

Dependency and Vulnerability Argument in Care Ethics and the Moral Justification of Human Genome Editing

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Abstract

Care ethics is a normative ethics that holds, among other things, that moral notions centres on human interpersonal relationships and care as a virtue. It concerns itself mainly with caring relationships. The problem of Human Genome Editing (HGE) raises different moral issues and different attempts has been made from the consequentialist (utilitarian) and non-consequentialist (deontological) perspectives for their justification but not satisfactorily. This paper aims to argue that care ethics provides a better alternative moral justification for HGE. In doing this, the paper will use dependency and vulnerability argument in care ethics. If this is successfully argued, it will show that care ethics provides a better alternative means of moral justification of HGE in Bioethics.

Keywords: human genome editing, care ethics, moral justification.

1. Introduction: The moral problems of human genome editing (HGE)

The moral problems of human genome editing emanate from the use of genome editing machines by humans for therapeutic or non-therapeutic purposes. In ethics, basically, the moral justification of genome editing has raised pertinent moral issues, problems and questions which has elicited critical discussions and comments from philosophers, bioethicists, biomedical scientists, religious scholars, and policy makers. Moral questions raised by human genome editing have caused conflicts between the interests of the government and the citizens.

The debate about the moral problems of HGE can be traced down to the cloning break identified with Dolly the sheep and breakthroughs made since the development of Induced Pluripotent Stem (IPS) cells derived from somatic (non-heritable) cells.¹ One of the moral problems of human genome editing is informed consent. When an embryo is genetically edited, the edition brings about changes that affect every cell in the baby's body. The effect of the edition goes a long way as it is passed down to the edited baby's posterity and it continues like that causing disable cum physical and mental pain to the person involved and their posterity.² In most cases, the consequence of germline editing is seriously negative and destructive.

¹ Kato, Kazuto. "Kazuto Kato: the ethics of editing humanity." *Bull World Health Organ* 99 (2021): 616-617.

² Lea R. A, Niakan K. K. "Human Germline Genome Editing." *Nat Cell Biology* 21(12): 1479–1489 2019. <https://doi.org/10.1038/s41556-019-0424-0>

According to Smolenski, heritable genome interventions present an ethical constraint on the impossibility of future generations of providing consent to an intervention on their genome.³ This is because the patients concerned are the embryo and its posterity.⁴ The pertinent question at this point is: is it morally permissible to use gene therapy on an embryo when it is impossible to get permission from the embryo for treatment? Is getting permission from the parents enough or sufficient moral justification for genome editing? Moreover, edits in the germline would be passed down through generations whereas it is impossible to get consent from future generations.⁵ This problem is otherwise known as the problem of the unborn and future generations.

The assurance of safety is another moral problem of human genome editing. This is because it is possible that cells be edited in the wrong place (this situation is known as off-target edit) and that some cells carry the edit while others do not (this situation is known as mosaicism).⁶ Another reason why safety is considered as an important moral problem of the use of human genome editing technologies is that it has a high risk of affecting human dignity. According to Mara Almeida and Robert Ranisch, human dignity is one of the key values emphasised in all the official and unofficial documents addressing human rights in the biomedical field.⁷

There are arguments presented by scholars that heritable genome interventions might affect the value of human dignity.⁸ It is with this mindset that the Council of Europe in 1982 declares that “the rights to life and to human dignity protected by Articles 2 and 3 of the European Convention on Human Rights imply the right to inherit a genetic pattern which has not been artificially changed.”⁹ This declaration is also supported by the Oviedo Convention on Human Rights and Biomedicine where Article 13 prohibits any genetic intervention with the aim of introducing a modification in the genome of any descendants. The Convention is the only international legally binding instrument that covers human germline modifications among the countries.¹⁰

In addition, conflict with human right is a problem of human genome editing. According to The Universal Declaration on the Human Genome and Human Rights (UDHGHR), “the human genome underlies the fundamental unity of all members of the human family, as well

³ Smolenski J. “Crispr/cas9 and Germline Modification: New Difficulties in Obtaining Informed Consent.” *Am J Bioeth* 15(12): 35–37. 2015.

⁴ Wolf D. P., Mitalipov P. A., Mitalipov S. M. “Principles of and Strategies for Germline Gene Therapy.” *Nat Med* 25(6):890–897. 2019.

⁵ Vassena R, Heindryckx B, Peco R, Pennings G, Raya A, Sermon K, Veiga A. “Genome Engineering Through CRISPR/Cas9 Technology in the Human Germline and Pluripotent Stem Cells.” *Hum Reprod Update* 22(4): 411–419. 2016. <https://doi.org/10.1093/humupd/dmw005>

⁶ Baylis, F. *Altered Inheritance: CRISPR and the Ethics of Human Genome Editing*. Cambridge, Mass: Harvard University Press. 2019.

⁷ Mara Almeida, Robert Ranisch. “Beyond safety: Mapping the Ethical Debate on Heritable Genome Editing Interventions.” *Humanities and Social Sciences Communications*. 2022, 9: 139. <https://doi.org/10.1057/s41599-022-01147-y>

⁸ Calo, Z. “Human Dignity and Health Law: Personhood in Recent Bioethical Debates.” *Notre Dame J Law Ethics Public Policy* 26: 473–499. 2012.

⁹ Council of Europe. “Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine.” *Convention on Human Rights and Biomedicine*. COE, Oviedo. 1997.

¹⁰ Mara Almeida, Robert Ranisch. “Beyond Safety: Mapping the Ethical Debate on Heritable Genome Editing Interventions.” *Humanities and Social Sciences Communications*, 9: 139, 2022. <https://doi.org/10.1057/s41599-022-01147-y>

as the recognition of their inherent dignity and diversity. In a symbolic sense, it is the heritage of humanity.”¹¹ The human genome is viewed as our uniquely human collective ‘heritage’ that needs to be preserved and protected. It is the case that editing human gene is liable to affect and interrupt this natural heritage and therefore would threaten human rights.¹²

Furthermore, the problem of identity is one of the perennial issues in the practice of human genome editing. Heritable human genome editing creates changes that can be transferred down to future generations. This can represent a threat to the unity and identity of the human species, as these modifications could have an impact on the human’s gene pool. Any alterations would then affect the evolutionary trajectory of the human species and, thus, its unity and identity. Also, there is the problem of how to identify someone whose gene has been edited either as a natural person or as an artificial being.¹³ In *An analysis of different concepts of “identity” in the heritable genome editing debate*, Ying-Qi Liaw argues for a new multi-faceted concept of identity as a suitable framework for discussing the moral and social implications of human genome editing. His major premise for his argument is that it shows the interconnection of the different forms of identity which is very essential in the understanding of human genome editing.¹⁴

Conflict with justice and equality is another vital problem ensuing from the use of genome enhancement technologies. According to Baumann, a major concern or ethical challenge posed by the use of genome editing technologies is how it would be easily affordable and accessible to the general populous irrespective of any social, economic, religious or political differences.¹⁵ There is a very high probability that human genome editing technologies would be more costly in the future. The global gene editing market is estimated to worth \$10.6 billion by 2028.¹⁶ The variables on which the research was based consists of the industry trends, pricing analysis, patent analysis, conference and webinar materials, key stakeholders, and market demand. Due to this, there is the risk that genome editing technologies will become very expensive technologies that only a few wealthy individuals in any population can access. In addition, there is the consideration that patenting of genome editing technologies will delay widespread access or lead to unequal distribution of corresponding health benefits.¹⁷

Therefore, this can lead to further increase in existing health inequality amongst inhabitants of a particular country and among nations. This is because, individuals and countries

¹¹ UNESCO. “Universal Declaration on the Human Genome and Human Rights.” *UNESCO*. Paris. 1997.

¹² Annas G. J. *Bioethics: Crossing Human Rights and Health Law Boundaries*. New York: Oxford University Press. 2005.

¹³ Melillo T. R. “Gene Editing and the Rise of Designer Babies”. *V and J Trans Law*, 50:757–790, 2017.

¹⁴ Liaw Y. Q. “An Analysis of Different Concepts of “Identity” in the Heritable Genome Editing Debate.” *Med Health Care Philos.* 27(1): 121-131, 2024. doi: 10.1007/s11019-023-10189-1. Epub 2024 Jan 8. PMID: 38189908; PMCID: PMC10904499.

¹⁵ Baumann, M. “CRISPR/Cas9 Genome Editing: New and Old Ethical Issues Arising from a Revolutionary Technology.” *Nanoethics*. 2016. 10:139–59, 2016.

¹⁶ “Markets and Markets. Gene Editing Market by Products and Services (Reagents, Consumables, Systems, Softwares), Technology (CRISPR, TALEN, ZFN, Antisense), Application (cell line engineering genetic engineering, drug discovery), and end user (pharma, biotech)” - *global forecast 2028*. 2023. https://www.marketsandmarkets.com/Market-Reports/genome-editing-engineering-market-231037000.html?gad_source=1&gclid=CjwKCAiAkp6tBhB5EiwANTCcx1BH4ouM62kJbKoLJirVrpYr2ibUrW63Ln_jxW3wdUkDJzh2oToJLURoCuGwQAvD_BwE#

¹⁷ Feeney O, Cockbain J, Morrison M, Diependaele L, Van Assche K, Sterckx S. “Patenting Foundational Technologies: Lessons from CRISPR and other Core Biotechnologies.” *Am J Bioeth* 18(12), 36–48, 2018.

with the best economic advantage will be able to easily afford these technologies and use it.¹⁸ This could enhance inequality at different levels, depending on the limits of applicability of the technology. Taken to its extreme, the use of the technology could allow germline editing to create and distinguish classes of individuals that could be defined by the quality of their artificial or edited genome.

2. Consequentialist arguments about HE

Ethical consequentialism is the moral theory that appraises the rightness or wrongness of actions based on their effects or consequences.¹⁹ Consequentialist theories, especially the theory of right action, deal with the concept that the moral goodness of any act is determined by the goodness or badness of its consequences.²⁰ In other words, an act is right if it causes good consequences or increases the amount of good in total and it is wrong if it causes bad consequences or does not maximize the amount of good. The best-known version of consequentialism is utilitarianism, popularised by people like Jeremy Bentham and John Stuart Mill. Utilitarianism is the theory asserting that right action produces the greatest happiness or pleasure among the majority of mankind.²¹ It is generally expressed as the greatest good for the greatest number.²²

Consequentialist theories are often set against deontological ethics, which hold intrinsic moral value in certain actions or principles, regardless of their outcomes. For example, while a consequentialist would argue that lying is wrong because it leads to negative consequences, a deontologist would contend that lying is inherently wrong, no matter the consequences, because it violates a moral principle like honesty. Critics of consequentialism worry that the theory allows for justifying actions that may infringe on individual rights or produce unjust outcomes in the pursuit of overall good. Despite these criticisms, consequentialism remains a significant and influential approach to moral reasoning, and it has been the subject of extensive philosophical debate and discussion about the moral justification of human genome editing. The following are examples of consequentialist arguments about the moral justification of HGE:

2.1 Parental responsibility arguments in support of HGE

John Harris is a famous bioethicist who has been one of the most outspoken advocates in using gene technologies, human editing machines included, for betterment of human welfare and reduction of suffering. Harris supports the argument that human genome editing could bring about an immense improvement in humans' health and well-being by eliminating periodic outbreaks of genetic diseases and enhancing the desirable traits. He goes further to argue that applying the available technology in preventing genetic disorders and improving life quality for people of the next generation is a moral duty.²³ Harris claims that genetic intervention should be

¹⁸ Bosley KS, Botchan M, Bredenoord AL, Carroll D, Charo RA, Charpentier E et al. "CRISPR Germline Engineering: the Community Speaks." *Nat Biotechnol* 33(5): 478–486, 2015. <https://doi.org/10.1038/nbt.3227>

¹⁹ McNaughton, David, and Piers, Rawling, "Deontology". In David Copp (ed.), *The Oxford Handbook of Ethical Theory*. Oxford University Press. 2006, 428-431.

²⁰ Railton, Peter. "Consequentialism." In *The Blackwell Guide to Ethical Theory*, edited by Hugh LaFollette, Blackwell Publishing, 2000, 168-185.

²¹ Mill, John Stuart. "Utilitarianism." In *Seven Masterpieces of Philosophy*.. Routledge, 2016. 329-375

²² *Ibid.*, 329.

²³ Harris, John. "Genetic Enhancement: Plan Now to Act Later." *Bioethics*, Vol. 19, No. 3, (2005): 198-205.

proactive on the ground of the moral obligation to reduce human suffering and foster human flourishing through the offer of scientific advances.

Also, Harris argues for the ethical permissibility of using genetic technologies to enhance the lives and future prospects of people yet to be born.²⁴ He further holds that there is a moral obligation to apply the available genetic means to prevent suffering and to improve the quality of life of persons from their very inception. On his part, he emphasised that every child should have the best possible start in life, free from preventable genetic diseases and able to flourish.

He also goes on to argue that genetic enhancements can greatly contribute to autonomy, well-being, and progress in society. It challenges some of the more traditional ethical theories and requires a fundamental change in values regarding the emerging genetic technology, in that his appeal is for a much more proactive role to be adopted for genetic interventions and he places an ethical duty on focusing welfare considerations upon future generations.

Second, Harris advocates protectionism on matters concerning genetic enhancement by showing that the consequences of allowing people to resort to genetic alterations according to their value judgments and preferences might be beneficial. The beneficent consequences are autonomy, living healthier and more fulfilling life, and fostering a society that values human welfare and progress. Harris's stance for editing the human genome raises several key ethical considerations: autonomy, beneficence, and justice. Harris's emphasis on the potential benefits of genetic technologies underlines a moral imperative to alleviate suffering and foster well-being through scientific innovation. On the contrary, one may argue that the utilitarian drive in bioethics of Harris may overlook critical concerns of justice, equity, and unwanted consequences of genetic interventions.

Furthermore, Harris argues that respect had to be paid to principles of autonomy and decision-making that included genetic interventions. Basically, his argument is premised on the fact that as rational agents, individuals ought to have the right to make moral decisions with regard to genetic enhancement both for themselves and their offspring, with the proviso that such moral choices square with ethical principle and are not harmful to others.²⁵

One of the ethical concerns arising from Harris's arguments is that the use of genetic enhancements exaggerates already existing social inequalities. Again, it would be proper to mention that if human genome editing becomes widely used in the future, it could increase the gap between those who can afford to get genetic treatments and those who cannot, therefore creating a stratified society of genetic advantages. There is also the rather ambiguous aspect how gene editing will affect individual identity, human diversity, and shifts in societal norms through genetic alteration for a very long time.

2.2 Arguments on natural order against HGE

Leon R. Kass, one of the iconic American bioethicist, has made a very strong case against the morality of human genome editing. In *The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans*, Kass constructs a thought-provoking critique pertaining to the ethical dimensions associated with altering the human genome.²⁶ Kass's argument is based on the

²⁴ Harris, John. "The Moral Imperative to Create Children with the Best Chance of the Best Start in Life." *Journal of Medical Ethics*, Vol. 32, No. 6 (2006): 353-357.

²⁵ Harris, John. *Genetic Enhancement: Plan Now to Act Later*. Bioethics, vol. 19, No. 3 (2005); 198-205.

²⁶ Leon, R. Kass. "The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans." 32 Val. U. L. Rev. 679-705, 1998. <http://scholar.valpo.edu/vurl/vol32/iss2/12>

consequences that could arise from altering the human genetic code and emphasizes that it will disturb the natural order and human dignity. What he means is that human genome editing is basically, fundamentally contrary to the intrinsic value of human life and the natural order of the world. However, he argued that adopting genetic manipulation technologies will only degrade human dignity and lose reverence for the mystery life itself deserves

Kass' view is strongly wedded to some old-fashioned view of human nature and the inviolability of the natural order. He argued that genetic tampering with the human code, ipso facto, goes against the wisdom within the basic repugnance that humans feel viscerally about such meddling. Kass argues that this repugnance is not simply a manifestation of irrational fear, but that, in fact, it is a deep-seated intuition that recognizes the perilous implications of disregarding the natural boundaries of human existence.

Furthermore, Kass is concerned that such massive genome editing will be related to practices of eugenics and turning human life into merchandise. He is afraid that this search for perfection in genes will eventually turn into discrimination, inequality, and devaluation of human diversity. For Kass, it is in the very imperfection of humanity that humanity itself resides; engineering a perfect human race would rid human existence of richness and multifariousness. This argument by Kass reflects his holding fast to the moral imperative of embracing the limiting and imperfecting conditions as definitional to human experience.

Further, Kass excavates deep questions about intergenerational effects of editing the human genome. He brings up the moral dilemmas regarding changing the germline, which would have permanent effects on subsequent generations. According to Kass, these interventions are going to violate the autonomy and identity of people who have no say over the genetic alterations undertaken on their behalf. It means imposing genetic determinism upon them, contrary to the very basic principles of human freedom and self-determination.

His argument is a deep reflection on the moral and ethical consequences that human genome editing would have on society, springing from deep concern for the preservation of human dignity, the sanctity of life, and the integrity of the natural order. However, it should be noted that this view by Kass has been open to criticisms, especially with respect to its potential thwarting of scientific progress and reliance on values of traditionalism, which may not be shared by every member of society.

Furthermore, the argument against morality in human genome editing by Kass offers quite a number of compelling criticisms on the subject of ethical implications by genetic manipulation. Kass criticises the dominant discourse for the possible benefits of genome editing and cited the significance of protecting the sanctity of human life and the natural order. On the one hand, his view has opened extremely relevant discourses with respect to the moral dimensions of biotechnological development. On the other hand, it also calls for critical review so that a balanced consideration of the complex ethical issues at stake may be reached.

2.3 Religious arguments against HGE

The Ramsey Colloquium itself was composed of several distinguished theologians and ethicists who made valuable contributions toward a moral argument about human genome editing. It's called a colloquium in honor of Paul Ramsey, a theologian and ethicist who believed one must address moral dilemmas from a perspective that blended religious insight with secular ethics. One of the basic arguments in the position the Ramsey Colloquium regarding the moral justification of human genome editing is that of human dignity. They argue that human beings

were made in the image of God, which gives them intrinsic value to be respected in any ethics consideration.²⁷

The Colloquium is of the view that, in regard to non-therapeutic enhancements, genome editing could violate the inherent dignity of a person by reducing human life solely to a series of biological characteristics that any person can modify at whim. On the other hand, they would adopt the use of genome editing technologies for therapeutic purposes since it is in line with human dignity and thus tends to relieve pain and offer people the possibility of living and realizing a good life.

The Colloquium examines the idea that human behavior must be guided by a natural moral order. They argue that human genome editing is a potential step toward rejecting the constraints and weaknesses that are inherent to the human experience and moving away from acknowledging the givenness of the human situation.²⁸ The group believes in respecting the order of nature and teaches man not to be over-confident about taking complete control over our biological destiny

Perhaps most compellingly moral of all the arguments advanced by the Ramsey Colloquium is “playing God,” a phrase that captures unease at overstepping boundaries traditionally ascribed to divine providence. In this regard, the Ramsey Colloquium recommends a humble approach toward technological innovation, in particular, where changes to the irreversible human genome were concerned. It will present a case for the precautionary principle, which involves restraint in the face of uncertain risks and the potential for unintended consequences.²⁹

The Colloquium also considers the relationship of genome augmentation technology with social justice and fairness. It argues that human genetic enhancement has the potential to further worsen societal inequality between those who have access to “improved” genetic features and those who have not, even while applications that are obviously medicinal are more often recognized as having the ability to lessen suffering. It provides fairness to social justice and equity in access to all people in relation to genome editing technology, so that such progress is not made at the cost of a few favored members of society alone.³⁰

3. Deontological Arguments about HGE

The word *deontological* comes from the Greek word *Deon*, meaning duty or obligation.³¹ This lies at the center of deontological ethics: it claims that actions are right or wrong in themselves, regardless of their results. Under this view, individuals are obliged to adhere to particular moral principles.³² Also referred to as duty-based ethics, this moral theory emphasizes adherence to moral rules or duties that are part of ethical decisions. Under deontological ethics,

²⁷ Gilbert, Meilaender. “Embryos the Smallest of Research Subjects”. In *Bioethics: A Primer for Christians*. Grand Rapids, MI: William B. Eerdmans Publishing Company. 1996, 110-119.

²⁸ Ramsey Colloquium. The Universal Declaration of Human Rights Fifty Years Later: A Statement of the Ramsey Colloquium. 1998, 18-22. <http://www.leaderu.com/ftissues/ft9804/articles/ramsey.html>.

²⁹ Ibid., 20.

³⁰ Ibid., 22.

³¹ Alexander, Larry and Michael Moore. “Deontological Ethics.” *The Stanford Encyclopedia of Philosophy* (Winter 2021 Edition). Edward N. Zalta (ed.) 2020. <http://plato.stanford.edu/archives/win2021/entries/ethics-deontological/>.

³² Alexander, Larry and Michael Moore. “Deontological Ethics.” *The Stanford Encyclopedia of Philosophy* (Winter 2021 Edition). Edward N. Zalta (ed.) 2020. <http://plato.stanford.edu/archives/win2021/entries/ethics-deontological/>.

the morality of an act is determined by its adherence to given moral rules or duties, not by its outcome. This contrasts with consequentialist ethical theories, which assess the morality of actions based on their consequences.

Immanuel Kant is one of the most important, famous, and influential exponents of deontological ethics. His ethical philosophy revolves around what he termed the categorical imperative—a principle basic to moral duty. In relation to this, Kant holds that individuals ought to act according to maxims which they could will to be universal laws; thus, he underlined both the universality and rationality of moral principles.³³ Kant also highlighted the inherent worth of human beings as rational agents, advocating for the moral respect and dignity of individuals capable of moral reasoning as a crucial aspect of ethical decision-making.

In practical terms, deontological ethics provides a structured framework for resolving ethical dilemmas, focusing on principles such as honesty, respect for others, and adherence to universal moral rules. This ethical approach is commonly applied in fields like bioethics, healthcare, professional ethics, business ethics, environmental ethics, and human rights advocacy.

3.1 *Argument on procreative beneficence in support of HGE*

Julian Savulescu's concept of procreative beneficence submits that parents have a moral obligation to bring into existence the child who will have the best life, whenever this is possible.³⁴ This is a conceptual justification of the selection for the best possible features by using genome editing and enhancement techniques for the promotion of well-being and flourishing. Savulescu's argument for procreative beneficence grounds itself essentially in the principle of beneficence, with its cardinal meaning directed toward promoting well-being and causing the least harm. He supported this claim with the premise that the use of technologies of genetic enhancement can prevent hereditary diseases and also improve human capabilities and well-being. Words: In other words, the selection of the best possible traits in offspring can promote the well-being and flourishing of future generations

Also, by preventing genetic diseases and enhancing desirable traits through genetic technologies, Savulescu argues that parents can contribute to a much healthier and more resilient population of the actual human society.³⁵ Moreover, Savulescu argues that it is the moral duty of future parents to act in a manner that ensures maximum benefits with minimum harm to their children.³⁶ He justified it by saying that making responsible and informed reproductive decisions is a way for the parents to fulfil their moral obligation to ensure the well-being of the offspring. He argues further that genome editing technologies could prevent suffering by preventing individuals from leading lives full of suffering, or significant hardship, from existing in the first place. More specifically, this means a parent will spare her children unnecessary suffering by passing up those genes that are harmful, either through mutations or predispositions.

Also, Savulescu argues for the need to have parental autonomy in reproductive decision-making. His premise is that parents should have free choices to make moral uses of the

³³ Kant, Immanuel. *Groundwork of the Metaphysics of Morals* H. J. Paton (trans.), New York: Harper and Row. 1964, 89-90.

³⁴ Savulescu, Julian. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics*, 15(5-6), (2001); 413-426.

³⁵Ibid., 420.

³⁶ Ingmar Persson and Julian Savulescu. "Unfit for the Future: Human Nature, Scientific Progress, and the Need for Moral Enhancement." In Julian Savulescu J, Ruud ter Meulen, and Guy Kahane (eds.), *Enhancing Human Capabilities*. Blackwell, 2011, 486-500.

HGE technology, guided by the best interests of their children and beneficence and well-being. Moreover, he is of the view that using human genome enhancement technologies can promote genetic diversity of human society. By selecting desirable traits in offspring, Savulescu believe parents can contribute to the promotion of genetic diversity and the evolution of the human species. Therefore, the responsible use of genetic technologies can lead to a more diverse and resilient human population.

By arguing for the possibility that genetic technologies could be used to benefit future generations regarding health and well-being, Savulescu brings out the bright side of responsible reproductive decisions. Some of the weaknesses in his position include genetic discrimination, as it devalues some traits, which are some of the unintended consequences that come with the position. Another example is the safety of the edited embryo.

It can also be the case that genetic editing of an embryo is done in the wrong place, which will result in some cells bearing the edit while others do not. Moreover, in a genetically edited embryo, the edition brings about changes that affect every cell in the baby's body. The impact of the edition goes a long way as it is passed on to the edited baby's posterity and it keeps like that, disabling cum giving physical and mental pain to the person involved and their posterity. This problem may also be referred to as the unborn person and future generations' problem.

Procreation provides individuals with the opportunity to create value in the world by creating new life. This argument is premised on the claim that life is of value, and through the raising of a child, it is possible for an individual to bring positive value into the world.³⁷ Another argument is that those who can offer children a proper environment—being, of course, nurturing and supportive—ought to. Here, the argument is based on the duty of parenting.³⁸

Also, procreation is necessary for the survival of humanity and perpetuation of its species. This perspective pays attention to the necessity of providing for a future generation to build society.³⁹ Lastly, a person can desire to have children and that fulfilling this desire could lead to personal fulfilment and happiness; therefore, individuals should be allowed to use the Human genome editing technologies to fulfil their desires of procreation.⁴⁰

3.2 Arguments on human dignity in support of HGE

Ronald Dworkin is a famous legal philosopher who has enormous contributions to ethics and morality. Relating this to human genome editing, his arguments brought seminal contributions to the debate by focusing on moral dimensions. Indeed, his philosophies really focus on the question of human dignity. Human dignity can simply be explained to refer to the natural capability of a human being to possess reason and use it fundamentally in making moral decisions. He says, therefore, that they have a right to make choices concerning their own lives, including such aspects as genetics. In his seminal work *Life's Dominion*, Dworkin tried to argue that dignity

³⁷ Kavka, Gregory. "The Paradox of Future Individuals." *Philosophy and Public Affairs*, Vol. 11, No.2, (1982); 93-112.

³⁸ Feinberg, J. In W. Aiken & H. LaFollette (Eds.), *Whose Child? Children's Rights, Parental Authority, and State Power*. Totowa, NJ: Rowman and Littlefield. 124-153, 1980.

³⁹ Glover, J. *Future People and Us*. In J. Glover (Ed.), *Utilitarianism and its Critics*. New York: Macmillan. 107-127, 1984.

⁴⁰ Overall, C. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics*, 26(1), 1-14, 2012.

is related to the human right of personal sovereignty and self-determination, which extends to decisions on genetic enhancement and modification.⁴¹

Also, Dworkin argues that at the core of the morality of human gene editing is the principle of respect for human autonomy. He said that if the pursuit of genetic enhancements corresponds to one's conception of a life lived well by the individual, permission should be granted for that individual to do so. In this light, Dworkin's argument on human dignity and genetic enhancement represents the ethical urgency necessary in considering such a balance of individual liberties with its corresponding implications for society. Dworkin extends his philosophy in planning for equality and justice in human genome application to the moral aspects. He believes that society should be what it ought to be, adhering to equality and fairness, so that no one is left at a disadvantage based on genetic predisposition. He goes to say genetic enhancements should not deepen or raise the social inequalities or bring about unjust disparities in access to the use of genetic technologies. He says whatever resources individuals privately own, there shall be equality in.⁴²

In view of Dworkin's insights into editing the human genome, his arguments develop relevant implications for public policy and ethical oversight. Dworkin explains that democratic societies need robust public deliberations for setting ethical standards with regard to the responsible use of genetic technologies. He supports open mechanisms of decision-making that would deal first with the collective well-being, avoiding possible misapplications of genetic engineering.⁴³

By putting increased emphasis on public deliberation and ethical oversight, Dworkin is providing the regulatory frameworks for dealing with the ethical, legal, and social consequences related to human genome editing. The argument is underlined by the importance of informed public discourse and the creation of ethical guidelines that set forth how genetic technologies should be used in such a way that at least will remain in the rubric of values and moral principles of society

3.3 *Argument on human dignity, autonomy and equality against HGE*

A prominent German philosopher, Jürgen Habermas, also grounding his ideas on human dignity, instrumentalisation of life, and consequences for generations to come, provided arguments about the ethical concerns of human genome editing. In reality, as much as possible, Habermas underscores the very central principles of ethical discourse relating to biotechnological interventions in the biological existence of man: human dignity. He fears that such changes in the human genome, for purposes of enhancement, would undermine the dignity intrinsic in a human person by making a living being become an object of manipulation or thingification.⁴⁴

Habermas links human dignity with the principle of autonomy and self-determination that would be at stake if a person were allowed genetic manipulation without their free will.⁴⁵ In

⁴¹ Ronald Dworkin. *Life's Dominion: An Argument about Abortion, Euthanasia, and Individual Freedom*. New York: Alfred a. Knoph. 1993, 15.

⁴² Ronald Dworkin. *Sovereign Virtue: The Theory and Practice of Equality*. Cambridge, Massachusetts: Harvard University Press. 2000, 65.

⁴³ Ibid., 15

⁴⁴ Jürgen, Habermas. *The Future of Human Nature*. Polity Press. 2003, 29-36.

⁴⁵ Ibid. 23-28.

this connection, central to Kant's ethical system too is the concept of dignity, which refers to the intrinsic value that human beings possess due to their capacity for rational moral deliberation.⁴⁶

Unlike material objects that can be assigned a price or instrumental value, dignity is a quality that cannot be quantified or compromised. Any appreciation of Kant's view of dignity needs to be framed within his broader ethical theory. For Kant, there exist two types of imperatives: hypothetical and categorical. Hypothetical imperatives are strictly conditional and entail the performance of certain actions if one or another aim is to be secured. By contrast, categorical imperatives are unconditional and require agents to perform certain acts quite regardless of any personal desires or goals whatever. It is under the rubric of the categorical imperative that Kant locates human dignity.⁴⁷

Kant distinguishes between things that have a price and things that have dignity. He states that everything has either a price or a dignity. Objects, animals, and even human inclinations or desires can have a price, meaning they are subject to comparison and exchange. However, persons, due to their autonomy, are not subject to such exchange. Their dignity makes them irreplaceable, incomparable, and beyond all calculation of price. Genetic enhancement tries to gain an advantage at the cost of human dignity because it can lead to a society in which the new human being is judged by his or her genetic makeup rather than on grounds of his worth as a person.

Another problem with regard to the critique of human genome editing by Habermas is instrumentalisation of human life. The instrumentalisation of human life can be explained as using human life as an object or means for achieving some end. He warns of how genetic interventions are making human life a mere object of manipulation or even a means to an end. He fears that such a view of humans, mainly through the prism of genetic makeup, risks the commodification of human existence: people being valued for genes, not humanness. In that respect, the commodification of human beings when it comes to human genome editing will involve participating in paid medical trials or editing one's gene for money's sake.

While explaining what human commodification does mean, Leandro Gaitan argues that the possibility of modifying personality by technical means could turn us into buyers and consumers of personality. As such, personality, which constitutes a core aspect of the self, could become a commodity.⁴⁸ The commodification of human life has already started posing a threat to the very moral fabric of society and according to Habermas may further enhance the existing inequalities and social injustices.

Moreover, in the view of Habermas, intergenerational effects from human genome editing are a matter of concern. He notices that decisions made today on enhancement genetic manipulation will have repercussions on very many future generations by setting a genetic heritage of humanity in ways that are not easy to forecast or control. Intergenerational justice is an important element of ethical decisions regarding editing of the human genome, according to Habermas. He argues that it is the interests and welfare of future generations, which must be borne in mind while making decisions on genetic interventions. He warns against any infliction of irreversible changes within the human genome, especially using enhancing genome technologies

⁴⁶ Kant, Immanuel. "Groundwork of the Metaphysics of Morals." *Cambridge Texts in the History of Philosophy*. (Transl. and Edited by Mary Gregor). Cambridge University Press. 1998, 42.

⁴⁷ Kant, Immanuel. "Groundwork of the Metaphysics of Morals." *Cambridge Texts in the History of Philosophy*. (Transl. and Edited by Mary Gregor). Cambridge University Press. 1998.

⁴⁸ Leandro, Gaitan. "The Commodification of Personality: Human Enhancement and Market Society." *Human Affairs*, Vol 31, No.1, (2021); 40-45.

for non-therapeutic purposes, with possible unforeseen future consequences on the fate of humankind.

The above study shows that consequentialist ethics and deontological ethics arguments as exemplified by the arguments of philosophers examined above do not adequately address the deeply relational and context-dependent nature of the ethical challenges that ensues from the use of genetic technologies for therapeutic and non-therapeutic purposes. In the following, this paper shall argue that care ethics through its argument on dependency and vulnerability within human relationships, provides a better, morally compelling justification for Human Genome Editing.

4. Argument on dependency and vulnerability

According to care ethics, human genetic interventions should be specially scrutinised to decide how they are affecting vulnerable populations, such as those with disabilities, socioeconomically less well-off groups of people, or even future generations, who cannot consent to the changes made. This is because care ethics tends to protect and care for the vulnerable populations rather than merely strive for the resorting to human genetic editing technological development for the sake of a good life. Basically, care ethics is a normative moral theory that focuses on the area of human life, which gives importance to relationships and dependencies.

Care ethics, rooted in feminist theory, challenges arguments on justifying human genome editing from deontological and consequentialist perspectives, citing that both schools of thought are only positioned on abstract principles and individual autonomy, arguing instead about the roles of empathy, compassion and relational dependence as crucial determinants of human choice of a good life and the use of human genome enhancement technology. It is in this very spirit that Nel Noddings argues that caring is the basis from which ethical decisions should be founded; giving primacy to response to the needs of others.⁴⁹

Moreover, care ethics is a moral theory that asserts the relationality and interdependence of human beings, while moral consequentialist and deontological arguments emphasises self-sufficiency and autonomy. From the cradle to the grave, human beings depends on one another for support physically, emotionally, and psychologically. This dependency does not describe any stage in life, such as childhood or old age; rather, it is a constant factor in human life. In tandem with this indubitable truth, Joan Tronto develops four phases of caring: caring about, taking care of, caregiving, and care receiving. All of these phases symbolise the interdependence of humans' existence.⁵⁰ Caregiving refers to the process of active engagement in the meeting of others' needs, while care receiving represents accepting care and hence reciprocal vulnerability and dependency.

The concept of vulnerability is central in care ethics and is a referent to susceptibility to harm common among all humans. In this regard, one is not talking about physical vulnerability only but also emotional and social vulnerabilities. According to care ethics, recognising our vulnerability and that of others is very important in decision-making on human genome editing.

⁴⁹ Noddings, Nel. "An Ethic of Caring." In *Caring: A Relational Approach to Ethics and Moral Education*, 2nd ed., University of California Press. 2013, 79-103.

⁵⁰ Tronto, Joan C. *Moral Boundaries: A Political Argument for an Ethic of Care*. New York and London: Routledge. 1993, 105-108.

Eva Kittay does this when she introduces the concept of dependency work, which valorizes caring for dependents as labor and directs a moral obligation to support caregivers and those in need.⁵¹

In care ethics, the recognition of human vulnerability goes much deeper with respect to the use of human genome enhancement technologies. Turning the other way around, this gives rise to a critique of societal structures that devalue or ignore care work, due to a reluctance actually to face human fragility and dependency as weaknesses in a culture that prizes independence. Care ethics challenges this by asserting that, so far as the human genome editing is concerned, vulnerability is an inseparable condition of the human nature and has to be especially cared for. Also, human society's moral and social systems should be designed in a manner where interdependence and mutual care are facilitated.

Furthermore, care ethics argues that decisions about genome editing have profound implications for families, communities, and future generations. As it is the case that the decision to edit the genome of an embryo is not solely a matter of parental choice. It impacts the future children, their potential siblings, extended family, and society at large. For example, when an embryo is genetically edited, the edition brings about changes that affect every cell in the baby's body. The effect of the edition goes a long way as it is passed down to the edited baby's posterity and it continues like that causing disable cum physical and mental pain to the baby involved and its posterity. It can also be stated as that of the unborn and future generations. Germline editing is usually very adverse and destructive in its outcome in many cases. Therefore, care ethics focuses on deliberation in which the voices and the concerns of all these stakeholders are included and valued. This relational approach makes sure that decision making is oriented towards collective well-being and not only focused on desires of the individual.⁵²

Context is another important factor which care ethics points out. The application of human genome editing technologies is also raised as moral questions which are also inextricably and contextually linked. Care ethics insists that genome editing shall be understood within the context of each particular individual's community, circumstances, history, and cultural origin. For example, the ethical acceptability of genome editing may lie far apart across cultural and social contexts. Whereas for some, human genetic manipulations are taboo in their societies because of strong cultural or religious objections, for many, like the Ramsey Colloquium, it will be very lenient or even supportive.⁵³ It is precisely this sort of contextual variation to which care ethics enjoins strong sensitivity, warning against the imposition of a one-size-fits-all ethical framework.

Further, care ethics in its commitment to social justice and recognition of the interdependency of all members of human society argues for the importance of considering the socio-economic context within the moral choice about human genome editing. Therefore, access to technologies of human genome editing is likely to be very unequally distributed, increasing

⁵¹ Kittay, F. Eva. *Love's Labour: Essays on Women, Equality and Dependency*. New York and London: Routledge. 1999, 57-82.

⁵² Kittay, F. Eva. *Love's Labour: Essays on Women, Equality and Dependency*. (2nd ed.). New York and London: Routledge. 34-56, 2020.

⁵³ The Ramsey colloquium seeks to address the moral justification of HGE from a perspective that combines religious thought with secular ethical reasoning. One of the most potent moral arguments made by the Ramsey Colloquium is the caution against 'playing God'—a phrase that captures the unease with overstepping boundaries traditionally ascribed to divine providence. They express concern that genome editing represent6s a significant departure from accepting the givenness of the human condition, potentially leading to a rejection of the limitations and vulnerabilities that are part of the human experience.⁵³ The group emphasises the importance of respecting the natural order and warns against the hubris of assuming complete control over our biological destiny. Ramsey Colloquium. The universal declaration of human rights fifty years later: a statement of the Ramsey Colloquium. 1998, 18-22. <http://www.leaderu.com/ftissues/ft9804/articles/ramsey.html>.

already huge inequalities in human societies. To curtail this problem, vital policies should be made which will enable the gains that come with the application of genome editing for all, not just a few, privileged persons. For instance, in Africa, as at June 2024, about 429 million people are living below the extreme poverty line of \$2.15 a day.⁵⁴ This represent more than 48 percent of Africa's population who are vulnerable due to poverty.⁵⁵ As it is the case that poverty is one of the wings upon which diseases thrive, due to Africa being the poverty capital of the world continent, it has the highest number of sickle cell traits: about 80 percent of sickle cell births happens in sub-Saharan Africa. Gene therapies for treating sickle cell diseases such as Casgevy and Lyfgenia costs \$2.2 million and costs \$3.1 million respectively. This makes it inaccessible to the poor sickle cell patients in Africa.⁵⁶

Care ethics, by focusing on the socio-economic context of the Africa continent so as to determine its variables of those who are vulnerable and dependent as indicated in the above paragraph will make sure that gene therapies for treating sickle cell diseases are available and accessible to poor sickle cell patients in Africa by *engaging with concerned healthcare providers within and outside the continent, the sickle cell patients, and African state leaders* to understand the impact of the high cost non-therapeutic genome editing on the patients, their families, the continent and the world at large and discuss potential and viable solutions such as subsidizing the price of gene therapies and giving out health loans.

5. Conclusion

The paper has shown that moral problems of human genome editing are the basic challenges that emanate from the use of genome editing technologies by humans for therapeutic or non-therapeutic purposes. In ethics, basically, and bioethics in particular, the moral justification of human genome editing has raised pertinent moral issues, problems and questions which has elicited different arguments from the consequentialist (utilitarian) and non-consequentialist (deontological) perspectives for their justification. The paper argued that consequentialist ethics and deontological ethics arguments as exemplified by the arguments of philosophers and bioethicists shows that arguments from the consequentialist and deontological perspectives do not adequately address the deeply relational and context-dependent nature of the ethical challenges that ensues from the use of human genome editing technologies for therapeutic and non-therapeutic purposes.

Therefore, the paper argued that care ethics through its argument on dependency and vulnerability within human relationships, provides a better, morally compelling justification for human genome editing. In conclusion, the paper argued that human genome editing has the potential to usher in a new era of human health and well-being, especially by following the care ethics perspectives to formulate policies about the production, availability and application of

⁵⁴Saifaddin Galal. "Extreme Poverty as Share of Global Population in Africa 2024, by County." *Statista*. 2024. Accessed on 21st June, 2024 at <https://www.statista.com/statistics/1228553/extreme-poverty-as-share-of-global-population-in-africa-by-country/#:~:text=Poverty%20levels%20remain%20high%20despite,below%20the%20extreme%20poverty%20line>.

⁵⁵ Children International. "Facts and Statistics about Poverty in Africa." Accessed on 21st June 2024 at <https://www.children.org/global-poverty/global-poverty-facts/africa>.

⁵⁶ Oluwatosin, Adesoye. "We Must Stop Neglecting Africa in the Global Fight against Sickle Cell." *Sickle Cell Disease*. *Bionews*. 2023. Accessed on June 21st, 2024 at <https://sicklecellaneamianews.com/columns/we-must-stop-neglecting-africa-global-fight-sickle-cell-disease/>.

human genome editing technologies and medicines, for the care of all human creatures, including those who are dependent and vulnerable.

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