INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 14, Issue 10, (2024) E-ISSN: 2222-6990

Study of Gender Differences in Perception and Acceptance of Bioethical Issues

Rou Tang

University of California, Irvine204 Aldrich Hall Irvine, CA 92697-1075

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v14-i10/23387 DOI:10.6007/IJARBSS/v14-i10/23387

Published Date: 26 October 2024

Abstract

This study examines gender differences in the perception and acceptance of bioethical issues, focusing on gene editing and cloning technologies. Previous studies have fallen short of explaining how gender influences bioethical views, leaving a knowledge gap in understanding public attitudes about accepting emerging biotechnologies. For this reason, we conducted a cross-sectional survey among 110 participants, 50 of whom were men and 60 of whom were women, using an online questionnaire in September 2024. Descriptive statistics analyses were made, along with one-way ANOVA. The results indicate that gene editing is more accepted by women, which could be related to reproductive health and hereditary problems. Men view cloning more positively, probably because of the male desire to leave behind a genetic legacy. This research would add to the knowledge of bioethics regarding differences between genders in making ethical decisions. It thus can be used as a keystone toward much more detailed studies. Insights from the study could help develop bioethical policies and educational programs that are more sensitive to the differences that gender entails.

Keywords: Gender Differences, Bioethics, Gene Editing, Perception, Acceptance

Introduction

Research Background

In the 21st century, rapid advancements in science and technology have brought new bioethical challenges, often conflicting with traditional moral values. Innovations like stem cell research, genetic engineering, and cloning have raised ethical concerns, especially about patient privacy and data management in medicine (Williams, 2020). Tools like CRISPR-Cas9, which enable precise genetic editing, have sparked debates on human enhancement (Piergentili et al., 2021). Each new technology introduces ethical dilemmas that challenge our understanding of humanity, placing bioethics at the center of discussions on human development and moral values. Exploring diversity is essential for understanding the broader implications of bioethical debates and for developing more inclusive and balanced approaches to those issues.

Bioethics serves as a vital topic that aids in shaping society and advancing the sciences. Firstly, moral constraints are crucial for regulating technological advancement, as it can

progress beyond the limits of acceptable ethical boundaries. Experts assert that globalization and the actualization of advanced technological tools demand comparative ethical accountability to avoid negative repercussions (D'Cruz et al., 2022). Second, bioethics serves an essential function of guarding human rights and human dignity, especially on issues of reproductive technology and genetic engineering. However, like all technologies, these present certain dangers of exploitation, discrimination, and dehumanization if not well governed. Besides, individual perceptions of bioethical issues can vary greatly, demographic differences might play a crucial role in shaping attitudes toward controversial topics such as genetic engineering or reproductive rights. For instance, on the issue of human gene editing, people from different countries, religions, beliefs, and living environments all hold various opinions (Joseph et al., 2022). Exploring diversity is essential for understanding the broader implications of bioethical debates and for developing more inclusive and balanced approaches to those issues.

Purpose and Significance of the Study

Despite progress, much remains unknown about bioethical concerns across different demographics, particularly regarding gender. While some studies have explored gender differences in perceptions of specific ethical issues like reproductive or end-of-life decisions, few have addressed a broader range of bioethical topics (Beatty et al., 2023). This paper aims to explore how gender influences perceptions and management of various bioethical concerns to enhance our understanding of these dynamics.

Theoretically, this research seeks to advance knowledge in bioethics and gender studies by examining how gender differences shape ethical perspectives. It will offer insights into how societal and cultural factors influence these views and help develop ethical models that reflect diverse perspectives. The study also aims to contribute to gender-sensitive approaches in ethical decision-making and policy development. Practically, understanding gender differences in bioethical perceptions can lead to more inclusive policies in science and society. It can help the government create more effective strategies that cater to the needs of all genders, fostering better community understanding. By highlighting the role of gender in bioethics, this study aims to reduce conflicts and promote a more balanced dialogue on ethical issues.

Method

Study Design

The present study has employed a cross-sectional survey design to research differences related to gender in the perception and acceptance of several bioethical issues, with a particular emphasis on genetic screening, gene editing, cloning, and embryonic stem cell research. This is especially suitable for cross-sectional design, which reflects participants' opinions at one time and allows testing of the association between gender and bioethics views. This design allowed a timely and relevant analysis of fast-moving bioethical discussions around recent biotechnological advances. Quantitative data were collected using a structured online questionnaire in September 2024, disseminated through WeChat, one of China's most popular social media usages.

Questionnaire Design

The questionnaire collected demographic information and participants' perceptions of various bioethical issues, organized into six sections: (1) Personal Information, (2) Genetic Screening, (3) Gene Editing, (4) Cloning Technology, (5) Embryonic Stem Cell Research, and (6) Summary of Bioethical Perceptions. Each section focused on the ethical considerations of these technologies and assessed the influence of gender on perceptions. An introductory overview of each topic was provided to ensure understanding before answering the perception questions.

The questionnaire included both closed-ended questions (using Likert scales and multiple-choice formats) to gauge agreement or disagreement with bioethical statements and open-ended questions for participants to elaborate on their reasoning regarding gender and ethical perspectives. These questions were developed based on a thorough literature review of contemporary bioethical debates, ensuring their relevance to discussions on genetic editing, screening, cloning, and stem cell research. A pilot test was conducted on September 7, 2024, with five respondents, leading to minor adjustments based on their feedback before full-scale distribution. Examples of questions from the genetic screening section are presented in Table 1.

Table 1
Genetic Screening Section Questions Example

Question Number	Question description	Answer design
1	Do you believe that genetic screening raises ethical issues?	Single choice: Yes (1); No (2); No understanding (3)
2	How serious do you think the ethical issues related to genetic screening could be?	Single choice: None (1); Moderately serious (2); Very serious (3); No understanding (4)
3	Genetic screening technology can detect hereditary diseases and identify potential risks, helping people prevent illness or receive early treatment, which can reduce disease incidence and improve quality of life. It can also be used for embryo screening, allowing parents to make reproductive decisions. However, genetic screening involves personal health data, improper management could lead to data disclosure. Embryo screening may widen the gap between the wealthy and the poor, as well as health status,	Single choice: Genetic screening helps individuals make informed health decisions and should be encouraged (1); Genetic screening should only be used to identify high-risk groups for serious hereditary diseases and must be strictly regulated (2); Genetic screening has both positive and negative implications at this stage, neither support nor oppose its use and development (3);

	parents tend to choose better genes for their children, which affecting social equity. Based on the above information, what is your attitude toward genetic screening?	Genetic screening raises significant ethical and social concerns and should be prohibited (4)

Data Collection

The sample included 50 males and 60 females, totaling 110 participants, providing near gender balance, essential for comparing bioethical perceptions. Participants were selected through convenience sampling, using personal networks and WeChat groups to streamline recruitment. They came from diverse occupational backgrounds, including students, health professionals, company workers, and teachers, offering a range of perspectives on bioethical issues.

Data collection was conducted via WeChat, utilizing its extensive user base in China, which ensured easy access and familiarity for respondents. The online format allowed participants to complete the survey at their convenience during September 2024, boosting response rates by removing logistical barriers. Informed consent was obtained from all participants, ensuring confidentiality and the option to withdraw at any time. No incentives were offered, confirming that responses were entirely voluntary and unbiased. Table 2 summarizes the respondents' details.

Table 2
Summary of Sample Distribution

Subject	Item	Sample size	Percent
Gender	Female	60	45.45%
	Male	50	54.55%
Age	Under 18 years old	6	5.45%
	18-25 years old	19	17.27%
	26-35 years old	15	13.64%
	36-45 years old	23	20.91%
	Over 46 years old	47	42.73%
Education Attainment	High school	6	5.45%
	2 years college	19	17.27%
	Bachelor’s degree	15	13.64%

	Master's degree	23	20.91%
	Doctor's degree	47	42.73%
	Student	15	13.64%
	Scientific researcher	3	2.73%
	Healthcare worker	7	6.36%
	Teacher/Educator	7	6.36%
Occupation	Company employee	37	33.64%
	Self-employed	6	5.45%
	Freelancer	22	20%
	Other	13	11.82%
	Total	110	

Results

Data Analysis Method

Data was analyzed by SPSS PRO statistical software, a widely recognized tool for analyzing quantitative data. The descriptive statistics for all demographic variables were addressed, including age, education level of occupation, and an overview of the characteristics of the participant pool. The key issues that were gauged in the primary analysis were genetic screening, gene editing, cloning technology, and embryonic stem cell research with male and female respondents using One-way ANOVA. This approach has been adopted since this type of data analytical technique helps compare mean differences between two or more groups, in this case, gender groups. Responses to the Likert scale questions were numerically coded, with each level of agreement having a value assigned, which allowed quantitative analysis.

Also, One-way ANOVA analyses were conducted to assess whether there are significant differences related to bioethical perceptions between genders. The probability level was selected for $p < 0.05$. Thematic analysis identified common patterns of responses and insightful comments on the role of gender for the open-ended questions about bioethical perceptions. In this mixed-methods design, deeper qualitative insights enhanced the quantitative results, offering a more holistic understanding of the research questions.

Data Analysis Result

Genetic Screening

Table 3
Analysis results of gender differences in genetic screening perception

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Genetic Screening Perception	Female	60	1.992	0.927	F=2.478 P=0.118	F=2.448 P=0.121
	Male	50	2.28	0.991		
	Total	110	2.123	0.963		

Table 4
Analysis results of gender differences in genetic screening acceptance

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Genetic Screening Acceptance	Female	60	1.783	0.691	F=2.084 P=0.152	F=1.947 P=0.167
	Male	50	2.02	1.02		
	Total	110	1.891	0.86		

For both perception and acceptance of genetic screening (Table 3 and Table 4), the mean values for males are higher than those for females, which indicates that females have a higher acceptance than males for genetic screening. Still, neither difference is statistically significant ($p > 0.05$). This suggests that gender differences in perception and acceptance are not substantial based on this data.

Gene Editing

Table 5
Analysis results of gender differences in gene editing perception

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Gene Editing Perception	Female	60	1.942	0.803	F=0.243 P=0.623	F=0.239 P=0.626
	Male	50	2.02	0.863		
	Total	110	1.977	0.828		

Table 6
Analysis results of gender differences in gene editing acceptance

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Gene Editing Acceptance	Female	60	2.1	0.775	F=3.933 P=0.50**	F=3.903 P=0.051*
	Male	50	2.4	0.808		
	Total	110	2.236	0.801		

For both perception and acceptance of gene editing (Table 5 and Table 6), the mean values for males are higher than those for females, but the difference for perception is not

statistically significant (p > 0.05). This suggests that gender differences in perception are not substantial based on this data. The P-value for the gender difference in acceptance shows a 5% significance level, indicating that males and females differ in their acceptance of gene editing, and females have a stronger acceptance of ethical issues related to gene editing.

Cloning

Table 7

Analysis results of gender differences in cloning perception

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Cloning Perception	Female	60	1.875	0.668	F=0.225 P=0.636	F=0.22 P=0.640
	Male	50	1.81	0.769		
	Total	110	1.845	0.713		

Table 8

Analysis results of gender differences in cloning acceptance

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Cloning Acceptance	Female	60	2.433	0.81	F=9.901 P=0.002***	F=10.03 P=0.002***
	Male	50	1.96	0.755		
	Total	110	2.218	0.817		

For both perception and acceptance of cloning (Table 7 and Table 8), the mean values for females are higher than those for males. Still, the difference in perception is not statistically significant (p > 0.05). This suggests that gender differences in perception are not substantial based on this data. The P-value for the gender difference in acceptance shows a 1% significance level, indicating that males and females differ in their acceptance of cloning, and males have a stronger acceptance of ethical issues related to cloning.

Embryonic Stem Cell

Table 9

Analysis results of gender differences in gene editing perception

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Embryonic Stem Cell Perception	Female	60	2.208	0.917	F=0.605 P=0.438	F=0.602 P=0.440
	Male	50	2.07	0.942		
	Total	110	2.145	0.927		

Table 10
Analysis results of gender differences in gene editing acceptance

Subject	Gender	Sample size	Mean value	Standard deviation	ANOVA test	Welch's ANOVA test
Embryonic Stem Cell Acceptance	Female	60	2.083	0.809	F=0.452 P=0.503	F=0.454 P=0.502
	Male	50	1.98	0.795		
	Total	110	2.036	0.801		

For both perception and acceptance of embryonic stem cell technology (Table 9 and Table 10), the mean values for females are higher than those for males, which indicates that males have a higher acceptance than females for embryonic stem cell technology. Still, neither difference is statistically significant ($p > 0.05$). This suggests that gender differences in perception and acceptance are not substantial based on this data.

Findings and Discussion

Reasons for Significant Gender Differences in Gene Editing

Females tend to be more supportive of gene editing than males, likely due to concerns about reproductive health and hereditary issues. As primary caregivers, they prioritize their children's health, seeing gene editing as a tool to reduce risks related to hereditary diseases. This technology offers a strategy to ensure their children's long-term well-being by minimizing health complications, especially during pregnancy, when stakes are high. Women's acceptance of gene editing also relates to its potential to lower risks of conditions like hereditary breast cancer (Pfledderer et al., 2022), aligning with their focus on advancing family health.

Open-ended responses also highlighted women's greater acceptance of gene editing due to their caregiving roles. One respondent noted that a mother's focus on her children's physical and mental health drives her interest in reducing reproductive risks through gene editing. As one participant remarked, "Women are more likely to use these biotechnologies to improve their children's quality of life," reflecting their desire to promote healthier futures for their families.

Conversely, women showed more hesitation toward cloning technology, which they often view as conflicting with natural reproduction. One respondent said, "Men focus on passing their genes on, while women prioritize nurturing healthy offspring," indicating that men may be more drawn to cloning for its potential in genetic legacy. This difference reflects women's stronger ethical and emotional reservations about cloning.

Reasons for Significant Gender Differences in Cloning

Females generally show lower acceptance of cloning technology compared to males, likely due to their ethical and emotional concerns regarding life's origins. They often view cloning and embryonic stem cell research as intrusions into natural reproduction, which can cause significant unease. Many women regard procreation as a sacred, natural process, and perceive cloning as a disruption to this. Their maternal instincts and ethical values strongly shape their attitudes toward these technologies. In contrast, men tend to hold more favorable views on cloning, focusing less on ethical concerns and more on the potential for genetic

legacy (Gaskell et al., 2003). This divergence highlights a gender-based difference in the ethical evaluation of cloning, with women more apprehensive about its impact on human rights and individuality.

Open-ended responses support these findings, revealing that women's focus on safeguarding child health drives their acceptance of gene editing, while their caution toward cloning stems from its perceived disruption of natural life processes. In contrast, men's interest in preserving their genetic legacy makes them more open to cloning and stem cell technologies. The gap in gender perspectives appears to be influenced more by factors like education and familiarity with these technologies than by inherent gender differences.

Reasons for Insignificant Gender Differences in Perception

Though there are important variations in the acceptance of gene editing and cloning, distinctions relating to gender in general perception seem to be less obvious. Several factors could explain why the perception gap is relatively small. Firstly, in countries such as China, gene editing and cloning are still in their developmental phases. The public's understanding of these technologies is still restricted, with many people relying on mass media and popular science for information instead of professional insights. As a result, men and women may perceive the topic superficially, which could lead to only slight differences in perceptions. In addition, the survey only included a small number of experts from the medical or biological realms. Without the technical know-how to appraise these technologies in depth, individuals of all genders may find it hard to arrive at detailed opinions. This situation has led to important distinctions in perception that tend to require more detailed expertise, making gender-based contrasts less obvious in the general population.

Similarly, open-ended responses indicate the nearly nonexistent gender differences in perception. One of the respondents claimed, "*Gender differences could lead to different views on bioethics, but I believe the difference will be quite insignificant. Everyone's values regarding ethics are more heavily influenced by their family's education and surroundings, and less influenced by gender*". This implies that although men and women can have varying views on technologies, their predominant perceptions of biotechnology are formed mainly by personal experiences and environmental conditions rather than their gender alone.

Conclusion

The study found significant gender-based differences in the acceptance of gene editing and cloning technologies. Women were more accepting of gene editing, likely due to concerns about reproductive health, while men showed more support for cloning, possibly linked to the desire to continue their genetic legacy. These results suggest that gender plays a crucial role in shaping ethical perceptions of biotechnology, influenced by traditional social roles—women as caregivers and men focused on legacy. These insights emphasize the need for gender-sensitive approaches in bioethical discussions.

Theoretically, this research contributes to bioethics by highlighting how gender affects ethical decision-making, especially in biotechnologies like gene editing and cloning. It builds on existing studies about gender differences in ethical perspectives, suggesting that social roles and cultural expectations significantly impact ethical judgments. Further research is needed to explore the social and psychological factors behind these gender differences and

to confirm whether caregiving roles indeed shape attitudes toward biotechnological interventions.

Practically, these findings can guide policymakers in developing targeted strategies for biotechnology and ethics. Understanding gender-specific views can lead to more responsive policy frameworks. For example, addressing women's concerns about reproductive health in embryonic stem cell technology or focusing on the broader ethical implications of cloning in educational initiatives for men. Gender-sensitive bioethical policies will support more inclusive decision-making in biotechnology.

The study's limitations include a small sample size, only 110 participants and a lack of diversity in participants' backgrounds, which may affect the generalizability of the results. Most participants lacked a biological or medical background, possibly influencing their understanding of the issues. Future research should include a larger, more diverse sample, with professionals in biology, medicine, and ethics, to better understand the impact of expertise on bioethical perceptions. Additionally, the explanations for gender differences remain speculative and require further investigation through qualitative methods like interviews or focus groups (Tenny et al., 2022).. Longitudinal studies could also explore how these gender-based perceptions evolve as biotechnology advances.

References

Beatty, A. E., Driessen, E. P., Clark, A. D., Costello, R. A., Ewell, S., Sheritta Fagbodun, Klabacka, R. L., Lamb, T., Mulligan, K., Henning, J. A., & Ballen, C. J. (2023). Biology Instructors See Value in Discussing Controversial Topics but Fear Personal and Professional Consequences. *CBE- Life Sciences Education*, *22*(3). https://doi.org/10.1187/cbe.22-06-0108

Bonetti, G., Donato, K., Medori, M. C., Dhuli, K., Henehan, G., Brown, R., Sieving, P., Sykora, P., Marks, R., Falsini, B., Capodicasa, N., Miertus, S., Lorusso, L., Dondossola, D., Tartaglia, G. M., Ergoren, M. C., Dundar, M., Michelini, S., Malacarne, D., & Beccari, T. (2023). Human Cloning: Biology, Ethics, and Social Implications. *PubMed*, *174*(Suppl 2(6)), 230–235. https://doi.org/10.7417/ct.2023.2492

D'Cruz, P., Du, S., Noronha, E., Parboteeah, K. P., Trittin-Ulbrich, H., & Whelan, G. (2022). Technology, Megatrends, and Work: Thoughts on the Future of Business Ethics. *Journal of Business Ethics*, *180*(3). https://link.springer.com/article/10.1007/s10551-022-05240-9

Gaskell, G., Allum, N., & Stares, S. (2003). Europeans and Biotechnology in 2002. In *European Union*. https://europa.eu/eurobarometer/surveys/detail/347

Joseph, A. M., Karas, M., Ramadan, Y., Joubran, E., & Jacobs, R. J. (2022). Ethical Perspectives of Therapeutic Human Genome Editing from Multiple and Diverse Viewpoints: a Scoping Review. *Cureus*, *14*(11). National Library of Medicine. https://doi.org/10.7759/cureus.31927

Piergentili, R., Del Rio, A., Signore, F., Umani Ronchi, F., Marinelli, E., & Zaami, S. (2021). CRISPR-Cas and Its Wide-Ranging Applications: From Human Genome Editing to Environmental Implications, Technical Limitations, Hazards and Bioethical Issues. *Cells*, *10*(5), 969. https://doi.org/10.3390/cells10050969

Pfledderer, C. D., Gren, L. H., Frost, C. J., Andrulis, I. L., Chung, W. K., Genkinger, J., Glendon, G., Hopper, J. L., John, E. M., Southey, M., Terry, M. B., & Daly, M. B. (2022). Women's

thoughts on receiving and sharing genetic information: Considerations for genetic counseling. *Journal of Genetic Counseling*, *31*(6), 1249–1260. https://doi.org/10.1002/jgc4.1599

Tenny, S., Brannan, J., & Brannan, G. (2022, September 18). *Qualitative Study*. National Library of Medicine; StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK470395/

Williams, R. K. (2020). *A Bioethical Paradigm for Enhanced, Post or Transhumans in Medicine and Biological Research - ProQuest*. Www.proquest.com. https://www.proquest.com/openview/6fb57d45ce081a91e68a3eb634938e1c/1?pq-origsite=gscholar&cbl=18750&diss=y