

R.A. Aslanova, L.M. Rzaguliyeva¹
Baku Medical Plaza, Baku, Azerbaijan

¹Azerbaijan State Institute of Advanced Medical Education named after A. Aliyev, Baku,
Azerbaijan

MEDICAL AND SOCIAL CHARACTERISTICS OF WOMEN OF REPRODUCTIVE AGE DURING IN VITRO FERTILIZATION PROGRAMS

e-mail: statya2021@mail.ru

The article presents a study of the medical and social characteristics of women of reproductive age undergoing infertility treatment by in vitro fertilization. 256 women from the main group and 74 women with physiological pregnancy (control) were included. A comprehensive analysis of demographic, socio-economic, clinical, anamnestic, and behavioral factors affecting reproductive function and the effectiveness of Assisted Reproductive Technology programs has been conducted. The dominance of urban living, mainly an average level of education, and a variety of social statuses among the patients were revealed. In the main group, there was a high prevalence of gynecological diseases and primary infertility (79.7 %), as well as a significant proportion of factors affecting reproductive function. The results emphasize the need for an integrated, individualized approach to women's management when planning and conducting In Vitro Fertilization programs, taking into account both clinical and medico-social characteristics.

Key words: women, infertility, age, reproductive health, in vitro fertilization.

Р.А. Асланова, Л.М. Рзакулієва

МЕДИКО-СОЦІАЛЬНА ХАРАКТЕРИСТИКА ЖІНОК РЕПРОДУКТИВНОГО ВІКУ ПРИ ПРОВЕДЕННІ ПРОГРАМ ЕКСТРАКОРПОРАЛЬНОГО ЗАПЛІДНЕННЯ

У статті представлено дослідження медико-соціальних характеристик жінок репродуктивного віку, які проходять лікування безпліддя методом екстракорпорального запліднення. Включено 256 жінок з основної групи та 74 жінки з фізіологічною вагітністю (контроль). Проведено комплексний аналіз демографічних, соціально-економічних, клініко-анамнестичних і поведінкових факторів, що впливають на репродуктивну функцію та ефективність програм допоміжних репродуктивних технологій. Виявлено домінування міського проживання, переважно середній рівень освіти та різноманітність соціального статусу серед пацієнток. В основній групі відзначено високу поширеність гінекологічних захворювань і первинного безпліддя (79,7 %), а також значну питому вагу факторів, що впливають на репродуктивну функцію. Результати підкреслюють необхідність комплексного, індивідуалізованого підходу до ведення жінок при плануванні та проведенні програм екстракорпорального запліднення з урахуванням як клінічних, так і медико-соціальних особливостей.

Ключові слова: жінки, безпліддя, вік, репродуктивне здоров'я, екстракорпоральне запліднення.

In recent years, the problem of infertility has become increasingly pronounced in medico-social importance, affecting not only women's reproductive health, but also demographic indicators in general [8, 10, 11]. In the context of demographic challenges, it is especially important to develop and improve assisted reproductive technologies, among which in vitro fertilization (IVF) occupies a leading place [3, 7]. The success of IVF programs is determined not only by medical indicators, but also by a combination of social factors that affect the availability, timeliness, and effectiveness of treatment. Age, educational level, social status, working and living conditions, presence of chronic diseases, and bad habits. All these parameters form a medical and social portrait of a woman undergoing infertility treatment [1, 5, 9]. A comprehensive assessment of the medical and social characteristics of patients entering IVF programs allows not only to identify risk groups that may reduce treatment effectiveness, but also to optimize approaches to the management of such patients [2, 4, 6]. This is especially important in conditions of limited resources and high cost of assisted reproductive technology procedures, when a reasonable allocation of medical services requires an individualized and prognostically oriented approach. In this regard, it is relevant to conduct a study to identify the characteristics of the medical and social status of women of reproductive age participating in IVF programs. The data obtained can be used both to improve the organization of reproductive care and to develop recommendations for socially oriented support for this patient group.

The purpose of the study was to conduct a comprehensive assessment of the medical and social characteristics of women of reproductive age undergoing infertility treatment by in vitro fertilization.

Materials and methods. The study was carried out as an observational comparative analysis with a retrospective design and a medical and social orientation. The analysis is based on the study of clinical, anamnestic, and socio-demographic data from patients who applied to the Baku Medical Plaza clinic (Baku, Azerbaijan) in the period from 2019 to 2023. The study included 256 women of reproductive age (19–44

years old) who underwent infertility treatment in in vitro fertilization programs (the main group). The control group consisted of 74 women with physiologically occurring pregnancies in the natural cycle of conception.

Inclusion criteria: women of reproductive age (19–44 years); established infertility diagnosis (for the main group); participation in in vitro fertilization programs; availability of complete medical documentation and medical history; informed consent to the use of medical data for scientific purposes.

Exclusion criteria: the presence of malignant neoplasms; severe decompensated somatic diseases; acute infectious diseases at the time of inclusion; and absence of key clinical and anamnestic data.

Data collection was based on the analysis of outpatient records, medical records, as well as individual patient questionnaires. Medical, social, demographic, and clinical anamnestic indicators reflecting living conditions, reproductive and gynecological history, as well as the presence of concomitant pathology and infectious diseases in the acute stage, were evaluated.

Urogenital material for screening sexually transmitted infections (STIs) was collected in the treatment room of the Baku Medical Plaza clinic by an obstetrician-gynecologist using sterile disposable probe swabs from the posterior vaginal arch and cervical canal. Laboratory diagnostics was performed in the clinical diagnostic laboratory of the same medical center. The screening panel included the detection of DNA/RNA pathogens: *Chlamydia trachomatis*, *Trichomonas vaginalis*, *Mycoplasma genitalium*, *Ureaplasma urealyticum*, *Gardnerella vaginalis* by real-time PCR. The results were processed using a QuantStudio 5 Real-Time PCR amplifier (Thermo Fisher Scientific, USA), and microscopic smear validation was performed using a Leica DM500 light clinical microscope (Germany).

The study was carried out in accordance with the principles of bioethics and the provisions of the Helsinki Declaration of the World Medical Association (2013 edition). The use of medical data was carried out in accordance with the local regulatory documents of the medical institution. All patients gave written informed consent to participate in the study. The patients' personal data was encrypted and depersonalized.

The statistical analysis of the obtained results was carried out in the EXCEL-2019 and SPSS programs (IBM SPSS Statistics 26 version) using the methods of variational (U-Mann-Whitney), discriminant (Chi-square Pearson), and variance (test ANOVA) analysis. The critical significance level when testing statistical hypotheses in this study was defined as $p < 0.05$.

Results of the study and their discussion. To achieve these goals, a study was conducted on the factors affecting the reproductive function of women. When assessing the general clinical and medical-social characteristics of the patients, the following data were obtained. The age of the patients included in the study ranged from 19 to 44 years, the average age of women in the main group was 31.1 ± 0.3 years (95 % CI: 30.4–31.8 years), in the control group – 29.9 ± 0.5 years (95 % CI: 29.0–30.9 years). Based on the analysis of the distribution of patients included in the study depending on age characteristics, the Mann-Whitney test did not reveal statistically significant age differences between the study groups ($p = 0.122$). The women participating in the study lived in both urban and rural areas, as well as outside of Azerbaijan. When studying the place of residence of women, it was noted that the dominant part were urban residents. The data obtained indicate that, mostly, patients with infertility lived in Baku ($n = 175$; 68.4 %), to a lesser extent – in the regions of Azerbaijan ($n = 75$; 29.3 %) and beyond ($n = 6$; 2.3 %). When analyzing the living conditions of the control group patients, it was found that in 66 (89.2 %) women were registered in Baku, 7 (9.5 %) in the regions of Azerbaijan and 1 (1.4 %) woman outside of it. The results showed a higher probability of infertility diagnosis in patients living in urban settings ($p = 0.000$, U-Mann-Whitney test; $\chi^2 = 12.768$; $p = 0.002$). This is due to the peculiarities of the organization of specialized and high-tech medical care for women with infertility in Azerbaijan and the patient's access to modern reproductive clinics. The distribution of women by type of employment, which may have an impact on the specifics of the reproductive function, revealed different social groups of the examined patients. Most of them were housewives (127 – 49.6 % in the main group, 39 – 52.7 % in the control group). The second largest number were employees (95 – 37.1 % in the main group, 28 – 37.8 % in the control group). 28 (10.9 %) patients of the main group and 6 (8.1 %) of the control group were students. Working specialties were noted in 6 (2.3 %) women of the main group and in 1 (1.4 %) of the control group. Given the uniformity of the distribution of patients according to this indicator, the observation groups can be considered comparable ($p = 0.729$, U-Mann-Whitney test; $\chi^2 = 0.830$; $p = 0.842$). An analysis of the level of education showed that the vast majority of women had secondary education – 149 (58.2 %), of which: 116 (45.3 %) in the main group and 33 (44.6 %) in the control group. There were 41 (16.0 %) women with incomplete secondary education in the main group and 11 (14.9 %) in the control group. The rest of the patients had higher education: 99 (38.7 %) in the main group and 30 (40.5 %) in the control group, a comparison of the level of education between the main and control groups of patients showed no statistically significant differences

($p=0.746$, U–Mann–Whitney test; $\chi^2=0.106$; $p=0.948$). The study of the socio-economic status of the patients showed that at the time of the study, 14 (5.5 %) of the women in the main group and 4 (5.4 %) of the control group indicated unsatisfactory socio-economic living conditions. 183 (71.5 %) patients of the main group and 46 (62.2 %) of the control group assessed their socio-economic situation as satisfactory. The remaining 59 (23.0 %) women of the main group and 24 (32.4 %) women from the control group rated the socio-economic living conditions as good. A comparison in terms of socio-economic status between the main and control groups of patients did not reveal statistically significant differences ($p=0.147$, U–Mann–Whitney test; $\chi^2 =2.730$; $p=0.255$). The analysis of the patients' adherence to bad habits revealed cases of tobacco smoking in 20 (7.8 %) patients of the main group and in 4 (5.4 %) of the control group. There were no cases of alcohol and drug addiction. A comparison of smoking rates between the main and control groups of patients did not reveal statistically significant differences ($p=0.483$, U–Mann–Whitney test; $\chi^2 =0.493$; $p=0.482$). The presence of emotional conflict situations in the family and/or at work was indicated by 45 (17.6 %) patients in the main group and 8 (10.8 %) patients in the control group. A comparison on this basis between the main and control groups of patients did not reveal statistically significant differences ($p=0.163$, U–Mann–Whitney test; $\chi^2 =1.950$; $p=0.163$). At the time of inclusion in the study, the patients had no somatic diseases in the decompensation stage, which could be an absolute contraindication for participation in the study. *in vitro* fertilization programs. To objectively characterize the general state of health, an analysis of anthropometric indicators was carried out, in particular, the body mass index (BMI). The analysis of anthropometric data showed that 139 (54.3 %) women in the main group and 38 (51.4 %) in the control group had a normal BMI at the time of the medical examination. 108 (42.2 %) patients of the main group and 31 (41.9 %) of the control group had a body weight deficiency. 9 (3.5 %) women in the main group and 5 (6.8 %) in the control group had grade I-II obesity. The mean BMI in the patients of the main group was 24.7 ± 0.2 kg/m² (95 % CI: 24.3–25.0 kg/m²). In the control group of patients, the average BMI was 24.8 ± 0.4 kg/m² (95 % CI: 24.0–25.6 kg/m²). Comparison of this trait between the main and control groups of patients did not reveal statistically significant differences ($p=0.519$, U–Mann–Whitney test; $\chi^2 =1.516$; $p=0.719$). Concomitant extragenital pathology has a significant impact on the formation and realization of women's reproductive function. In the anamnesis of the examined patients, concomitant somatic diseases were observed in 70 (27.3 %) women of the main group and in 14 (18.9 %) women of the control group. In the structure of chronic somatic diseases in patients of the main group, the following were recorded: diseases of the urinary system in 21 (8.2 %); diseases of the musculoskeletal system in 6 (2.3 %); diseases of the cardiovascular system in 9 (3.5 %); diseases of the respiratory system – in 10 (3.9 %); diseases of the digestive system – in 19 (7.4 %); diseases of the endocrine system – in 5 (2.0 %). In the control group of women, diseases of the urinary system were noted in 4 (5.4 %), musculoskeletal system – in 1 (1.4 %), cardiovascular system – in 1 (1.4 %), respiratory system – in 4 (5.4 %), digestive system – in 3 (4.1 %), endocrine system – in 1 (1.4 %). A comparative analysis of the somatic status of the patients showed that the groups were comparable in terms of existing extragenital pathology. Comparison of this trait between the main and control groups of patients did not reveal statistically significant differences ($p=0.152$, U–Mann–Whitney test; $\chi^2 =3.689$; $p=0.719$). Thus, despite the absence of statistically significant differences between the groups in the overall incidence of extragenital pathology, patients in the main group tended to have a higher prevalence of somatic diseases, which may have clinical significance in assessing individual prognosis and requires consideration when conducting IVF programs. Anamnestic indications of gynecological diseases as a possible cause of existing infertility deserved special attention. Data analysis revealed a higher level of gynecological morbidity among the patients of the main group – 111 (43.3 %) women. In the control group, 16 (21.6 %) women had a history of gynecological diseases. Among the concomitant gynecological pathologies, various diseases of the cervix, such as ectopia of the cylindrical epithelium, and cicatricial deformities were noted in the anamnesis in 18 (7.0 %) patients of the main group and in 3 (4.1 %) women of the control group. Bacterial vaginosis was indicated by 22 (8.6 %) patients of the main group and 2 (2.7 %) patients of the control group. Endometritis was noted in 13 (5.1 %) and 2 (2.7 %), salpingoophoritis – in 16 (6.3 %) and 2 (2.7 %), ovarian cyst – in 12 (4.7 %) and 1 (1.4 %) patients in the comparison groups, respectively. At the time of entry into the IVF protocol, 13 (5.1 %) patients in the main group had myomatous nodules that did not deform the uterine cavity. In the control group, a history of uterine fibroids was noted in 4 (5.4 %) women. Hyperplastic processes in the anamnesis (endometrial polyps) occurred in 1 (0.4 %) patient, uterine malformations – in 4 (1.6 %) women of the main group and were not diagnosed in the control group. The analysis of gynecological pathology showed significant differences between the U–Mann–Whitney test ($R_i=0.001$) and the Pearson Chi-Square Tests ($\chi^2=13.598$; $p=0.137$). It is also noteworthy that the gynecological history was burdened with sexually transmitted infections. Analyzing urogenital infectious

pathology, we noticed a high ($n=94$; 36.7 %), relative to the control group ($n=12$; 16.2 %), the incidence of various infections in patients of the main observation group. However, this difference was not supported by statistical reliability. Thus, the incidence of ureaplasma infection in patients of the main group was 13.7 % ($n=35$) versus 6.8 % ($n=5$) in the control group ($p=0.109$, U-Mann-Whitney test; $\chi^2 = 2.577$; $p=0.108$), mycoplasma infection – 12.5 % ($n=32$) vs. 5.4 % ($n=4$) in the control group ($p=0.085$, U-Mann-Whitney test; $\chi^2 = 2.973$; $p=0.085$) gardnerellosis – 5.1 % ($n=13$) vs. 4.1 % ($n=3$) in the control group ($p=0.718$, U-Mann-Whitney test; $\chi^2 = 0.130$; $p=0.718$), chlamydia – in 6 (2.3 %) cases, did not occur in the control group ($p=0.184$, U-Mann-Whitney test; $\chi^2 = 1.766$; $p=0.184$), trichomoniasis – in 3 (1.2 %) patients, did not occur in the control group ($p=0.350$, U-Mann-Whitney test; $\chi^2 = 0.875$; $p=0.350$). When considering the main characteristics of the menstrual cycle of the women studied, it was found that in the majority of patients in the main group, the average age of menarche was 12.7 ± 0.1 years (95 % CI: 12.6–12.8 years). The average age of menarche in women in the control group was 12.4 ± 0.1 years (95 % CI: 12.2–12.6 years) ($p=0.024$, ANOVA; $p=0.034$, U-Mann-Whitney test). An assessment of the nature of menstrual function showed that 221 (86.3 %) women in the main group of patients had regular menstruation, and 71 (95.9 %) in the control group. Irregular menstruation was observed in 35 (13.7 %) and 3 (4.1 %) patients of the main and control groups, respectively. Comparison of this trait between the main and control groups of patients revealed statistically significant differences ($p=0.023$, U-Mann-Whitney test; $\chi^2 = 5.212$; $p=0.022$). One of the frequent complaints made by patients in the main group was dysmenorrhea. The severity of dysmenorrhea in patients of the main group was noted as mild in 11 (35.4 %) cases, moderate in 15 (48.4 %) and severe in 5 (16.2 %) cases. At the time of the examination, 31 (12.1 %) patients of the main group and 3 (4.1 %) patients of the control group with mild dysmenorrhea complained of dysmenorrhea of varying severity. Comparison of this trait between the main and control groups of patients revealed statistically significant differences ($p=0.045$, U-Mann-Whitney test; $\chi^2 = 4.031$; $p=0.045$).

Infertility was the leading clinical symptom in the patients of the main group. Primary infertility occurred in 204 (79.7 %) patients, secondary infertility – in 52 (20.3 %) women. The group of patients with secondary infertility consisted of women with a history of no more than one pregnancy. In addition, there was a tendency to develop primary infertility in women under the age of 28, which indicates diseases of the reproductive system at a young age. The main factors of infertility in the examined patients were: male factor, decreased ovarian reserve, polycystic ovarian syndrome (PCOS), tubal factor and combined factors (Table 1).

Table 1

Structure of infertility factors in women included in the IVF protocol

	Patients of the main group ($n=256$)	
	abs. number	%
Primary infertility	204	79.7
Secondary infertility	52	20.3
Infertility factor		
Male factor	19	7.4
Reduced ovarian reserve	73	28.5
Polycystic ovary syndrome	43	16.8
Pipe factor	33	12.9
Combined factors	88	34.4

In the structure of infertility, the male factor was noted in 19 (7.4 %) patients of the main group, a decrease in ovarian reserve in 73 (28.5 %), the presence of PCOS in 43 (16.8 %), a violation of the patency of the fallopian tubes in 33 (12.9 %), combined factors in 88 (34.4 %) women. According to the results, all patients with infertility had objective indications for inclusion in IVF programs. Thus, the assessment of the medical and social characteristics of women undergoing infertility treatment using IVF showed the presence of a wide range of factors potentially affecting the effectiveness of ART. It was found that a significant part of the patients had primary infertility, as well as various gynecological diseases in the anamnesis, which makes it difficult to become pregnant. The data obtained emphasize the importance of a comprehensive assessment of women's medical and social status when planning and conducting IVF programs, as well as the need for a personalized approach to infertility treatment, taking into account not only the clinical, but also the socio-demographic characteristics of patients. The results obtained in this study are consistent with modern ideas about the multifactorial nature of infertility and confirm the significant role of medical, social, clinical and anamnestic factors in the formation of reproductive disorders in women of reproductive age. The predominance of urban living among the patients of the main group revealed in our study is consistent with the data of a number of authors, indicating a higher detection and

treatment of infertility in urbanized regions, due to both environmental and stress-associated factors, as well as greater availability of specialized reproductive care [1, 9]. Of particular importance in the structure of the identified factors was the high prevalence of gynecological diseases in patients of the main group, which is consistent with the results of clinical and population studies indicating the key role of chronic inflammatory pathology, endocrine disorders and structural changes in the organs of the reproductive system in the formation of primary infertility [4, 8]. The significantly higher incidence of primary infertility (79.7 %) in the study cohort confirms the tendency for reproductive disorders to shift to younger age groups, which is also noted in modern demographic and clinical observations [7, 10]. Thus, a comparison of the results obtained with the literature data confirms that the effectiveness of in vitro fertilization programs is determined not only by medical indications, but also by the complex of medical and social characteristics of patients. The identified features emphasize the need for a personalized approach to planning and implementing ART programs, taking into account the socio-demographic conditions, reproductive history and gynecological status of women, which can help optimize management tactics and improve the effectiveness of infertility treatment.

The present study has several limitations. The study was medically and socially oriented and did not include laboratory hormonal parameters in the analysis, since the purpose was to assess anamnestic and social factors potentially affecting women's reproductive health.

Conclusions

1. It has been established that patients undergoing infertility treatment using IVF are characterized by a multifactorial combination of clinical and medico-social conditions that potentially affect the effectiveness of assisted reproductive technologies.

2. A significant part of the surveyed women had primary infertility (79.7 %) and a burdened gynecological history, including inflammatory and hormone-dependent diseases, which significantly complicates the onset of pregnancy and determines the need for an in-depth pre-pregnancy assessment.

3. The predominance of urban living among the patients of the main group was revealed, which reflects a higher diagnosis of infertility in urbanized regions and is associated with the availability of specialized reproductive care, as well as the possible influence of environmental and stress-associated factors.

4. The data obtained confirm the significant role of medical, social and clinical anamnestic factors in the formation of reproductive disorders in women of reproductive age.

References

1. Aslam S. Sociodemographic profile of females with in vitro fertilization failure. *Pioneer Journal of Biostatistics and Medical Research*. 2024;2(4):34–40. <https://doi.org/10.61171/v02.04.87>.
2. Dyer SJ, Patel M. The economic impact of infertility on women and families: a global perspective. *Facts, Views & Vision in ObGyn*. 2023;15(1):13–22.
3. Elyasi F, Parkoobi PI, Naseri M, Gelekolae KS, Hamed M, Peyvandi S, et al. Relationship between coping/attachment styles and infertility-specific distress in Iranian infertile individuals: a cross-sectional study. *International Journal of Reproductive Biomedicine*. 2021;19(4):347–360. <https://doi.org/10.18502/ijrm.v19i4.9061>.
4. Farquhar CM, Bhattacharya S, Repping S, Mastenbroek S, Kamath MS, Marjoribanks J, et al. Female subfertility. *Nature Reviews Disease Primers*. 2019;5(1):7. <https://doi.org/10.1038/s41572-018-0058-8>.
5. Fauque P, De Mouzon J, Devaux A, Epelboin S, Gervoise-Boyer MJ, Levy R, et al. Reproductive technologies, female infertility, and the risk of imprinting-related disorders. *Clinical Epigenetics*. 2020;12(1):191. <https://doi.org/10.1186/s13148-020-00986-3>.
6. Inhorn MC, Patrizio P. Infertility around the globe: new thinking on gender, reproductive technologies and global movements in the 21st century. *Human Reproduction Update*. 2015;21(4):411–426. <https://doi.org/10.1093/humupd/dmv016>.
7. Ranji U, Diep K, Frederiksen B, Gomez I, Salganicoff A. Access to fertility care: findings from the 2024 KFF women's health survey. *KFF Women's Health Policy Issue Brief*. 2024 Oct 21.
8. Sadecki E, Weaver A, Zhao Y, Stewart EA, Ainsworth AJ. Fertility trends and comparisons in a historical cohort of US women with primary infertility. *Reproductive Health*. 2022;19(1):13. <https://doi.org/10.1186/s12978-021-01313-6>.
9. Silva SG, Bertoldi AD, da Silveira MF, Domingues MR, Evenson KR, Dos Santos IS. Assisted reproductive technology: prevalence and associated factors in Southern Brazil. *Revista de Saúde Pública*. 2019;53:13. <https://doi.org/10.11606/S1518-8787.2019053000737>.
10. Snow M, Vranich T.M., Perin J., Trent M. Estimates of infertility in the United States: 1995-2019. *Fertil. Steril*. 2022;118(3):560-567. <https://doi.org/10.1016/j.fertnstert.2022.05.018>.
11. Sohbaty F, Hasanpoor Azghady SB, Jafarabadi M, Amiri-Farahani L, Mohebbi M. Psychological well-being of infertile women and its relationship with demographic factors and fertility history: a cross-sectional study. *BMC Women's Health*. 2021;21(1):22. <https://doi.org/10.1186/s12905-020-01167-3>.

Стаття надійшла 30.11.2024 р.