

REDUCING STRESS LEVELS IN WOMEN WITH RECURRENT PREGNANCY LOSS THROUGH INTERVENTION: A QUASI-EXPERIMENTAL STUDY

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Abstract. Recurrent pregnancy loss (RPL) is a severe clinical and psychological challenge associated with increased levels of stress, anxiety, depression, and reduced quality of life among women. The aim of this study was to evaluate the effectiveness of an 8-week psychological intervention in reducing stress and associated psychopathological symptoms in women with RPL.

A quasi-experimental study included 98 women aged 23–45 years with a history of two or more pregnancy losses. Participants were assigned to an intervention group (n=49) and a control group (n=49). The intervention program included cognitive behavioral therapy (CBT), psychoeducation, mindfulness, and emotional regulation techniques. Psychological status was assessed before the intervention, immediately after its completion, and at 3-month follow-up using the Perceived Stress Scale (PSS-10), Depression Anxiety Stress Scales (DASS-21), Impact of Event Scale–Revised (IES-R), and General Self-Efficacy Scale (GSES).

Baseline stress levels did not differ significantly between the groups. After 8 weeks of intervention, perceived stress in the experimental group decreased from 24.6 ± 4.1 to 16.2 ± 3.5 , compared with a decrease from 24.3 ± 3.9 to 23.8 ± 4.2 in the control group ($p < 0.001$; Cohen's $d = 1.97$). Significant reductions in symptoms of depression, anxiety, and post-traumatic stress were also observed, accompanied by increased self-efficacy ($p < 0.001$). Repeated-measures ANOVA confirmed the stability of the intervention effects at follow-up ($F = 45.32$, $p < 0.001$, $\eta^2 p = 0.38$).

The comprehensive psychological intervention demonstrated high effectiveness in reducing psychological distress and improving psychological well-being among women with RPL. Integrating such programs into routine obstetric and gynecological care and women's health clinics may contribute to a multidisciplinary approach to the management of recurrent pregnancy loss and provide essential psychological support for affected women.

Keywords: recurrent pregnancy loss, stress, anxiety, depression, psychological intervention, mindfulness, cognitive behavioral therapy.

Introduction

Repeated pregnancy loss, or a common miscarriage, is a complex pathology of the reproductive system. According to various data, it occurs in about 1-5% of women of reproductive age (Metz et al., 2020). According to the updated clinical recommendations of the European Society for Human Reproduction and Embryology (*ESHRE, 2022/2023*), repeated pregnancy loss is defined by the interruption of two or more pregnancies (Bender, et al., 2023). The clinical significance of this problem is not only due to the difficulties in achieving motherhood, but also to the burden on the psychological health of women.

A study conducted by Kazakhstani researchers Issakhanova, Issanov, Aimagambetova, and colleagues (Issakhanova et al., 2023) demonstrated that women with recurrent pregnancy loss experience higher levels of stress, anxiety, and depressive symptoms compared with women without such experiences. These findings highlight the importance of integrating psychological support and comprehensive psychosocial interventions into reproductive healthcare.

Many recent studies, including extensive work by Quenby and colleagues (2021), suggest that the consequences of pregnancy loss go far beyond the physiological realm. Women who have repeatedly lost a pregnancy have a much higher level of psychological distress than the population norm. A meta-analysis by Iorio and colleagues (2023) found that women who have experienced repeated pregnancy losses have a several times higher incidence of depression, anxiety, and stress than women who have not had such experiences (Iorio et al., 2023). Each subsequent failure can increase feelings of guilt, low self-esteem, fear of the future, and lead to the development of post-traumatic stress disorder (Farren et al., 2022). Nevertheless, in clinical practice, obstetricians and gynecologists often focus on somatic factors, genetic, immunological, endocrine, and anatomical causes (2012). A major gap in literature and practice is the lack of standardized and empirically based psychological interventions and their poor integration into patient management protocols. Recent papers, such as the Integrative Review on Psychosocial Bronzing by Midwives and Nurses (Xie et al., 2024), as well as papers examining the effectiveness of individual counseling (Amani et al., 2022), prove that targeted psychological support can significantly reduce symptoms of grief and anxiety.

The psychological support program proposed in this study is based on a combination of cognitive-behavioral therapy and mindfulness practices (mindfulness). In particular, a clinical trial by Jensen and colleagues (Jensen et al., 2021) clearly demonstrated that meditation and mindfulness training reduced perceived stress levels in women who repeatedly grieved a pregnancy (MacGregor et al., 2025). The program we are proposing extends this approach and offers a comprehensive model of psychological rehabilitation.

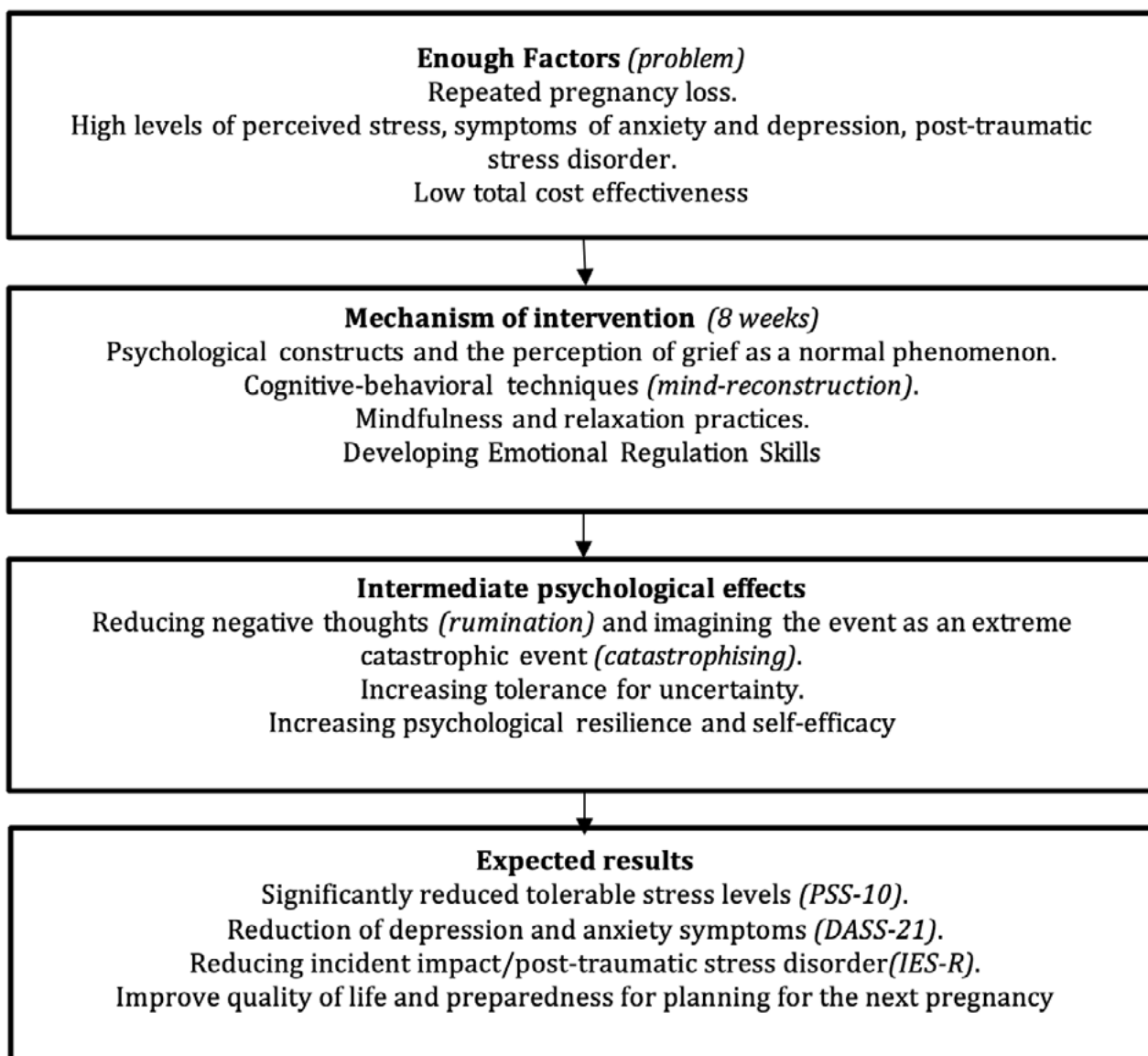


Figure 1. Model of reducing stress levels with intervention in women who have repeatedly lost pregnancies

Materials and Methods

Research methodology

The purpose of the study: to determine the effectiveness of an 8-week comprehensive psychological intervention in reducing stress levels and associated psychological disorders in women with repeated pregnancy loss.

Subject of study: the psycho-emotional condition of women of reproductive age who have repeated pregnancy losses in their obstetrical history.

Research subject: dynamics of perceived stress, anxiety, depression and self-efficacy levels under the influence of specific psychological intervention.

Research hypothesis: participating in an 8-week program that includes cognitive-behavioral therapy and mindfulness elements in women with recurrent pregnancy loss leads to a statistically significant reduction in perceived stress, anxiety, depression, and post-traumatic symptoms, as well as an increase in overall self-efficacy.

Research tasks:

- assessment of the initial psycho-emotional state of the participants by conducting an empirical analysis;
- development and testing of an intervention protocol;

- comparison of changes in experimental and control groups after the intervention and 3 months later;
- identify key predictors of stress reduction through regression analysis.

Scientific discovery: This study extends the existing evidence by demonstrating the effectiveness of an integrative intervention combining cognitive behavioral therapy and mindfulness for women with recurrent pregnancy loss in a quasi-experimental setting. These findings contribute to the growing body of research on psychological interventions for this population.

Practical relevance: the results of the research and the program developed can be directly incorporated into the psychological support protocols in perinatal centers and reproductive clinics.

Research materials and methods.

This work was carried out in a quasi-experimental model, which includes pre-, final and post- testing (*follow-up*) phases. The study was conducted in the Women's Health Clinics from November 2025 to April 2026. The total size of the study group was 98 women between the ages of 23 and 45 who had repeated pregnancy losses ($M=32.4$, $SD=4.8$).

Criteria for participation:

- 18-45 years old;
- a history of at least two abortions (*up to 22 weeks*);
- perceived stress level ≥ 14 points on the PSS-10 scale;
- giving written consent to participate in the study.

Participation in the study was entirely voluntary. All participants were informed about the study objectives and procedures and provided voluntary informed consent prior to participation.

Participants were allocated to two groups: an intervention group ($n = 49$), which completed the 8-week program, and a control group ($n = 49$), which remained on a waiting list and received standard medical care only. Participants were allocated to the study groups according to the study site and their preferences regarding participation in the intervention program. Consequently, the study employed a quasi-experimental design.

The research was conducted in strict accordance with the Declaration of Helsinki, and participants signed an informed consent that data confidentiality would be ensured.

A set of standardized tests was used to evaluate the effectiveness of the intervention as psychodiagnostic methodologies in the study (Zhu et al., 2023; Côté-Arsenault & Denney-Koelsch, 2021; Li et al., 2024; Wang et al., 2024; Lovibond & Lovibond, 1995):

1. *Perceived Stress Scale (PSS-10)* (Cohen et al., 1983). Measures subjective perception of life situations as stressful over the past month. Comprised of 10 items, each rated from 0 to 4. Higher scores indicate higher stress levels.

2. *Depression, Anxiety, and Stress Scale (DASS-21)* (Lovibond & Lovibond, 1995). Consists of 21 questions, divided into three subscales (7 points each): depression, anxiety, and stress (*pressure*). It has high reliability for clinical screening.

3. *Events Impact Rating Scale (Les-R)* (Weiss & Marmar, 1997): Measures the severity of post-traumatic symptoms associated with pregnancy loss (*intrusion, avoidance, physiological arousal*).

4. *The General Self-Efficacy Scale (GSES)* (Schwarzer & Jerusalem, 1995). Consists of 10 items, measuring a person's confidence in their ability to cope with difficult life situations (*range of 10-40 points*).

5. *Brief socio-demographic and history survey*. Designed to collect data on participants' age, education, marital status, and number of pregnancy losses.

Intervention Program. The proposed intervention was carried out as a structured group program for 8 weeks (*8-10 participants per group*) (Montigny et al., 2020; Lok et al., 2007; Lovibond & Lovibond et al., 1995; Cohen et al., 1983). The meetings were held once a week, lasting 90 minutes. The program included the following stages:

Week 1: Psychoeducation- explaining the nature of stress and sadness in the context of repeated pregnancy loss, teaching to accept feelings as normal.

Week 2: Cognitive restructuring - Identifying automatic negative thoughts (*It's my fault, I can never have children*) and cognitive distortions.

Week 3: Physiological self-regulation - learning diaphragmatic breathing and Jacobson progressive muscle relaxation.

Week 4: Mindfulness fundamentals - mindfulness practices, “body scan” techniques, returning to the “now and here” state.

Week 5: Thought Acceptance and Remote Control - the ability to observe without interfering with disturbing thoughts (*elements of Acceptance and Commitment Therapy*).

Week 6: Emotional regulation - working with complex feelings (*anger, jealousy, shame in pregnant women*), developing self-compassion skills.

Week 7: Rebuilding social connections - discussing relationship difficulties with partner, relatives and health care providers, assertiveness training.

Week 8: Conclusion - preventing relapses, applying learned skills to daily life, making plans for the future.

At the intervals between sessions, participants are given homework assignments: audio recordings for meditation, keeping thought journals. These exercises required about 15 to 20 minutes of time each day.

Results

The mathematical and statistical processing of the data obtained was carried out using the SPSS 26.0 software. Student's t-criterion for independent groups and the chi-squared criterion for categorical variables (χ^2) were used to determine differences between groups. Assessment of the effectiveness of the intervention was carried out by means of a dispersion analysis based on secondary measures (*Repeated Measures ANOVA*). The statistical significance level was set at $p < 0.05$.

Table 1

Socio-demographic and history characteristics of groups (n=98)

Character	Intervention (n=49)	Control (n=49)	p-value (χ^2 / t)
Age, year ($M \pm SD$)	32.5 $\pm$ 4.7	32.2 $\pm$ 4.9	0.761
Higher Education, abs. (%)	38 (77.5%)	36 (73.4%)	0.638
Married/with a partner, abs. (%)	42 (85.7%)	40 (81.6%)	0.583
Number of abortions ($M \pm SD$)	2.6 $\pm$ 0.8	2.5 $\pm$ 0.7	0.519
The number of living children, abs. (%)	14 (28.5%)	12 (24.4%)	0.647

As shown in Table 1, the groups were similar in key socio-demographic and clinical indicators during the pre-intervention period.

Table 2

Initial results of psychological methodologies (before intervention)

Indicator (points)	Interventional ($M \pm SD$)	Control ($M \pm SD$)	t-criterion	p-value
PSS-10 (Acceptable stress)	24.6 $\pm$ 4.1	24.3 $\pm$ 3.9	0.371	0.711
DASS-21: Depression	16.8 $\pm$ 3.5	16.4 $\pm$ 3.8	0.542	0.589
DASS-21: Anxiety.	14.5 $\pm$ 3.2	14.1 $\pm$ 3.4	0.599	0.550
IES-R (Post-traumatic stress)	38.4 $\pm$ 8.7	37.9 $\pm$ 9.1	0.278	0.781
GSES (Self-efficacy)	23.1 $\pm$ 4.5	23.5 $\pm$ 4.2	-0.455	0.650

Table 2 shows that there were no statistically significant differences in stress, depression, anxiety (Weiss & Marmar, 1997), and self-efficacy (Schwarzer & Jerusalem, 1995) levels at baseline between the groups ($p>0.05$). Both groups showed higher stress levels and clear signs of psychological distress.

Table 3

Post-experimental results (8 weeks later)

Indicator (points)	Intervention (M±SD)	Control (M±SD)	t-criterion	p-value	Cohen's d
PSS-10	16.2±3.5	23.8±4.2	-9.74	<0.001	1.97
DASS-21:	10.4±2.9	15.9±3.6	-8.32	<0.001	1.68
DASS-21:	9.1±2.4	13.8±3.3	-8.08	<0.001	1.63
IES-R	22.5±6.4	36.5±8.5	-9.21	<0.001	1.86
GSES	28.7±3.8	23.8±4.4	5.89	<0.001	1.19

Analysis of the results after the program was completed (Table 3) showed significant changes. The level of stress assumed (PSS-10) in the intervention group was statistically significantly lower ($t=-9.74$, $p<0.001$), and the impact size was very high (Cohen's $d=1.97$). Similarly, high-value improvements were reported in depression, anxiety, and post-traumatic stress disorder.

Table 4

Dynamics of perceived stress in the follow-up period (PSS-10) (3 months later)

Groups	T ₁ (to)	T ₂ (later)	T ₃ (3 months later)	ANOVA (Interaction. Time×groups)
Intervention	24.6±4.1	16.2±3.5	17.1±3.8	F=45.32, $p<0.001$, $\eta^2_p=0.38$
Control	24.3±3.9	23.8±4.2	24.1±4.5	

The use of Repeated Measures ANOVA (Table 4) demonstrated a clear effect of the «time×group» interaction. The result achieved in the intervention group (a decrease in stress levels) was stable during the delayed control period (T₃) after 3 months, although a slight “rebound” was observed, which did not statistically differ from the results of T₂. The control group did not show any significant dynamics over the entire study period.

Table 5

Correlation analysis of changes in experimental group ($\Delta=T_1 - T_2$) (Pearson r)

Variables	Δ PSS-10	Δ DASS - Depression	Δ IES-R	Δ GSES
Δ PSS-10	1	0.68**	0.59**	-0.54**
Δ DASS - Depression	0.68**	1	0.62**	-0.49**
Δ IES-R	0.59**	0.62**	1	-0.41**
Δ GSES	-0.54**	-0.49**	-0.41**	1

Note: ** $p<0.01$. The values of Δ represent the differences between the pre- and post-intervention values.

Correlation analysis results showed that lower levels of perceived stress were strongly correlated with lower depression ($r=0.68$) and lower experiences of trauma ($r=0.59$). In addition, a negative correlation was found with changes in self-efficacy ($r=-0.54$), meaning that stress levels decreased as self-efficacy (GSES) increased.

Table 6Results of analysis of stress reduction predictors (Δ PSS-10) in the total sample using multiple linear regression

Predictor	B	SE B	β	t	p	95% confidence interval of B
Accommodation in an intervention group. (0/1)	5.84	0.71	0.58	8.23	<0.001	4.43; 7.25
The initial level of stress. (PSS-10, T_1)	0.41	0.09	0.29	4.56	<0.001	0.23; 0.59
Changes in self-efficacy. (Δ GSES)	-0.37	0.11	-0.24	-3.36	0.001	-0.59; -0.15
Number of Missed Pregnancies	0.28	0.18	0.09	1.56	0.22	-0.08; 0.64
Last pregnancy lost < 6 months (0/1)	0.74	0.49	0.10	1.51	1.135	-0.23; 1.71

The last proposed regression model was statistically significant: $F(5.92)=24.18$, $p<0.001$; corrected $R^2=0.54$. The strongest predictor of stress reduction was relevance to the intervention group after monitoring increases in initial stress levels and self-efficacy.

In addition, an ANOVA was performed, in which the subsequently estimated value of PSS-10 was taken as a dependent variable, the group being a constant factor, and the initial PSS-10 was introduced as a controlled variable; the group effect remains significant: $F(1.95)=68.41$, $p<0.001$, partial $\eta^2=0.42$.

Discussion

The data from the proposed quasi-experimental study clearly demonstrates the effectiveness of the 8-week psychological intervention conducted. This program is aimed at women who have experienced repeated pregnancy loss. The initial findings are consistent with the findings in the work of Quenby et al. (2021) and Iorio et al. (2023), which found that in the case of repeated pregnancy loss, there are very high levels of distress, depression and anxiety. Initially, 80% of the subjects were in the risk zone for developing clinical depression and post-traumatic stress on the IES-R scale.

The intervention, which combined cognitive-behavioral therapy and mindfulness, improved psychoemotional status to a clinically and statistically significant extent. The magnitude of the effect on stress reduction was estimated to be very large. These data are similar to a randomized controlled trial by Jensen and colleagues (2021), in which a 7-week mindfulness program reliably reduced stress in women who repeatedly lost a pregnancy. However, because our intervention involved cognitive restructuring and emotion regulation approaches, not only significantly reduced stress but also depression symptoms (score 16.8 to 10.4 on the DASS-21).

The mechanism of the intervention is likely to be related to transforming cognitive patterns. Women who lose pregnancies repeatedly are more likely to ruminate and blame themselves. Mindfulness practices have been shown to help avoid destructive thoughts, and cognitive-behavioral therapy techniques have helped rationalize fears about future pregnancies. The results of correlation analysis (Table 5) suggest that increased self-efficacy (GSES) is a key protective factor mediating reduced distress.

In practical terms, the results obtained respond to updated ESHRE recommendations (Lewis et al., 2023) and systematic analyses on psychosocial interventions (Xie et al., 2024). Obstetricians and reproductive physicians should refer patients to clinical psychologists from the moment recurrent pregnancy loss is diagnosed, rather than after many failures.

Obstetricians and gynecologists and reproductive specialists should refer patients to clinical psychologists from the moment recurrent pregnancy loss is diagnosed, not after many failures. Despite the significance of the results, there are a number of limitations. First, a quasi-experimental study without strict randomization may allow for selection bias. Second, the sample is limited to women in large cities, so caution is needed in generalizing to other socio-cultural groups. Third, the estimates are based on self-reports, so this is likely to be a social bias effect.

Conclusion

This study is based on cognitive-behavioral therapy and mindfulness experiments. The series provides strong evidence of the effectiveness of an 8-week psychological intervention. The program has proven to be a powerful tool that significantly reduces stress, depression, and anxiety levels in women who have repeatedly lost a pregnancy. In addition, it increases overall self-efficacy and decreases post-traumatic symptoms, and the positive impact gained lasts for up to three months after the program ends.

Given the serious psychological consequences of repeated pregnancy loss, we see the clinical need to integrate science-based psychological rehabilitation programs into the standards of obstetric and gynecological care. Future research should focus on large-scale randomized controlled trials, in which the impact of such interventions should be evaluated not only on the psychological condition, but also on the physiological outcomes of subsequent pregnancies.

Conflict of interest

The authors declare no conflicts of interest.

Contribution of the authors

Imirova Dilara Kakharmanovna – Generation of research ideas, collection of material and selection of research tools according to theoretical sections, conducting research, performing statistical analysis of data and interpreting them, editing the text for publication.

Aikinbayeva Gulden Kanatovna – Critically review the content of the article and edit the text, conduct consultations; approve the final version of the article for publication.

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Жүктілікті қайталап жоғалтқан әйелдердегі стрессті төмендету: квазиэксперименттік зерттеу

Аңдатпа. Қайталама жүктілікті жоғалту (ҚЖЖ) әйелдер үшін стресс, мазасыздық, депрессия деңгейінің жоғарылауымен және өмір сапасының төмендеуімен қатар жүретін ауыр клиникалық және психологиялық сынақ болып табылады. Зерттеудің мақсаты — ҚЖЖ бар әйелдердегі стресс пен қатар жүретін психопатологиялық симптомдарды төмендетуде 8 апталық психологиялық интервенцияның тиімділігін бағалау.

Квазиэксперименттік зерттеуге анамнезінде екі немесе одан да көп жүктілікті жоғалту жағдайы бар, жасы 23–45 аралығындағы 98 әйел қатысты. Қатысушылар интервенциялық (n=49) және бақылау (n=49) топтарына бөлінді. Бағдарлама когнитивті-мінез-құлықтық терапия, психобілім беру, майндфулнесс

және эмоцияларды реттеу әдістерін қамтыды. Психологиялық жағдай интервенцияға дейін, интервенция аяқталғаннан кейін және 3 айдан соң Перцептивті стресс шкаласы (PSS-10), Депрессия, мазасыздық және стресс шкаласы (DASS-21), Оқиға әсері шкаласы (IES-R) және Жалпы өзіндік тиімділік шкаласы (GSES) арқылы бағаланды.

Зерттеу басында топтар арасында стресс деңгейі бойынша статистикалық маңызды айырмашылықтар анықталмады. 8 апталық интервенциядан кейін эксперименттік топта қабылданатын стресс деңгейі $24,6 \pm 4,1$ -ден $16,2 \pm 3,5$ баллға дейін төмендеді, ал бақылау тобында $24,3 \pm 3,9$ -дан $23,8 \pm 4,2$ баллға дейін өзгерді ($p < 0,001$; Cohen's $d = 1,97$). Сонымен қатар, депрессия, мазасыздық және посттравмалық стресс симптомдарының айтарлықтай төмендеуі және өзіндік тиімділіктің жоғарылауы байқалды ($p < 0,001$). Қайталама өлшемдерге жүргізілген дисперсиялық талдау Follow-up кезеңінде әсердің тұрақтылығын растады ($F = 45,32$; $p < 0,001$; $\eta^2 p = 0,38$).

Кешенді психологиялық интервенция ҚЖЖ бар әйелдердегі психологиялық дистресті төмендетуде және психологиялық әл-ауқатты жақсартуда жоғары тиімділігін көрсетті. Мұндай бағдарламаларды акушерлік-гинекологиялық клиникалар мен әйелдер консультацияларының тәжірибесіне енгізу жүктілікті әдеттегі көтере алмаушылығы бар пациенттерге көмек көрсетуде пәнаралық тәсілді дамытуға ықпал етуі мүмкін.

Түйін сөздер: жүктілікті қайталап жоғалту, стресс, мазасыздық, депрессия, психологиялық интервенция, майндфулнесс, когнитивті-мінез-құлықтық терапия.

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Снижение уровня стресса у женщин с повторной потерей беременности с помощью интервенции: квазиэкспериментальное исследование

Аннотация. Повторная потеря беременности (ППБ) является тяжелым клиническим и психологическим испытанием, сопровождающимся повышением уровня стресса, тревоги, депрессии и снижением качества жизни женщин. Цель исследования — оценить эффективность 8-недельной психологической интервенции в снижении стресса и сопутствующих психопатологических симптомов у женщин с ППБ.

В квазиэкспериментальном исследовании приняли участие 98 женщин в возрасте 23–45 лет с анамнезом двух и более потерь беременности. Участницы были распределены на интервенционную ($n = 49$) и контрольную ($n = 49$) группы. Программа включала методы когнитивно-поведенческой терапии, психообразование, майндфулнесс и техники эмоциональной регуляции. Психологическое состояние оценивали с помощью Шкалы воспринимаемого стресса (PSS-10), Шкалы депрессии, тревоги и стресса (DASS-21), Шкалы событийного воздействия (IES-R) и Шкалы общей самооффективности (GSES) до интервенции, после ее завершения и через 3 месяца.

Исходные показатели стресса в группах статистически значимо не различались. После 8 недель интервенции в экспериментальной группе уровень воспринимаемого стресса снизился с $24,6 \pm 4,1$ до $16,2 \pm 3,5$ балла, тогда как в контрольной группе — с $24,3 \pm 3,9$ до $23,8 \pm 4,2$ ($p < 0,001$; Cohen's $d = 1,97$). Также отмечено значимое снижение симптомов депрессии, тревоги и посттравматического стресса и повышение самооффективности ($p < 0,001$). Повторный дисперсионный анализ подтвердил устойчивость эффекта на этапе Follow-up ($F = 45,32$; $p < 0,001$; $\eta^2 p = 0,38$).

Комплексная психологическая интервенция продемонстрировала высокую эффективность в снижении психологического дистресса и улучшении благополучия женщин с ППБ. Ее интеграция в практику акушерско-гинекологических клиник и женских консультаций может способствовать развитию междисциплинарного подхода к ведению пациенток с привычным невынашиванием беременности.

Ключевые слова: повторная потеря беременности, стресс, тревога, депрессия, психологическая интервенция, майндфулнесс, когнитивно-поведенческая терапия.

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