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ASSISTED REPRODUCTIVE TECHNOLOGIES IN KAZAKHSTAN IN 2017: SUMMARY REPORT ON EFFICIENCY AND AVAILABILITY

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ANNOTATION

The article contains a descriptive analysis to study the characteristics and outcomes of treatment with various methods of assisted reproductive technologies (ART). The report includes data on ART cycles registered by the Kazakhstan Association for Reproductive Medicine for the period from January 1 to December 31, 2017. A total of 10,523 ART treatment cycles and 2,037 newborns were registered in 2017. The accessibility of ART treatment was 583 cycles per million population. The Instruction of the President of the Republic of Kazakhstan given in the Message of September 1, 2020 is an important step to improve the reproductive potential of the country.

Key words: *ART in Kazakhstan, the effectiveness of ART, the availability of ART.*

SUMMARY

The article contains a descriptive analysis to study the characteristics and outcomes of treatment with various methods of assisted reproductive technologies (ART). The report includes data on ART cycles registered by the Kazakhstan Association for Reproductive Medicine for the period from January 1 to December 31, 2017. A total of 10,523 ART treatment cycles and 2,037 newborns were registered in 2017. The accessibility of ART treatment was 583 cycles per million population. The Order of the President of the Republic of Kazakhstan given in the Message of September 1, 2020 is an important step to improve the reproductive potential of the country.

Introduction

Infertility is a pressing challenge both for Kazakhstan and for most countries of the world. Since the birth of the first child conceived by in vitro fertilization in 1996, the era of ART development in the country had started. Since then, the number of assisted reproductive technology (ART) cycles has been increasing every year. Almost all innovative technologies used throughout the world are applied in the country.

An important stimulus for the development of ART is tracking the trend and development of situations in the field of ART executed in the country. To this end, the Kazakhstan Association of Reproductive Medicine (KARM) launched the registration system for ART programs in 2008, from the beginning of its activities. Since then, all reports from IVF clinics participating in the data collection have been sent to the database of the European ART register (ESHRE-EIM) [1]. Since the maintenance of ART reports, their control and analysis is not mandatory, some clinics are not involved in the collection of IVF data.

In 2010, as a result of the efforts of the medical community and patients, and the active participation of the Ministry of Health, a program of state funding for ART cycles was

launched for some patients who needed it [2]. In 2010, 100 married couples were provided with the quota. On September 1, 2020, the President of the Republic of Kazakhstan instructed to launch a special program "Ansagansabi" from 2021 and announced an increase in ART programs for guaranteed volume of medical aid to 7000, which once again actualizes the problem of introducing a national register.

According to various sources, the rate of infertile marriage in the Republic of Kazakhstan ranges from 12 to 15.5% [3]. From the point of view of the development of the state, infertility has a very strong effect on both demographic indicators [4] and the socio-economic development of the country and the psychoemotional and physical state of health of the nation [5]. With the increase in infertility, the need for treatment with assisted reproductive technologies is also growing [6].

The purpose of this study is providing data on the registered ART cycles executed in the Republic of Kazakhstan in the period from 2017 from January 1 to December 31.

Register participants, number of ART cycles

Nine clinics (46.6%) out of 15 ART centers that, according to our data, had worked in this period in Kazakhstan, took part in the 2017 report.

The total number of ART cycles available for analysis performed in ART centers of the Republic of Kazakhstan in 2017 is 10,523 (in 2016 – 9,520 cycles; + 10.6%), In 2017, the population of the Republic of Kazakhstan, according to the statistics committee of the Republic of Kazakhstan (http : // / taldau.stat.gov.kz), amounted to 18,037,776. Thus, 583 ART cycles have been conducted per 1 million population.

In 2017, out of 9 clinics participating in the report, 4 were in, 2 in Nur-Sultan, 1 in Aktob, 1 in Taraz and 1 clinic in.

The pattern of ART cycles

In 2017, the proportion of IVF in clinics of the Republic of Kazakhstan amounted to 19.3% (in 2016 - 18.1%) of all ART cycles, the share of ICSI - 40.4% (in 2016 - 45.7%); frozen embryos were transferred in 25.2% (in 2016 - 21.6%) cycles, the oocyte donation program was performed in 10.9% (in 2016 - 8.2%) cycles, pre-implantation genetic diagnosis - in 4 , 7% (in 2016 - 6.4%) cycles (table 1).

In the Embryo Donation program, 1,232 embryo transfers were carried out, as a result, 552 (44.8%) pregnancies occurred (in 2016 - 44.5%), 229 pregnancies ended in childbirth, of which 293 with unknown outcomes.

The number of embryos transferred. In 2017, the share of transfers of 1 and 2 embryos in IVF and ICSI programs was 39.2% and 55.3%, respectively (in 2016 - 25.2 and 69.1%). The proportion of transfers of 3 embryos decreased by almost one percent - 5.5% (in 2016 - 6.2%), and 4 embryos and more amounted to 0.2% (in 2016 - 0%).

Pregnancy. There were 2970 known pregnancies. In the IVF program, the pregnancy rate (PR) in 2017 was 24.3% per puncture, and 30.8% per embryo transfer (in 2016 - 38.9%). In the ICSI program, these indicators were 23.7 and 38.1%, respectively (in 2016 - 42.3%). In the program for the transfer of frozen embryos, PR per cycle was 49.1%, and for embryo transfer - 51.3% (in 2016 - 42.5%). In programs with PGT, PR per cycle - 47.0%, for embryo transfer program - 57.2% (in 2016 - 54.9%).

Patient age and ART outcome. In the group of patients aged 35-39 years, the pregnancy rate and birth rate in the IVF programs (29.2 and 14.6%) and ICSI (33 and 15%) are lower compared to these indicators in the group of women aged 34 and younger (IVF - 36.4 and 19.5%; ICSI - 30 and 18%). The pregnancy rate in women 40 years and older was 2 times lower (IVF - 21.5%, ICSI - 14.8%), and the frequency of pregnancy completion in childbirth is for IVF - 9.7%, and for ICSI - 8%. During the transfer of frozen embryos, the pregnancy rate in all age groups was higher than for IVF and ICSI - 56.0, 41.2, 33.0%, respectively. The proportion of childbirth in the FET program in the group of 40 years and older (17.3%) is 1.5 times lower than in younger women (31.2 and 23.0%). When assessing the overall effectiveness for IVF / ICSI / FET cycles - in the age groups 34 and younger, 25-39, and over 40 years old, the overall pregnancy rate is 40.9%, 34%, 23.0%. The birth rate is 22.8%, 17.5%, 11.6% (Fig. 1).

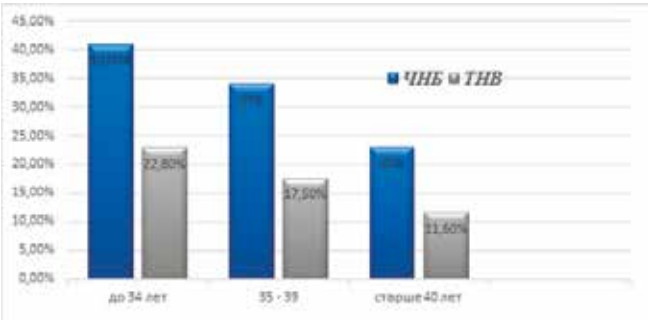
A high frequency of pregnancy and childbirth was noted in all age groups in the Oocyte Donation program (49.1% 51.2%, 41.0%, respectively). However, this program also confirmed the negative influence of a female's age on the main result - completion of pregnancy with childbirth (23.5, 23.1, 15.3%, respectively).

Distribution by age

The women were divided into 3 age groups. In IVF cycles, women under 34 years old accounted for 51.4% of the total number of IVF cycles, at the age from 35 to 39 years old - 36.6%, over 40 years old - 11.8%. Similarly, women in ICSI cycles were distributed by age group. Up to 34 years old -55.5%, from 35 to 39 years old-29.7%, over 40 years old 14.8%.

The age distribution of patients in FET programs was as follows: 60.2% among those were under the age of 34, 25.2% aged 35 to 39, and 14.6% were over 40. Accordingly, in cycles with donor oocytes, the distribution was inversely proportional, at the age of over 40 years 60.7%, from 35 to 39 years old 21.8%, up to 34 years old 17.6%.

Figure 1. Distribution of PR and DR by age groups in the IVF / ICSI and FET cycle.



PR – Pregnancy rate
DR – Delivery rate.
IVF –in vitro fertilization
ICSI –intracytoplasmic spermatozoa injection.
FET– Frozen embryo transfer.

The pregnancy rate in IVF program patients according to the age groups.

In IVF cycles, the pregnancy rate (PR) in the age group under 34 years was 30.3%, almost twice the same rate in women over 40 (17.9%). PR is two times lower than DR, under the age of 34 - 17.8%, from 35 to 39 years - 10.7%. In ICSI cycles, the PR in the age group under 34 has been 27%, while DR - 16%, at the age of 35 to 39 years PR (23%), DR (10%), a low percentage of effectiveness was noted in women over 40 years, PR - 11%, DR - 7%.

In FET cycles, the more optimistic results of PR under the age of 34 years - 56.4%, PR - 30.8%. The PR and DR decreases with increasing age. In women over 40 years old in FET cycles, PR - 32.3%, DR - 16.7%. Pregnancy rates in recipients in donor programs over the age of 40 are 40.7%, and DR - 14.2%.

Childbirth and other pregnancy outcomes. In the reports, all pregnancy terminations starting at 22 complete weeks are categorized as “childbirth”.

The outcome of 1,111 pregnancies resulting from ART is not known; this is 29.5% of all pregnancies. 2,037 (54.2%) pregnancies ended in childbirth at 22 weeks or later, 733 (19.5%) pregnancies were lost at different periods of up to 22 weeks.

Among the known outcomes, the frequency of termination of the onset pregnancies with childbirth at 22 weeks and more in IVF and ICSI programs in total amounted to 37.4%, RE - 55.4%, Egg Donation - 41.4%, Preimplantation genetic testing - 75.1%.

The timing of the completion of pregnancy with childbirth according to the type of ART procedure and the number of fetuses.

In 2017, 10,523 cycles and 2,037 newborns have been registered, which is 0.52% of all newborns born in the Republic of Kazakhstan (the total number of newborns in 2017 was 390,262).

In IVF / ICSI cycles, the proportion of births of one child has been 83.3%, twins - 16.3%, triplets - 0.47%. In the cycles of frozen embryos, the proportion of births of one child has been 81.6%, twins - 16.5%, triplets - 1.1%. In the cycles of oocyte donation, respectively 85.1%, 13.7%, triplets have not been registered.

Pre-implantation genetic testing. In 2017, genetic diagnostics in these centers has been carried out in 491 cycles, embryo transfer has been performed in 362 cases, pregnancy occurred in 185 (51.1%) cases, childbirth at 22 weeks or later resulted in 139 (75.1%) pregnancies.

"Parameters of excellence". As such indicators, the EIM ESHRE determined the ratio of the number of pregnancies received to the number of embryos transferred (PR / ET) and the ratio of the number of transferred embryos to the number of pregnancies received (ET / PR). The ideal value of these parameters is 1. In the centers of the Republic of Kazakhstan, PR / EThas been 0.254, and ET / PR- 3.93.

Table 1- Absolute numbers of assisted reproductive technologies methods by effectiveness.

	IVF	ICSI	FET	PGT IVF/ICSI	PGT FET	ED	FDE
Induced cycles	2028	4205		340		614	
TVP (transvaginal puncture)	1632	4186		319		614	
Frozen embryo transfer			2648		151		100
Embryos ER	1336	2720	2542	211	151	409	261
Pregnancies PR	526	1202	1292	94	91	233	98
Deliveries DR	306	647	716	68	71	84	88
Unknown outcome of pregnancy	118	178	15	67	12	111	79

IVF – in vitro fertilization ICSI – intracytoplasmic injection of spermatozoa,FTET – frozen embryo transfer, PGT – preimplantation genetic diagnostics, ED – Egg Donation program, FDE – Frozen donor egg program

EDFET - program with donor eggs in the cycle of transfer of frozen embryos.

CONCLUSION

Thus, the 2017 ART register data made it possible to note the tendency of an increase in the number of ART programs by 10.6%. Unfortunately, the data collection system requires high-quality digitalization and further improvement. The high number of unknown pregnancy outcomes, incomplete reporting on programs obstruct complete data processing and reveal the absence of a monitoring system for the effectiveness of ART clinics. The introduction of a mandatory national register should become an integral and important requirement in the improving of ART in Kazakhstan.

Affordability rate per million of population also indicates low ability to pay and inadequate government funding for IVF programs in the country. The Message of the President of the Republic of Kazakhstan on increasing number of quota programs allows a favorable forecast for the reproductive health of the country's population.

Clinics participating in the Unified National Register

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REFERENCES

1. Zegers-Hochschild F, Adamson GD, Dyer S, Racowsky C, Mouzon J De, Sokol R, Rienzi L, Sunde A, Schmidt L, Cooke ID, et al. The international glossary on infertility and fertility care, 2017. Hum Reprod [Internet] 2017;32:1786–1801. OxfordUniversityPress.
2. Lokshin V.N.Razvitie vspomogatelnyih reproduktivnyih tehnologiy v Kazahstane. Reproduktivnayameditsina 2011; 3-4 (08-09).
3. Lokshin V.N., Ahmetova E. A. Vspomogatelnyie reproduktivnyie tehnologii v respublike Kazahstan po dannyim registra 2011 g. Reproduktivnaya meditsina. 2013;275:5–10
4. Lutz W, Skirbekk V. Policies Addressing the Tempo Effect in Low-Fertility Countries. Population and Development Review. 2005;31:699–720. doi.org/10.1111/j.1728-4457.2005.00094.x
5. Wolf DA, Lee RD, Miller T, Donehower G, Genest A. Fiscal externalities of becoming a parent. Popul Dev Rev. 2011;37(2):241–266. doi:10.1111/j.1728-4457.2011.00410.x
6. Lokshin V.N., Karibaeva Sh.K., Omar M.D. Dostupnost lecheniya besplodiya s pomoschyu VRT v razlichnyih sotsialno-ekonomicheskih gruppah. Obzor literaturyi. 3 (40) 2019.

РЕЗЮМЕ

ВСПОМОГАТЕЛЬНЫЕ РЕПРОДУКТИВНЫЕ ТЕХНОЛОГИИ В КАЗАХСТАНЕ ЗА 2017 ГОД: КРАТКИЙ ОТЧЕТ ПО ЭФФЕКТИВНОСТИ И ДОСТУПНОСТИ

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Статья содержит описательный анализ для изучения характеристик и результатов лечения разными методами вспомогательных репродуктивных технологий (ВРТ). В отчет включены данные циклов ВРТ, зарегистрированных Казахстанской Ассоциацией Репродуктивной Медицины за период с 1 января по 31 декабря 2017 года. В общей сложности за 2017 год были зарегистрированы 10,523 циклов лечения с помощью ВРТ и 2037 новорожденных. Доступность лечения с помощью ВРТ составила 583 циклов на 1 млн населения. Поручение Президента РК в послании от 1 сентября 2020 является важным шагом для улучшения репродуктивного потенциала станы.

Ключевые слова: *ВРТ в Казахстане, эффективность ВРТ, доступность ВРТ.*