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**ASSESSMENT OF CORRECTION
EFFECTIVENES OF PSYCHOEMITIONAL
STATE IN PREGNANT WOMEN
AFTER APPLICATION
OF ASSISTED REPRODUCTIVE
TECHNOLOGIES**

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Ключові слова: *допоміжні репродуктивні технології, реактивна тривожність, особистісна тривожність, гестаційна домінанта*

Ключевые слова: *вспомогательные репродуктивные технологии, реактивная тревожность, личностная тревожность, гестационная доминанта*

Abstract. *Assessment of correction effectiveness of psychoemotional state in pregnant women after application of assisted reproductive technologies. Beniuk V.O., Ginzburg V.G., Vygivska L.M., Maidannyk I.V., Chorna O.O., Oleshko V.F., Marushchenko Yu.L., Lastovetska L.D. To determine the role and effectiveness of the proposed therapeutic and preventive complex in the correction of psychoemotional state in the dynamics of pregnancy in pregnant women after assisted reproductive technologies (ART) application in order to improve the tactics of antenatal observation and prevention of obstetric and perinatal complications. 299 pregnant women were comprehensively examined and a set of therapeutic and preventive measures was carried out: the main group included 249 women whose pregnancy occurred as a result of ART application. The control group consisted of 50 pregnant women with spontaneous pregnancy. The complex of measures for pregnant women after ART application included: micronized progesterone, magnesium oxide, folic acid, L-arginine aspartate, Omega-3 polyunsaturated fatty acids and long-term psychological correction – before ART program, at 8-10 weeks of pregnancy, at 16-18 weeks of pregnancy and at 28-30 weeks of pregnancy. Introduction of the proposed*

complex of psychoemotional correction contributed to the formation of reactive anxiety and personal anxiety levels at a moderate level in women of subgroups IA-44 (89.8%) and 43 (87.6%), IIA – 43 (89.6%) and 44 (91.7%) and IIIA – 30 (83.3%) and 26 (72.2%), which is considered to be an adaptive, physiological type during pregnancy. The positive effect of the proposed complex of psychoemotional correction demonstrates the improvement of processes of formation of type of component gestational dominant, its return to the optimal type in women of subgroup IA – 41 (83.6%), IIA – 39 (81.3%) and IIIA – 26 (72.2%) that is close to the physiological course of pregnancy and contributes to the reduction of perinatal and obstetric complications among pregnant women of these subgroups.

Реферат. Оцінка ефективності корекції психоемоційного стану у вагітних після використання допоміжних репродуктивних технологій. Бенюк В.О., Гінзбург В.Г., Вигівська Л.М., Майданник І.В., Чорна О.О., Олешко В.Ф., Марущенко Ю.Л., Ластовецька Л.Д. Мета – визначити роль та ефективність запропонованого лікувально-профілактичного комплексу та комплексу психоемоційної корекції в динаміці вагітності у вагітних після допоміжних репродуктивних технологій (ДРТ) для вдосконалення тактики антенатального спостереження та профілактики акушерських і перинатальних ускладнень. Комплексно обстежено та проведено комплекс лікувально-профілактичних заходів у 299 вагітних жінок: до основної групи увійшли 249 жінок, вагітність яких настала в результаті застосування ДРТ. Контрольну групу склали 50 вагітних зі спонтанним настанням вагітності. Комплекс лікувально-профілактичних заходів для вагітних після ДРТ включає: мікронізований прогестерон, магнію оксид легкий, фолієва кислота, L-аргініну аспартат, Омега – 3 поліненасичені жирні кислоти, тривала психологічна корекція – напередодні програми ДРТ, на 8-10 тижні вагітності, на 16-18 тижні вагітності та на 28-30 тижні вагітності. Упровадження запропонованого комплексу психоемоційної корекції сприяло встановленню рівнів реактивної тривожності та особистісної тривожності на помірному рівні в жінок підгрупи IA – 44 (89,8%) та 43 (87,6%), IIA – 43 (89,6%) та 44 (91,7%) і IIIA – 30 (83,3%) та 26 (72,2%), що вважається адаптивним, фізіологічним типом під час вагітності. Позитивний вплив запропонованого комплексу психоемоційної корекції демонструє покращення процесів формування типу компонента гестаційної домінанти, повернення його до оптимального типу в жінок підгрупи IA – 41 (83,6%), IIA – 39 (81,3%) і IIIA – 26 (72,2%), що наближається до фізіологічного перебігу вагітності та сприяє зменшенню перинатальних та акушерських ускладнень серед вагітних вказаних підгруп.

The psychoemotional state of a woman is essential to pregnancy prolongation and the normal delivery course [8, 12, 13]. Disorders of adaptive mechanisms aimed at the functional systems restructuring during pregnancy and before delivery, as well as the state of chronic stress, contribute to an increase in frequency of obstetric and perinatal complications and have an adverse effect on the pregnancy course [3, 4, 7, 11, 14]. In women with a history of infertility, a state of chronic stress accompanies both the inability to perform reproductive function and unsuccessful assisted reproductive technologies (ART) cycles that usually precede pregnancy [1, 9, 12, 15]. Emotional stress as the realization of fears for the results of pregnancy plays a negative role in the adaptation processes of a woman to the function of the fetoplacental complex, that closes the false circle and contributes to the progression of gestational complications [1, 7].

The purpose of the research. To determine the role and effectiveness of the proposed therapeutic and preventive complex in the correction of psychoemotional state in the dynamics of pregnancy in pregnant women after ART application in order to improve the tactics of antenatal observation and prevention of obstetric and perinatal complications.

MATERIALS AND METHODS OF RESEARCH

A prospective clinical examination of 299 pregnant women was conducted. The main group

included 249 women whose pregnancy occurred as a result of ART application. The control group consisted of 50 pregnant women with spontaneous pregnancy and its physiological course and was registered in antenatal clinic in 6-8 weeks of gestation.

Depending on the prescribed therapy and cause of infertility, women of the main group are divided into subgroups: subgroup I – pregnant women with tubal-peritoneal type of infertility in anamnesis, subgroup II – pregnant women with endocrine type of infertility in anamnesis, subgroup III – pregnant women with a history of male infertility. Depending on the therapy prescribed, pregnant women were additionally divided into subgroups A and B. Women from subgroup A received the proposed preventive complex of treatment and psychoemotional correction complex. Women from subgroup B were followed up in accordance with generally accepted standards of obstetric care regulated by orders of the Ministry of Health of Ukraine. Thus, a subgroup IA – 49 pregnant women, a subgroup IB – 45 pregnant women, a subgroup IIA – 48 pregnant women, a subgroup IIB – 39 pregnant women, a subgroup IIIA – 36 pregnant women and a subgroup III B – 32 pregnant women. Pregnant women of the studied groups were representative by age, family and social status and place of residence that allowed further assessment of the differences caused precisely by the etiological factors of infertility.

All pregnant women were examined in accordance to the quality standards: Order of the Ministry of Health of Ukraine No. 417 "Methodological recommendations for providing outpatient obstetric and gynecological care" dated July 15, 2011 [6], No. 787 "The procedure of ART application in Ukraine" dated September 9, 2013 [6].

The recommended complex of therapeutic and preventive measures for pregnant women after ART application included:

1. Progesterone support (micronized progesterone orally and vaginally 200 – 400 mg twice a day) up to 12 weeks, followed by adjustment of the progesterone dosage depending on the clinical course of pregnancy;

2. Magnesium support (magnesium oxide, light – 342 mg and magnesium carbonate, light – 670 mg, which corresponds to magnesium ions 365 mg, one effervescent tablet once a day during pregnancy);

3. Folic acid at the rate of 200 mcg of folic acid and 200 mcg of metafolin, 1 tablet per day orally with meals before pregnancy and during the first 16 weeks of pregnancy.

4. L-arginine aspartate in a solution for oral use – 5 ml (1 ml of the solution contains 200 mg of L-arginine aspartate) 3 times a day from the 8th week of pregnancy to the 16th week of pregnancy.

5. Omega-3 polyunsaturated fatty acid – 1 capsule three times a day starting from the 12th week of pregnancy.

6. Long-term psychological correction – on the eve of the ART program, at 8-10 weeks, 16-18 weeks and 28-30 weeks of pregnancy.

In order to determine the psychoemotional state of pregnant women of the studied groups in the screening mode, a clinical interview was conducted by filling out questionnaires that contained the Spilberger test questions in modification of Y.L. Hanin and "Test of relation of pregnant" by the method of I. V. Dobryakova [2, 3].

The initial assessment was performed at 8-9 weeks of pregnancy. Re-evaluation was performed 3 months after the beginning of the therapy.

For women of the studied groups, psychoemotional correction classes were conducted in a closed homogeneous group (from 7 to 12 participants) with a frequency of 3 times a week for 1.5 hours during 2-3 weeks. Psychoemotional correction was based mainly on the method of catatime-imaginative experience of images, together with elements of body-oriented methods and autogenic training. Negative triggers were identified and destroyed that contributed to improving the psychological and somatic state of the respondents. In addition, the work in the group was aimed at harmonizing the

individual, merging it with people around them, getting out of the narrow egocentric world, and engaging in transpersonal experiences [15].

The materials contain an "Informed Consent Form", the study does not contain an increased risk for the subjects of the study and is performed taking into account the existing bioethical norms and scientific standards for conducting clinical trials.

Statistical processing of the obtained results was conducted using licensed standardized application packages of multidimensional statistical analysis SPSS for Windows Release 19.0 (SPSS Inc. Chicago, Illinois, license No. 15G09207000A). The differences were considered statistically significant at $p < 0.05$ according to the χ^2 criterion.

RESULTS AND DISCUSSION

Against the background of the proposed complex for the psychoemotional state correction in pregnant women of IA, IIA and IIIA subgroups, there were no significant differences in the indicators of the Spilberger test in modification of Y.L. Hanin. The frequency of high and low levels of reactive anxiety (RA) in pregnant women of the subgroup IA, IIA, and IIIA significantly decreased in comparison to the indicators of subgroup IB, IIB, and IIIB women who did not undergo correction of the psychoemotional state (Table 1).

Among pregnant women of the subgroup IA, a low RA level was registered in 4 (8.2%) cases that is almost 3 times lower than in women of the subgroup IB who did not receive psychoemotional correction – 11 (24.4%) ($p < 0.05$). Moderate RA was observed in 44 (89.8%) women of the IA subgroup that significantly exceeded the indicators of pregnant women of the subgroup IB – 16 (35.6%) ($p < 0.05$).

Among pregnant women of subgroup IIA, there was a significant decrease in the number of low RA cases after applying the proposed psychoemotional correction – 5 (10.4%) that is three times lower than in women of subgroup IIB, observed according to generally accepted standards – 14 (35.9%) ($p < 0.05$).

Moderate RA was observed in 43 (89.6%) cases of women of subgroup IIA that significantly exceeded the indicators of pregnant women of subgroup IIB – 10 (27.7%) ($p < 0.05$).

In pregnant women of subgroup IIIB, similarly, there was a significant decrease in the low RA cases registration – 6 (16.6%), which indicator was almost 2 times lower comparing to the women of subgroup IIB – 10 (32.3%) ($p < 0.05$). Moderate RA levels were observed in 30 (83.3%) women of subgroup IIIA that is almost 2.5 times higher than in women of subgroup IIIB – 12 (37.4%) ($p < 0.05$).

Table 1

**Results of reactive and personal anxieties study in women of examined groups
in dynamics of treatment (abs.nom., %)**

Type of anxiety	Points	Value in the examined groups (n)						control group (n=50)
		main group (n=249)						
		group I (n=94)		group II (n=87)		group III (n=68)		
		subgroup IA (n=49)	subgroup IB (n=45)	subgroup IIA (n=48)	subgroup IIB (n=39)	subgroup IIIA (n=36)	subgroup IIIB (n=32)	
RA	Low	4 (8.2) × *	11 (24.4) *	5 (10.4) × *	14 (35.9) *	6 (16.6) × *	10 (32.3)	25 (50.0)
	Moderate	44 (89.8) × *	16 (35.6)	43 (89.6) × *	10 (27.7) *	30 (83.3) × *	12 (37.4)	18 (36.0)
	High	-	18 (40.0) *	-	19 (39.4) *	-	10 (32.3) *	7 (14.0)
PA	Low	6 (12.4) × *	21 (46.7) *	4 (8.3) × *	22 (56.4) *	10 (27.8) ×	9 (28.1) *	34 (68.0)
	Moderate	43 (87.6) × *	9 (20.0) *	44 (91.7) × *	5 (12.8) *	26 (72.2) × *	14 (43.8) *	12 (24.0)
	High	-	15 (33.3) *	-	12 (30.8) *	-	9 (28.1) *	4 (8.0)

Notes: * – statistically significant differences compared to control group ($p < 0.05$); ° – statistically significant differences between I, II and III group ($p < 0.05$); × – statistically significant differences between subgroups A and B ($p < 0.05$).

The value of proposed complex of psychoemotional correction is confirmed by the absence of registered cases of high RA in women of subgroups IA, IIA, IIIA and a significant difference in comparison with the indicators of women in the control group ($p < 0.05$) that indicates a steady decrease in such psychoemotional components as tension, anxiety, nervousness, attention disorders, fine coordination.

Examination of the personal anxiety level (PA) against the background of the proposed complex of psychoemotional correction, a significant decrease in the number of low PA cases among women of the IA subgroup was noted – 6 (12.4%) that was significantly lower comparing the result of IB subgroup women – 26 (27.6%) ($p < 0.05$).

Among women of subgroup IIA, a low level of PA was registered in 4 (8.3%) cases that is almost 6 times lower compared to women of subgroup IIB – 22 (56.4%) ($p < 0.05$). At the same time, 44 (91.7%) women of subgroup IIA had moderate PA level. Among women of subgroup IIB, the number of moderate PA cases was 7 times lower and amounted to 5 (12.8%) ($p < 0.05$).

Among women with male infertility factor who received the proposed complex of psychoemotional correction – subgroup IIIA, we did not note a significant difference in the number of cases of low PA registration (subgroup IIIA – 10 (27.8%), subgroup IIIB – 9 (28.1%) ($p > 0.05$)). However, the frequency of

moderate PA registration in women of subgroup IIIA – 26 (72.2%) was almost twice higher in comparison to subgroup IIIB women – 14 (43.8%) ($p < 0.05$).

Against the background of the proposed complex of psychoemotional correction, high PA cases were not registered among women of subgroups IA, IIA, and IIIA that indicates the normalization of neurotic, emotional and psychosomatic processes in the examined women.

Changes in the type of gestational dominant in women of the studied groups against the background of the proposed complex and psychoemotional correction were studied using the method of “Test of relation of pregnant” by the method of I.V. Dobryakova three months after the beginning of the treatment (Table 2).

Among women of subgroup IA, the number of registration of euphoric type cases of psychological component of the gestational dominant (PCGD) was 3 (6.1%) that was 4 times lower compared to women of subgroup IB – 13 (28.9%) ($p < 0.05$). Hypogestogenic type of PCDD was recorded in 5 (10.3%) women of subgroup IA, while among women of subgroup IB, the frequency of registration of a similar type of PCGD was 11 (24.4%) ($p < 0.05$). It should be noted that against the background of the proposed complex of psychoemotional correction, almost 85% of women in subgroup IA were characterized by the optimal type of PCGD – 41 (83.6%), subgroup IB – 5 (11.1%) ($p < 0.05$).

Table 2

Results of psychological component of the gestational dominant examination in pregnant women in the dynamics of treatment (abs. nom., %)

Gestational dominant type	Value in the examined groups (n)						Control group (n=50)
	main group (n=249)						
	group I (n=94)		group II (n=87)		group III (n=68)		
	subgroup IA (n=49)	subgroup IB (n=45)	subgroup IIA (n=48)	subgroup IIB (n=39)	subgroup IIIA (n=36)	subgroup IIIB (n=32)	
Optimal	41 (83.6) * ×	5 (11.1) *	39 (81.3) * ×	4 (10.3) *	26 (72.2) * ×	10 (31.3) *	29 (58.0)
Hypogestognosic	5 (10.3) * ×	11 (24.4)	4 (8.3) * ×	12 (30.8)	10 (27.8) ×	13 (40.6)	15 (30.0)
Euphoric	3 (6.1) ×	13 (28.9) *	5 (10.4) ×	14 (38.9) *	-	5 (15.6)	6 (12.0)
Anxious	-	9 (20.0)	-	5 (12.8)	-	4 (12.5)	-
Depressive	-	7 (15.5)	-	4 (10.3)	-	-	-

Notes: * – statistically significant differences compared to control group ($p < 0.05$); ° – statistically significant differences between I, II and III group ($p < 0.05$); × – statistically significant differences between subgroups A and B ($p < 0.05$).

Against the background of the proposed complex of psychocorrection there were no cases of anxious and depressive PCGD type in the IA subgroup.

Among women of subgroup IIA, 5 (10.4%) cases of euphoric PCGD type were registered, that is 4 times lower compared to women of subgroup IIB – 14 (38.9%) ($p < 0.05$). Hypogestognosic type of PCGD was registered in 4 (8.3%) women of subgroup IIA, while among women of subgroup IIB, the frequency of its registration was 12 (30.8%) ($p < 0.05$). Against the background of the proposed complex of psychoemotional correction, the optimal type of PCGD was registered in 39 (81.3%) pregnant women of subgroup IIA, while in women of subgroup IIB there were only 4 (10.3%) cases ($p < 0.05$). Against the background of the proposed complex of psychoemotional correction there were no anxious and depressive PCGD types in subgroup IIA.

In women of subgroup IIIB who received the proposed complex of psychoemotional correction, the number of hypogestognosic PCGD type cases was 10 (27.8%). Among women of subgroup IIIB – 13 (40.6%) ($p < 0.05$). The frequency of registration of the optimal PCGD type in the dynamics of treatment in women of subgroup IIIA was 26 (72.2%) that is almost three times higher than in subgroup IIIB – 10 (31.3%) ($p < 0.05$). Euphoric, anxious and depressive types of PCGD among pregnant women of subgroup IIIA against the background of the proposed complex were not detected in the dynamics of treatment.

The psychological manifestations we have studied against the background of chronic psychological stress can manifest themselves by the following types: the first type is – the level of reactive anxiety (low and high), manifested by tension, anxiety, attention disorders, and the second type is the so – called personal anxiety, "alienation" reactions with pronounced signs of asthenization, lack of contact, closeness, denial of problems.

Against the background of chronic stressors such as family problems, traumatic losses, perinatal losses and miscarriage in the anamnesis, material problems, both types of psychological reactions of pregnant women to stress occur with the same frequency. Stress caused by nervous loads associated with constant contacts with people leads to reactions of the first type. Long-term work with a computer, work in the third trimester of pregnancy often leads to psychological reactions of the second type.

According to the obtained data, a high level of asthenization, defensive aggression, manifestations of pronounced fear, anxiety, and depressive tendencies were detected. Studies of mental anxiety have shown that in all subscales, mental anxiety in women from the main group is higher than normal, however, pregnant women with the first type of stress response show significantly higher indicators of anxiety, what correlates with the data of I.A. Ancheva (2017).

According to our data, we can say that a high level of mental anxiety acts as a mechanism of

psychological protection against a traumatic situation. When the level of alert decreases, the level of anxiety decreases, if the anxiety is situational and not basic. In this case, it is recommended to conduct psychotherapeutic work with the personality structure and improve adaptive and communication processes. As a result of testing, it was noticed that women with the first type of reaction, in general, respond better and more easily to the examination and treatment procedure. They themselves ask for help, are more willing to make contact. In the second type of chronic stress sources response, high screening test scores are not observed, women in this group are more flexible, have better adaptability to the environment, independence, and independence. A significant amount of energy spent on compensatory processes causes more pronounced mental asthenia than in the first type of response.

In accordance with the identified types of reactions, as well as in connection with various targets of psychocorrection, the principles of a differentiated program of psychological correction of the psychological state of pregnant women after ART application are proposed.

In pregnant women with the first type of response to chronic stressors, the results of testing before and after psychocorrection show significant differences. In the course of joint obstetric and psychological methods, pregnant women calm down and respond well to treatment. After psychocorrection, almost all

indicators of the main tests are reduced, as compared to the data before psychocorrection, almost the same results were obtained by M.Y. Skvortsova (2018).

Pregnant women with the second type of reaction to chronic stressors are usually reserved, asthenized, and nonsociable. After several sessions of psychocorrection, pregnant women usually agree that their existing problems will be difficult to solve by themselves, and that they need the help of specialists and only later positive changes in their psychological state are determined.

CONCLUSIONS

1. Introduction of the proposed complex of psychoemotional correction contributed to the formation of RA and PA levels of a moderate one in women of the subgroup IA – 44 (89.8%) and 43 (87.6%), IIA – 43 (89.6%) and 44 (91.7%) and IIIA – 30 (83.3%) and 26 (72.2%) that is considered as an adaptive, physiological type during pregnancy.

2. The positive effect of the proposed complex of psychoemotional correction demonstrates improvement in the processes of PCGD formation, its return to the optimal type in women of subgroup IA – 41 (83.6%), IIA – 39 (81.3%) and IIIA – 26 (72.2%) that approaches the physiological course of pregnancy and helps to reduce perinatal and obstetric complications among pregnant women of these subgroups.

Conflict of interests. The authors declare no conflict of interest.

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