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Original Article

Assisted Reproductive Technologies and Oocyte Donation

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Abstract

Background: A number of important problems remain unresolved in the field of assisted reproductive technologies (ART) using germ cells from a single donor. We aimed to assess attitudes about the use of sex gamete donation in ART in different social groups including medical workers, oocyte recipients, and oocyte donors.

Methods: To achieve this goal, we surveyed 286 participants from seven countries. Of them, 190 were medical workers from ART clinics (respondents from seven countries), 45 were oocyte recipients, and 51 were oocyte donors.

Results: The main motive for oocyte donation was financial compensation, which draws attention to the social disadvantage of the donor population. Medical workers with more than 5 years of work experience (79.7%) supported the use of programs tracking donor sex cells and limiting the use of oocyte donors.

Conclusion: The willingness and consent of the surveyed medical workers and oocyte recipients to use the donor material and create a unified registry of donor sex cells demonstrates the importance of this issue.

Keywords: Gamete donation; Donation motives; Donor rights; Oocyte donors; Assisted reproductive technologies

Introduction

For Over the past few decades, scientific and technological progress has rapidly created unlimited opportunities in the fields of medicine and genetics (1). The frequency of infertility is 15% of women of reproductive age, and 28% of patients are unable to use their own genetic material for reproductive purposes (2).

The donation of sex cells (oocytes) is a frequently used and relatively affordable (including financial) procedure for the treatment of infertility in women (3). The concept of oocyte donation includes the use of a donor gamete from a healthy young woman who, for various reasons, cannot receive an egg using IVF (4).

Donation is performed in cases of an absence of oocytes due to natural menopause; premature ovarian failure syndrome and other reasons (5).

The donation of sex cells in different countries is regulated by national legislation, which often differs significantly. As infertility treatments, in par-

ticular in vitro fertilization, become more common, there are ethical, moral and legal issues (6). In Kazakhstan, ART procedures are regulated by several laws (5-8). The donation of sex cells (oocytes and sperm) and embryos has been successfully used in IVF clinics (9, 10). Despite this, many questions remain related to the use of donor oocytes, including ethical ones (11).

We aimed to determine the importance of gamete donation in ART in Kazakhstan and discuss oocyte donation with different social groups including medical workers, oocyte recipients, and oocyte donors.

Methods

Participants and Data Collection Process

We used participant-level data collected at baseline from a Google questionnaire that was held between April 26 and August 15, 2021. The questionnaire was developed to gather detailed information on participants' attitudes, experiences, and motivations regarding oocyte donation and ART.

Participants (n=286) were recruited from three groups (medical workers, oocyte recipients, and oocyte donors) using representative sampling strategies. The sample consisted of 286 participants from the three groups who participated between April 26 and August 15, 2021.

Medical workers

The first group consisted of medical workers from ART clinics (n=190) (Table 1). Participants had to be employed in an ART clinic for at least 1 year and actively involved in reproductive health services, as obstetricians, gynecologists, embryologists, or ART clinic heads.

Table 1: Role, sample size, and descriptive statistics of participants in the medical worker group

Medical worker role	n	Female sex, %	Male sex, %	Work experience in ART, years, %		
				0-3	5-10	>10
Obstetrician-gynecologist	83	85.5	14.5	22.6	31	46.4
Andrologist-urologist	8	50	50	0	50	50
Embryologist	50	78	22	32	36	32
ART clinic head	36	72.2	25	8.3	16.7	75
Others	13	92.3	7.7	38.5	46.1	15.4
Total N	190	80.0	19.5	22.6	31.6	45.8

ART, assisted reproductive technologies; n, sample size for each role. Percentages might not add up to 100% due to rounding and missing data for sex and work experience.

Oocyte recipients

Women aged 37 years or older who had undergone or were undergoing oocyte donation procedures and had a clinical history of infertility or difficulty using their own oocytes. The second group consisted of oocyte recipients (n=45) aged 37–42 years and older. Of them, 37.5% were 37–41 years old and 62.5% were 42+ years. Among the interviewed recipients there were different pregnancy results: most respondents had pregnancy end in childbirth (38%) or gave no answer (24%); and reasons for utilizing donor cells: reduced ovarian reserve (38%), No ovarian reserve (25%) and age > 40 years (25%) were three most popular responses.

Oocyte donors

The third group consisted of oocyte donors (n=51). Donor age was 18–35 years. All surveyed donors had children of their own. Of them, 74.2% had already performed oocyte donation, while the other 25.8% were donating for the first time.

Exclusion criteria for the three groups

Medical workers: Those who had been employed for less than 1 year or who were not directly involved in ART services.

Oocyte recipients: Women who were under 37 years old or had no history of undergoing oocyte donation procedures.
Oocyte donors: Individuals with reproductive health issues or genetic disorders, or those who had no prior experience or intent to donate oocytes during the study period.
These criteria were applied to ensure that the sample represented the relevant population for assessing attitudes toward oocyte donation and ART procedures, and to improve the generalizability of the study's findings.

Recipients' psychological status

To understand the attitude of recipients to the problem under study, the following questions were asked: What feelings did you experience when you first heard about the need to use donor oocytes? What is your attitude toward the doctor who made the diagnosis and suggested the use of donor oocytes? Are you ready to accept such a child? Are you worried that the unborn child is genetically not your own?

Donor motives and attitude toward donation programs

The donors were asked the following questions to characterize their attitudes: How did you learn about the oocyte donation program? Do you know how many babies have been born using your oocytes? Are you ready to become an oocyte donor? Did you receive compensation for completing the donation program? Are you satisfied with the compensation? Do you know how many eggs have been received? How many times have you donated oocytes? Are you looking for customers on social networks? Have you thought about potentially meeting the children born as a result of your donation? How did you feel before joining the donation program? Is donor anonymity important to you?

Cross-sectional survey of study groups

To understand the general societal attitude toward the issue of oocyte donation, we asked the three groups of respondents' five main questions that could characterize the most significant aspects of the issue under study.
Questions: 1) What do you think patients want to know about donors? (This is the very first question about donors that recipients ask during the selection process.) 2) In your opinion, should the recipient's spouse know that donor material is being used? 3) What donor information is important to you? 4) Why do you think donors become donors? 5) Will the creation of a unified registry make it possible to keep records of the number of children resulting from a single donor?
A qualitative data analysis was performed using SPSS version 20 software (IBM Corp., Armonk, NY, USA).
This statistical software was employed to conduct both descriptive and inferential analyses, ensuring that the results were robust and could provide insights into the attitudes and behaviors of the three study groups (medical workers, oocyte recipients, and oocyte donors).
Descriptive Analysis: Basic descriptive statistics, including frequencies and percentages, were used to summarize participant demographics, donation motivations, and responses related to the use of oocyte donation in ART.
Inferential Analysis: To assess relationships between variables and draw inferences, several statistical tests were performed:
Chi-square tests (χ^2): Used to assess the association between categorical variables, such as the relationship between donor motivations and the willingness to donate again or between medical workers' experience and their support for a unified registry of donor gametes. The significance level was set at $P < 0.05$ for all tests.
Cramer's V coefficient: Applied to measure the strength of the association between categorical variables, especially where chi-square tests showed significant results.
Cross-tabulation analysis: Used to compare the responses of medical workers, oocyte recipients, and donors on specific questions regarding attitudes and perceptions of ART and oocyte donation.

Results

Characteristics of recipients' psychological status

The main reason a recipient participated in a donation program is a reproductive system problem. Upon being told the need to use donor oocytes for the first-time feelings of recipients were split and primarily negative, with 28% reporting powerlessness/despair, 25% - denial/disagreement and 19% - confusion. At the same time, 68% remained under the supervision and treatment of the doctor who informed them about the need to use donor oocytes, while 32% of patients went to other doctors and other clinics.

Donor motives and attitude toward donation program

The main reasons that encourage a woman to become a donor of her own oocytes are financial interest or a desire to help loved ones.

Of those donors who repeatedly participated in a donation program number of children were born using their eggs the overwhelming majority (77.8%) have an unknown number of children.

Of all respondents who participated in the donation program, 80% answered that they would be an egg donor again and 20% doubt their participation again. At the same time, 52.2% of donors had incomplete information about the number of received oocytes versus 44.8% who had complete information. Of all respondents surveyed, 29% indicated that they were donors in another country.

Only 32.1% of donors participated in the donation program only once. The majority participated more than once: 25% reported four or more times, while 21.4% reported two or three times. Of all respondents, only 12.9% were seeking oocyte recipients through social media, while 87.1% were not.

In 50% of cases, donors thought about potentially meeting the children resulting from their donation in the future, 33.3% did not, and 16.7% were not at all interested in knowing about it. Before joining the donation program, donors experienced different feelings. In addition, according to some studies, a significant proportion of donors worry about their health.

Among the donors, 54.8% did so anonymously, 41.9% did not think about it, and only 3.2% agreed to provide their information. According to Swedish scientists, most donors approve of non-anonymity.

Cross-sectional survey of study groups

In response to the question "What information about the donor is important to you," the medical workers and oocyte recipients identified three main indicators: health (90.5% and 68.8%), external signs (78.4% and 59.4%), and education (51.6% and 50.0%) (Table 2).

Table 2: Answers from medical workers and oocyte recipients regarding important donor information

What donor information is important to you?	Medical workers, %	Oocyte recipients, %
Health-related factors	90.5	68.8
Blood type and Rh factor	42.1	25.0
Phenotype	78.4	59.4
Education	51.6	50.0
Where she was born, where she lives	12.1	31.3
Whether she was a previous donor	22.6	15.6
How many children she has	0.0	34.4
Zhuz clan (in the Republic of Kazakhstan)	22.6	9.4

The probability of null hypothesis was 0%. The value of the χ^2 criterion was 87.34. The number of degrees of freedom was eight. The critical value of χ^2 at the significance level of P=0.01 was 20.09 (P<0.01). Cramer's coefficient was 0.322.

At the same time, the relationship between the studied characteristics was statistically significant, that is, moderate and direct (P<0.01). At the same time, the very first information that the respondents of these two groups wanted to know was the health of the future donor (71% and 35%), followed by external signs (18% and 33%). The relationship between signs was statistically significant, that is, moderate and direct (P<0.05). The probability of the null hypothesis was 0%. The value of the χ^2 criterion was 17.16. The number of degrees of freedom was seven. The critical value of χ^2 at the significance level (P=0.05) was 14.07 (P<0.05). The Cramer's coefficient was 0.362.

When answering the question "Should the spouse know that donor material is being used," the opinions of the two groups were divided. Medical workers answered this question positively (86.3%), while oocyte recipients answered negatively (44%). The relationship between the signs was statistically significant, that is, moderate, direct (medical workers believed that the spouse should know, while oocyte recipients did not) (P<0.01; Table 3).

Table 3: Answers from medical workers and oocyte recipients about spousal awareness of oocyte donation

In your opinion, should the spouse know that donor material is being used?	Medical workers, %	Oocyte recipients, %
Yes	86.3	37.5
No	3.7	43.8
I doubt it	10.0	18.8

The probability of the null hypothesis was 0%. The value of the χ^2 criterion was 56.57. The number of degrees of freedom was two (P<0.01). Cramer's coefficient was 0.528

Medical workers, taking into account their professional duties, strictly observing legal, medical and ethical standards, believed that it was impossible to hide information about the use of donor oocytes. Oocytes recipients were divided in their opinion: 43.8% did not want to tell their spouse that donor oocytes were used, and 37.5% agreed to inform their partner. This fact may testify to the level of trusting relationships in the family.

An interesting fact is that the answer to the question "Why does a donor become a donor" for respondents in all groups were identical. In their opinions, the most important and significant argument for which people become donors is likely income (Table 4). The rest of the reasons, according to the respondents, are less relevant, and there was a weak relationship between the signs (P>0.05).

Table 4: Answers from medical workers, oocyte recipients, and oocyte donors about donor motive

Why does a donor become a donor?	Medical workers, %	Oocyte recipients, %	Oocyte donors, %
Financial interest	81.6	78.1	80.0
Desire to help a relative	8.4	6.3	2.9
Desire to help a friend	1.6	3.1	0
Altruism	6.3	3.1	14.3
Sexual ambition	1.6	6.3	0.0
Other	0.5	3.1	2.9

The null hypothesis is accepted. The value of the χ^2 criterion was 12.3. The number of degrees of freedom was 10. The critical value of χ^2 at the significance level of P=0.05 was 18.307 (P>0.05). Cramer's coefficient was 0.201

All respondents answered positively to the question "Will the creation of a single registry allow keeping records of the number of children born from one donor" (Table 5).

Table 5: Answers from medical workers, oocyte recipients, and oocyte donors about the creation of a unified registry of sex gamete donors

Will the creation of a unified registry make it possible to keep records of the number of children born from each donor?	Medical workers, %	Oocyte recipients, %	Oocyte donors, %
Yes	75.8	53.1	34.3
No	3.7	12.5	31.4
It cannot guarantee my complete confidentiality	20.5	3.1	34.3
I do not care	0	15.6	0
I do not know	0	15.6	0

The probability of the null hypothesis was 0%. The value of the χ^2 criterion was 114.26. The number of degrees of freedom was eight. The critical value of χ^2 at the significance level of P=0.01 was 20.09 (P<0.01). Cramer's coefficient was 0.464

The creation of a unified registry of donors of sex cells, which accounts for the tracking of births from one donor, is an important issue. According to the oocyte donors, the creation of a single registry cannot guarantee complete anonymity; in fact, 31.4% feared information leakage. The relationship between the signs is moderate, and direct (the creation of a unified registry will allow accounting for the number of children born from one donor) (P<0.01).

Discussion

There are many views on the problem of the donation of germ cells: the moral right of a child conceived using donor material, reproductive freedom, freedom of choice, the right to donor secrecy and privacy, the couple, and the recipient's overall well-being (12, 13). Legal rights are associated with a number of practical, medical, and social problems, which in turn require balanced decision-making (14-16). The surveys made it possible to understand how the problem of oocyte donation is viewed and understood by various segments of the population from the medical community to the recipients and donors themselves.

Almost half of the respondent medical workers who are involved in reproductive health have been working in that field for >10 years, which allows an objective look at such a direction as oocyte donation. Their opinions about this issue are very important, particularly since 78% of them directly administered donation programs. Most of the medical worker respondents (60%) were positive about infertility treatment using donor oocytes.

It is noteworthy that all three parties are concerned about donor health. However, in studies performed in other countries such as Europe and the United States, the question of donor health does not arise among customers of donor sex cells. At the same time, the temperament and nature of gamete donors are of particular interest to recipients and their resulting offspring (17).

External data of the donor according to medical workers and oocyte donors are asked by recipients at appointments; according to donors, they are the most important in the donor selection process.

Studies have also indicated that most donors donate altruistically (18). In our study, the vast majority of respondents from all three groups answered that donation was chosen due to financial interest. In 93% of cases, oocyte donors received a reward, but in more than half of the cases, they were not satisfied with the amount of payments.

Our research shows that, in the overwhelming majority of respondents (86%), physicians consider it necessary and obligatory to inform the spouse that donor oocytes are being used. More than 54% of the recipients disagree or doubt this, mainly due to the fact that they can lose a child in a probable divorce from their spouse and that she will not be a mother. This information allows us to consider the imperfection of the legal regulation of family relations in the field of ART (5, 8).

It is especially important to note the problem of surrogacy, which in different countries has a different status at the legislative level. For example, in France, Germany and Spain, surrogate motherhood is prohibited, although in a number of countries (Great Britain, Denmark, India, the Netherlands) it is prohibited only on a commercial basis, but as altruistic it is possible and allowed (19). At the same time, studies in the field of surrogacy note that the main motive for becoming a surrogate mother in IVF programs remains financial interest (20), which coincides with the motives for donating oocytes.

Differences were revealed in the responses of respondents to the need to create a unified electronic registry of donor sex cells. In almost 80% of cases, the medical worker respondents answered that the creation of a registry is necessary. Among the recipients, 56% responded positively and 44% negatively. Among the donors, 36% responded positively and 64% responded negatively. This is due to the fear that the storage of their information in the electronic database cannot guarantee their complete confidentiality.

At the same time, more than 50% of donors do not think about potentially meeting their genetically close children in the future, the likelihood of closely related marriages, or the increased risk of hereditary diseases (21, 22).

A key limitation of this study as it was conducted within a specific cultural and regulatory context in Kazakhstan, making it difficult to generalize the findings to other countries with different ART regulations.

Conclusion

The results of this study provide an opportunity to consider the issue of creating a unified national database of donor reproductive cells. This will make it possible to control the use and limitation of the use of germ cells in the state and between clinics of assisted reproductive technologies. The willingness to introduce accounting for the use of donor material through the creation of the Unified Electronic Registry shows the awareness of the importance of this issue and the need to address it.

Future studies in different countries will allow a comparative analysis of data received from recipients and show this problem from a different perspective.

Ethics statement

The study was approved by the Ethics Committee of the Kazakhstan Medical University Higher School of Public Health (08-2021 dated February 16, 2021).

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Conflict of Interest

All authors declare no other competing interests.

References

1. Chalova LR, Lokshin VN (2020). [Mitochondrial replacement therapy: future or present?] *Reproductive Medicine*, 2 (43): 7-12.
2. Kashir J, Jones C, Child T, et al (2012). Viability assessment for artificial gametes: the need for

biomarkers of functional competency. *Biol Reprod*, 87 (5): 114.
3. Practice Committee of the American Society for Reproductive Medicine and the Practice Committee of the Society for Assisted Reproductive Technology (2013). Recommendations for gamete and embryo donation: a committee opinion. *Fertil Steril*, 99 (1): 47-62.e1.
4. Steptoe PC, Edwards RG (1978). Birth after the reimplantation of a human embryo. *Lancet*, 2 (8085): 366.
5. Healthcare Ministry of the Republic of Kazakhstan (2020). Order of December 15, 2020 No. KR DCM -272/2020 "On approval of the rules and conditions for the implementation of assisted reproductive methods and technologies". Adilet: Legal information system of regulatory legal acts of the Republic of Kazakhstan [cited 2024 Jan 21].
6. Negro F, Varone MC, Del Rio A (2020). Advances in medically-assisted procreation technologies: can malpractice claims and "reproductive damage" be identified. *Clin Ter*, 171 (3): e225-8.
7. Parliament of the Republic of Kazakhstan (2020). Code of the Republic of Kazakhstan of July 7, 2020, No. 360-VI ZRK "On the health of the people and the health care system". Kazahstanskaja Pravda [The Kazakh Truth] 08.07.2020, No. 130 (29257).
8. Parliament of the Republic of Kazakhstan (2011). Code of the Republic of Kazakhstan of December 26, 2011, No. 518-IV "On marriage (matrimony) and family". Kazahstanskaja Pravda [The Kazakh Truth] 07.01.2012, No. 6-7 (26825-26826).
9. Ahuja KK, Simons EG, Edwards RG (1999). Money, morals and medical risks: conflicting notions underlying the recruitment of egg donors. *Hum Reprod*, 14 (2): 279-84.
10. Montanari Vergallo G, Marinelli E, di Luca NM, et al (2018). Gamete donation: Are children entitled to know their genetic origins? A comparison of opposing views. The Italian state of affairs. *Eur J Health Law*, 25 (3): 322-37.
11. Zaami S (2018). Assisted heterologous fertilization and the right of donorconceived children to know their biological origins. *Clin Ter*, 169 (1): e39-e43.
12. Jordan CB, Belar CD, Williams RS (2004). Anonymous oocyte donation: a follow-up analysis of donors' experiences. *J Psychosom Obstet Gynaecol*, 25 (2): 145-51.
13. Söderström-Anttila V, Miettinen A, Rotkirch A, et al (2016). Short- and long-term health consequences and current satisfaction levels for altruistic anonymous, identity-release and known oocyte donors. *Hum Reprod*, 31 (3): 597-606.
14. Skoog Svanberg A, Sydsjö G, Lampic C (2020). Psychosocial aspects of identity-release gamete donation - perspectives of donors, recipients, and offspring. *Ups J Med Sci*, 125 (2): 175-82.
15. Svanberg AS, Sydsjö G, Bladh M, et al (2016). Attitudes about donor information differ greatly between IVF couples using their own gametes and those receiving or donating oocytes or sperm. *J Assist Reprod Genet*, 33 (6): 703-10.
16. Purewal S, van den Akker OB (2009). Systematic review of oocyte donation: investigating attitudes, motivations and experiences. *Hum Reprod Update*, 15 (5): 499-515.
17. Brändström S, Schlette P, Przybeck TR (1998). Swedish normative data on personality using the Temperament and Character Inventory. *Compr Psychiatry*, 39 (3): 122-8.
18. Svanberg AS, Lampic C, Gejervall AL, et al (2012). Gamete donors' motivation in a Swedish national sample: is there any ambivalence? A descriptive study. *Acta Obstet Gynecol Scand*, 91 (8): 944-51.
19. Piersanti V, Consalvo F, Signore F, et al (2021). Surrogacy and "Procreative tourism". What does the future hold from the ethical and legal perspectives? *Medicina (Kaunas)*, 57 (1): 47.
20. Brandão P, Garrido N (2022). Commercial surrogacy: An overview. *Rev Bras Ginecol Obstet*, 44 (12): 1141-58.
21. Aylamazyan EK, Baranov VS (2007). *Prenatal diagnostics of hereditary and congenital diseases*. Moscow: MED press-inform, 365 p.
22. Kononova SK, Sidorova OG, Fedorova SA, et al (2014). Bioethical issues of preventing hereditary diseases with late onset in the Sakha Republic (Yakutia). *Int J Circumpolar Health*, 73: 25062.