, so that embryo creators have the freedom to use their embryos as long as they are viable. These countries, such as most US states, the UK, and Australia, allow embryo adoptions which fully respect the decisions of embryo creators.<sup>45</sup>

Some countries have a five-year or shorter limit, such as France,<sup>46</sup> and other countries even completely ban embryo storage.<sup>47</sup> However, the reasons these countries chose such policies are because they posit that the human embryo requires protection for its dignity as human; these countries rarely put forward the practical concerns that the Korean court laid out.<sup>48</sup> If Korea brings the perspective of human dignity into embryo regulation, that may require consideration of other aspects and may lead to a different conclusion. However, if the legitimacy of the Korean law is to be reviewed from a practical point of view, it is difficult to take the laws of these countries as a model for Korean law.

## Conclusion

The Constitutional Court of Korea upheld the constitutionality of the law that limits embryo storage to five years, regardless of the embryo creators' will. This law limits the embryo creators' rights. Therefore, such a limitation is justifiable only when there is a strong need, as noted by the court. The court provided four reasons for justifying these limitations: the social burden of keeping embryos, the possibility of embryo misuse, the decreased value of embryos stored beyond five years, and the legislation of other

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<sup>44</sup> *Id.* at 124. Mr and Mrs Rio had stored two embryos, formed through Mrs Rio's ova and donated sperm, in November 1981 in Victoria. In early 1984 Mr and Mrs Rio died in a plane crash in South America. They were United States citizens and left no instructions on what should be done if both died. The Australian committee of legal experts, philosophers, theologians and scientists recommended that frozen embryos should be destroyed if couples die or divorce without leaving instructions. *Panel in Australia Urges that Orphaned Frozen Embryos be Destroyed*, NEW YORK TIMES (Sep. 4, 1984), <https://www.nytimes.com/1984/09/04/science/panel-in-australia-urges-that-orphaned-frozen-embryoes-be-destroyed.html>.

<sup>45</sup> Elizabeth Cason Crosby, *Embryo adoption and the law*, in *The Ethics of Embryo Adoption and the Catholic Tradition*, Springer, Dordrecht 276 (2007).

<sup>46</sup> Embryo freezing is now allowed in most EU countries, but has proved contentious in some jurisdictions, notably Italy (where it was banned in 2004 but reintroduced in 2011), Germany (where under embryo protection legislation it is only allowed in emergency but fully allowed for fertilized eggs at the 2PN (two pronuclei) stage), and Poland (where it remains in political limbo). ESHRE, *ESHRE Fact Sheets 2, Regulation and legislation in assisted reproduction*, 2017, <file:///C:/Users/user/Downloads/2%20Regulation.pdf>.

<sup>47</sup> *Id.*

<sup>48</sup> Declan Butler, *Pressure grows for relaxation of French embryo research laws*, 395 NATURE 623 (1998), <https://www.nature.com/articles/27017>; MCGregor, Joan, and Frédérique Dreifuss-Netter, *France and the United States: the legal and ethical differences in assisted reproductive technology (ART)*, 26 MED. & L. 117 (2007); Saniei, M., & H. Baharvand, *Human embryonic stem cell science in muslim context: "Ethics of human dignity" and "ethics of healing,"* 4(1) ADVANCES IN MED. ETHICS 7, 7-21 (2018); Michaela Kreyenfeld & Dirk Konietzka, *Europe: Contexts, Causes, and Consequences* 269-88 (2017).

countries that limit embryo storage. However, this study found that all four reasons require re-examination, because the court's analysis was too narrow and outdated in scope.

These days, IVF has become more widespread, and its use will grow even further in the future. Therefore, the legislative regulations for IVF procedures will have a significant impact on society. Therefore, the law must set regulatory standards based on an accurate examination of the situation. The law should be revisited based on a comprehensive assessment of the potential social impact of embryo storage, the risks of embryo misuse, other regulatory mechanisms preventing such misuse, and up-to-date scientific data.

To develop an effective regulatory IVF policy, continued active research in this field is essential. Many scholars point out that policymakers remain uninformed, and these topics need to be explored to inform policymakers of the current situation. For example, research needs to figure out how many embryos are stored, what infertile couples want, and the difficulties faced by the medical institutions in maintaining unclaimed embryos in Korea.