

## Original Article

# Metabolic diseases and mental disorders in female subfertility: effectiveness of cognitive behavioral therapy intervention

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## Abstract

Women with impaired fertility and metabolic disturbances often experience anxiety, depressive symptoms, emotional overeating, and dysfunctional beliefs related to body weight and self-image. This study evaluated the effectiveness of a structured cognitive behavioral therapy program in this patient group. A total of 609 women with metabolic disturbances were initially screened, including 314 women with primary or secondary subfertility; 240 eligible women aged 25–44 years were subsequently included in the prospective randomized controlled trial. Participants were randomized to standard care combined with a 12-week cognitive behavioral therapy program or to standard care alone. Psychological, behavioral, anthropometric, and laboratory parameters were assessed at baseline and after 12 weeks. The intervention group showed a greater reduction in depressive and anxiety symptoms than the control group. Cognitive behavioral therapy was also associated with fewer maladaptive automatic thoughts, reduced emotional overeating, increased physical activity, better dietary adherence, and moderate improvements in body mass index, waist circumference, glucose metabolism, and lipid profile. Cognitive behavioral therapy may be an effective component of interdisciplinary care for women with subfertility and metabolic disturbances.

**Keywords:** subfertility, metabolic syndrome, obesity, depression, anxiety, feeding and eating disorders

## Introduction

Subfertility is a clinical and medical-social problem that requires consideration of somatic, metabolic, psychological, and behavioral factors. Subfertility is often accompanied by emotional distress, uncertainty regarding treatment outcomes, decreased quality of life, and an increased risk of anxiety and depressive symptoms [1, 2]. At the population level, depressive disorders and mental health problems represent a

substantial public health burden, and reproductive or perinatal vulnerability may be additionally aggravated under conditions of war-related displacement and stress [3–5].

Metabolic diseases, including obesity, type 2 diabetes mellitus, dyslipidemia, and metabolic syndrome, may impair reproductive health through hormonal, inflammatory, vascular, and behavioral mechanisms. Chronic metabolic disturbances are also associated with psychological distress, difficulties adhering to



lifestyle recommendations, disordered eating behavior, and reduced treatment adherence [6–9]. In female reproductive endocrinology, obesity, polycystic ovary syndrome, metabolic syndrome, and menstrual dysfunction are closely connected with reproductive disorders and may require early clinical and laboratory identification [10–12]. Disordered eating behavior, body dissatisfaction, and weight-related stigma may additionally reinforce distress and unhealthy weight-related behaviors [13–16]. Microbiome-related mechanisms have also been discussed in relation to female reproductive health and the interaction between somatic and mental health [17, 18]. Perceived weight discrimination may further complicate adherence and psychological well-being in patients with obesity [19, 20].

In our previous study, women with subfertility and metabolic diseases frequently showed anxiety and depressive symptoms, as well as maladaptive automatic thoughts related to body weight, eating behavior, and self-esteem [21]. Beliefs such as “diets do not work”, “I will always be fat”, and “no one will love me because of my weight” may reinforce emotional overeating, distress, and low motivation for long-term lifestyle change.

Cognitive behavioral therapy (CBT) is an evidence-based approach for reducing anxiety, depressive symptoms, maladaptive behavior, and emotional regulation difficulties [22–28]. For women with subfertility and metabolic disturbances, CBT may be especially relevant because psychological factors can directly affect adherence to recommendations regarding nutrition, physical activity, and medical treatment.

Despite evidence supporting CBT in various mental and behavioral disorders, its use in women with combined subfertility, metabolic disturbances, and psycho-emotional symptoms remains insufficiently studied. The aim of the study was to evaluate the effectiveness of a structured CBT program in correcting anxiety, depressive symptoms, cognitive distortions, and maladaptive eating behavior in subfertile women with metabolic disorders.

## Material and methods

### Study design and patients

This prospective randomized controlled trial with parallel groups was conducted as an interventional continuation of a previous observational stage that assessed psycho-emotional symptoms, cognitive diffi-

culties, and maladaptive automatic thoughts in women with subfertility and metabolic diseases [21]. During that stage, 314 women with primary or secondary subfertility were identified among 609 patients with metabolic disturbances.

A total of 240 eligible women were randomized in a 1:1 ratio to the CBT group or the control group. The CBT group received standard metabolic and reproductive care combined with a structured CBT program, whereas the control group received standard medical care only.

Inclusion criteria were female sex, age 25–44 years, confirmed primary or secondary subfertility, at least one diagnosed metabolic disturbance, and psycho-emotional symptoms or maladaptive cognitions defined by PHQ-9 $\geq$ 5, GAD-7 $\geq$ 5, or clinically significant dysfunctional automatic thoughts. Exclusion criteria were severe psychiatric disorders, severe cognitive impairment, concurrent structured psychotherapy, inability to attend weekly sessions, acute severe somatic decompensation, or pregnancy before intervention initiation.

### Laboratory, anthropometric and clinical data collection

At baseline and after 12 weeks, all participants underwent clinical, anthropometric, laboratory, and psychological assessment. Clinical data included type of subfertility, metabolic disturbances, comorbidities, reproductive history, and ongoing treatment. Anthropometric assessment included body mass index and waist circumference.

Laboratory evaluation included fasting glucose, HbA1c, LDL-C, HDL-C, and triglycerides. Depressive symptoms were assessed using PHQ-9, anxiety symptoms using GAD-7, and maladaptive automatic thoughts related to body weight, eating behavior, self-esteem, and social rejection were analyzed during psychological assessment.

The CBT group received 12 individual weekly sessions lasting 50–60 minutes. The program included psychoeducation, individual goal setting, identification and restructuring of dysfunctional thoughts, eating behavior modification, emotional regulation skills, stress management, and relapse prevention. The control group received standard gynecological, reproductive, and endocrinological care with lifestyle counseling.

The full five-stage assessment and correction algorithm was described in our previous publication, which presented the results of the first two stages [21]. In the

present interventional study, the focus was placed on the implementation and evaluation of stages 3, 4, and 5, including the formation of healthy behavioral strategies, stress and emotional regulation, and relapse prevention. Primary endpoints were changes in PHQ-9 and GAD-7 scores after 12 weeks. Secondary endpoints included changes in maladaptive automatic thoughts, readiness for behavioral change, emotional overeating, physical activity, dietary adherence, body mass index, waist circumference, fasting glucose, HbA1c, and lipid profile parameters.

### Statistical analysis

Statistical analysis was performed after completion of the 12-week follow-up period using Microsoft Excel and SPSS Statistics. Quantitative variables are presented as means and standard deviations, and categorical variables as absolute numbers and percentages.

Distribution normality was assessed before selecting statistical tests. Within-group changes were analyzed using the paired Student’s t-test or a non-parametric alternative when distributional assumptions were not met. Between-group differences were assessed using the independent samples Student’s t-test or the corresponding non-parametric test. Categorical variables were analyzed by frequency analysis. Differences were considered statistically significant at  $p < 0.05$ .

The sample size was determined by the available cohort selected after the preliminary observational stage. A total of 240 participants allowed randomization into two equal groups and provided sufficient power to assess clinically meaningful changes in the main psycho-emotional outcomes during the 12-week follow-up.

### Results

Overall, at the initial stage of the study, 609 women with metabolic disturbances were screened. During the preliminary observational stage, primary or secondary subfertility was identified in 314 patients. After applying the inclusion and exclusion criteria, 240 women were considered eligible for participation in the interventional stage of the study and were randomized in a 1:1 ratio to the cognitive behavioral therapy group or the control group. Each group initially included 120 participants. During the 12-week follow-up period, 112 women in the CBT group and 109 women in the control group completed the study. The study com-

pletion rate was 93.3% in the CBT group and 90.8% in the control group. The scheme of patient enrollment, randomization, and completion of study participation is presented in Figure 1.

Baseline demographic, anthropometric, clinical, and psycho-emotional characteristics are presented in Table 1. The groups were comparable in age, BMI, waist circumference, frequency of metabolic disturbances, PHQ-9, GAD-7, and MoCA scores, indicating adequate baseline balance before the intervention. The therapeutic intervention represented the practical implementation of stages 3, 4, and 5 of the previously described CBT-based algorithm.

These stages included the formation of healthy behavioral strategies through self-monitoring, food diaries, gradual physical activity, and alternatives to emotional overeating; stress and emotional regulation using relaxation, mindfulness, work with overeating triggers, and impulse-control techniques; and support with relapse prevention through action plans, analysis of relapse factors, long-term follow-up, regular sessions, and remote support.

PHQ-9 scores decreased from  $8.2 \pm 1.9$  to  $4.1 \pm 1.6$  in the CBT group, compared with a smaller decrease from

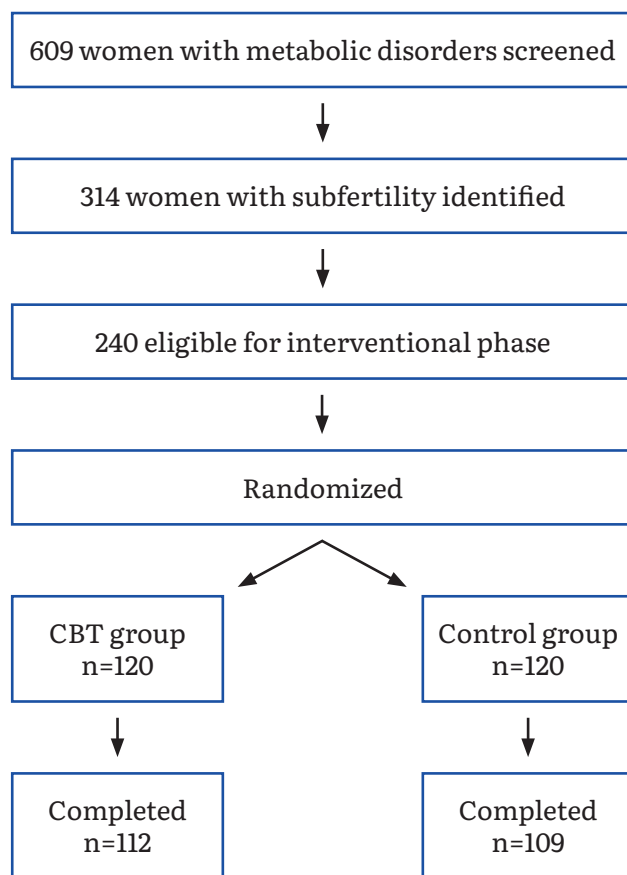


Figure 1: Flowchart of patient enrollment, randomization and follow-up.

Table 1: Baseline characteristics of study participants.

Variable	CBT group (n=120)	Control group (n=120)	p-value
Age (years)	37.4±3.2	36.9±3.5	0.28
BMI (kg/m <sup>2</sup> )	31.8±3.9	32.1±4.1	0.56
Waist circumference (cm)	98.7±8.4	99.5±8.1	0.47
Type 2 diabetes	56 (46.7%)	58 (48.3%)	0.79
Obesity	87 (72.5%)	89 (74.2%)	0.76
Dyslipidemia	71 (59.2%)	69 (57.5%)	0.78
Metabolic syndrome	64 (53.3%)	62 (51.7%)	0.80
PHQ-9	8.2±1.9	8.0±2.1	0.52
GAD-7	11.4±2.3	11.1±2.4	0.41
MoCA	23.1±1.8	23.3±1.7	0.48

8.0±2.1 to 7.1±2.0 in the control group ( $p<0.001$ ). GAD-7 scores followed the same pattern, decreasing from 11.4±2.3 to 6.2±2.0 in the CBT group and from 11.1±2.4 to 10.2±2.3 in the control group ( $p<0.001$ ). Figure 2 illustrates the contrasting trajectories of PHQ-9 and GAD-7 scores, with a clear decrease in the CBT group and only minor changes in the control group.

Behavioral outcomes are presented in Table 2. After 12 weeks, the CBT group showed fewer episodes of emotional overeating, a marked increase in weekly physical activity, and better dietary adherence. Changes in the control group were smaller, indicating that the psychotherapeutic component strengthened the behavioral effect of standard lifestyle counseling.

At baseline, dysfunctional beliefs related to dieting, body weight, dietary lapses, and rejection were common. After 12 weeks, these thoughts decreased substantially in the CBT group, whereas they remained close to baseline levels in the control group. The reduction in the frequency of maladaptive cognitive patterns is additionally presented in Figure 3. Visual comparison demonstrates a substantial decrease in the prevalence of dysfunctional beliefs in the CBT group compared with the control group, where the indicators remained close to baseline values.

Changes in metabolic parameters are presented in Table 3. At baseline, no statistically significant differences were found between the CBT and control groups for any metabolic parameter, indicating comparable initial metabolic status. After 12 weeks, the CBT group showed statistically significant improvements in BMI, waist circumference, fasting glucose, HbA1c, LDL-C, HDL-C, and triglycerides compared with baseline and

with the control group. In contrast, no statistically significant changes were observed in the control group between baseline and 12 weeks. The most pronounced anthropometric change was observed for waist circumference, which decreased by 4.9 cm in the CBT group and by 1.2 cm in the control group.

Exploratory reproductive outcomes are presented in Figure 4. The CBT group showed a higher proportion of spontaneous pregnancies, which may indicate a more favorable trend toward natural conception among women who received psychotherapeutic support. Although continuation of subfertility treatment was observed in both groups, it was higher in the control group. At the same time, control participants more often proceeded to an *in vitro* fertilization program, whereas women in the CBT group were less frequently referred to or chose IVF. Since these outcomes were exploratory, they should be interpreted cautiously and not as direct evidence of a reproductive effect of CBT.

Overall, CBT was associated with greater improvement across psycho-emotional, cognitive, behavioral, and metabolic indicators than standard care alone. Exploratory reproductive outcomes suggested a favorable trend toward spontaneous pregnancy in the CBT group, while IVF entry was more frequent in the control group.

## Discussion

This study found that adding a structured 12-week cognitive behavioral therapy program to standard metabolic and reproductive care improved psycho-emo-

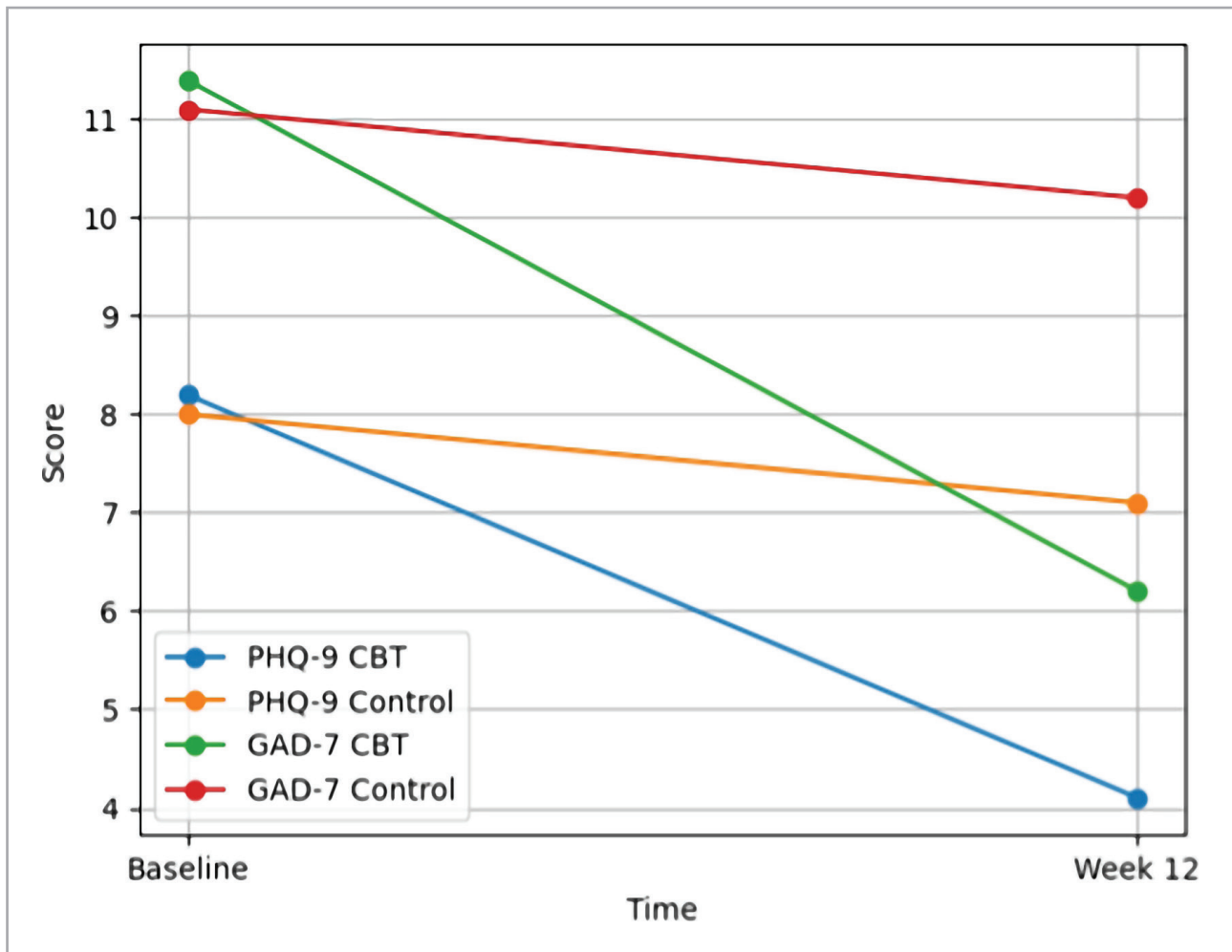


Figure 2: Changes in PHQ-9 and GAD-7 scores.

tional, cognitive, behavioral, and metabolic outcomes in women with subfertility and metabolic disturbances. Compared with standard care alone, CBT was associated with larger reductions in PHQ-9 and GAD-7 scores, fewer maladaptive automatic thoughts, less emotional overeating, greater physical activity, and better dietary adherence. Moderate improvements in BMI, waist circumference, glycemic control, and lipid profile were also observed.

These findings extend the previous observational stage of the study, which identified anxiety, depressive symptoms, cognitive distortions, emotional overeat-

ing, and unstable health-related habits as key therapeutic targets in this patient group [21]. The present results suggest that these targets can be modified within a time-limited CBT intervention when psychological care is integrated with routine medical management.

The reduction in depressive and anxiety symptoms is clinically relevant because emotional distress may undermine self-regulation, treatment adherence, and motivation to continue reproductive care. In women with subfertility, anxiety may be reinforced by uncertainty, repeated treatment attempts, fear of failure, and perceived loss of control over the body. CBT may

Table 2: Changes in behavioral outcomes.

Variable	CBT baseline	CBT 12 weeks	Control baseline	Control 12 weeks
Emotional eating episodes/week	4.6±1.3	2.1±1.1	4.5±1.4	4.0±1.3
Physical activity (min/week)	78±32	152±45	81±30	96±34
Diet adherence score	4.2±1.5	7.1±1.7	4.3±1.6	5.0±1.5

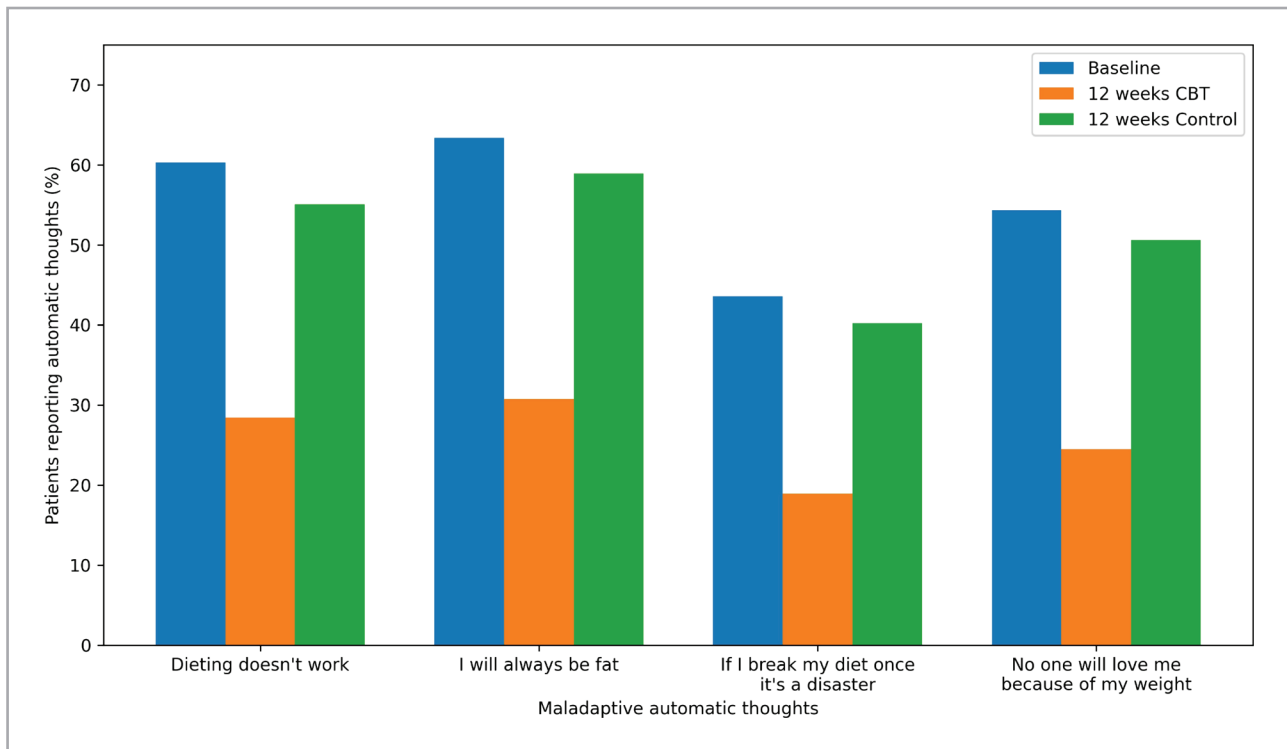


Figure 3: Reduction of maladaptive cognitions.

reduce these responses by addressing catastrophizing, avoidance, dysfunctional beliefs, and low tolerance of uncertainty [22–28].

A central effect of the intervention was the decline in maladaptive automatic thoughts, particularly beliefs related to the futility of dieting, irreversible excess weight, and anticipated rejection. Such cognitions may sustain learned helplessness, self-criticism, and repeated lapses in eating behavior. Their reduction supports the role of cognitive restructuring as a plausible mechanism of change.

Behavioral outcomes also improved in the CBT group. The decrease in emotional overeating and the

increase in physical activity and dietary adherence indicate that the intervention helped patients translate general lifestyle recommendations into more stable daily behaviors. This is important because standard counseling may be insufficient when patients experience anxiety, low self-efficacy, negative body image, or previous unsuccessful attempts to change weight-related behavior.

The metabolic improvements should be interpreted as indirect effects of psychological and behavioral change rather than as a direct biological effect of CBT. Reduced emotional overeating, greater activity, improved adherence, and lower psycho-emotional tension

Table 3: Changes in metabolic parameters.

Parameter	CBT baseline	CBT 12 weeks	Control baseline	Control 12 weeks	P
	1	2	3	4	
BMI	31.8±3.9	28.9±3.7	32.1±4.1	31.8±4.0	0.01
Waist circumference	98.7±8.4	93.8±7.9	99.5±8.1	98.3±8.0	0.003
Glucose	6.4±1.1	4.9±0.9	6.3±1.0	6.2±1.0	0.02
HbA1c	6.3±0.8	4.9±0.7	6.2±0.7	6.1±0.7	0.03
LDL-C	3.68±0.74	2.61±0.68	3.64±0.71	3.55±0.69	0.01
HDL-C	1.09±0.21	1.38±0.22	1.10±0.20	1.12±0.21	0.04
Triglycerides	1.96±0.43	1.32±0.37	1.91±0.41	1.84±0.39	0.02

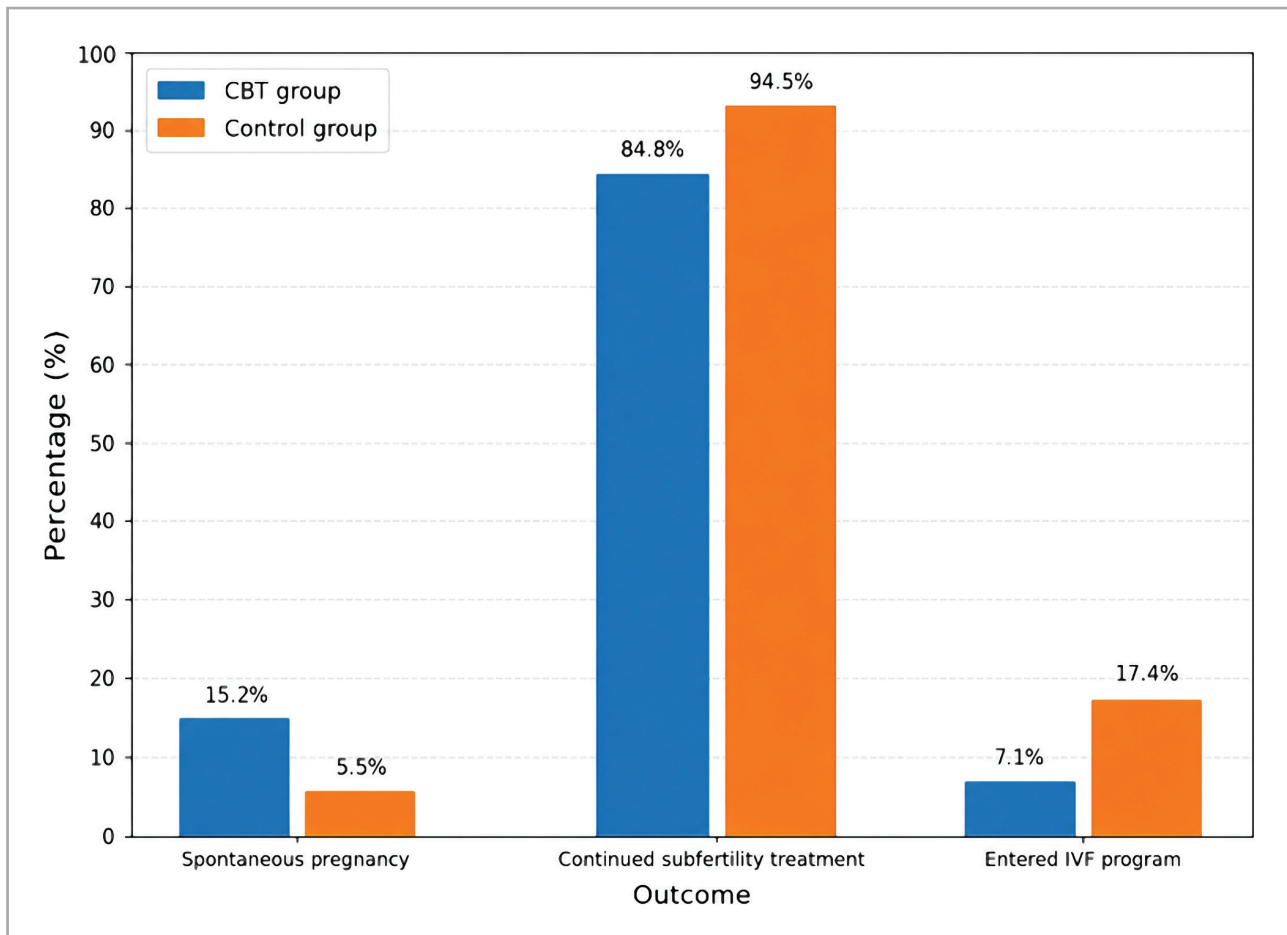


Figure 4: Exploratory reproductive outcomes.

may together contribute to better waist circumference, glucose control, and lipid profile. The relatively short follow-up period means that these metabolic findings require confirmation in longer studies. These findings should also be considered in the broader context of female metabolic and reproductive health, where endocrine, cognitive-behavioral, weight-stigma, microbiome-related mechanisms, and early child health programming may contribute to insulin resistance, inflammatory responses, metabolic dysregulation, reproductive vulnerability, and difficulties in maintaining long-term lifestyle changes [8–20, 29].

Exploratory reproductive outcomes suggested a favorable trend in the CBT group, mainly due to a higher proportion of spontaneous pregnancies, whereas IVF entry was more frequent in the control group and continuation of subfertility treatment remained high in both groups.

These outcomes were not primary endpoints and should not be interpreted as proof that CBT directly improves fertility. More cautiously, they suggest that reduced distress and maladaptive beliefs may support engagement with reproductive care and may be com-

patible with a more natural-conception-oriented trajectory in some patients.

An important strength of this study is that it continues the previous observational stage and evaluates the same clinically relevant targets within a prospective interventional design. This allows a more consistent interpretation of CBT effects in this specific patient population. Additional strengths include baseline comparability of the groups and multidimensional assessment of psychological, behavioral, anthropometric, metabolic, and exploratory reproductive outcomes.

Several limitations and gaps should be acknowledged. The follow-up period was limited to 12 weeks, behavioral outcomes partly relied on self-reported data, and the intervention was assessed as a whole without separating the effects of individual CBT components. In addition, reproductive outcomes were exploratory and cannot confirm a direct fertility-enhancing effect of CBT. Future studies should include longer follow-up, larger multicenter samples, and a more detailed analysis of psychological, metabolic, endocrine, microbiome-related, and reproductive mechanisms underlying the observed changes.

Further research should assess the durability of these effects at 6 and 12 months, identify subgroups that benefit most from CBT, and compare individual, group, combined, and digital formats of psychological support.

## Conclusions

The 12-week CBT program demonstrated clinical effectiveness as an adjunct to standard metabolic and reproductive care in women with subfertility and metabolic disturbances.

CBT led to a more pronounced reduction in depressive and anxiety symptoms and helped correct maladaptive weight-, eating-, and self-image-related cognitions that had been identified as key therapeutic targets in the previous observational stage.

The intervention improved behavioral self-regulation, particularly by reducing emotional overeating and increasing physical activity and dietary adherence, which was accompanied by favorable changes in anthropometric and metabolic parameters.

Exploratory reproductive outcomes suggested a higher tendency toward spontaneous pregnancy and natural conception in the CBT group, while IVF entry was more frequent in the control group; however, these findings require cautious interpretation and confirmation in longer follow-up studies.

Overall, the results support the use of CBT as part of interdisciplinary management for women with combined subfertility, metabolic disorders, and psycho-emotional difficulties.

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## Conflict of interest

The authors declare no conflict of interest.

## Ethics approval

The approval for this study was obtained from the Ethics Commission in Conducting Experimental and

Clinical Research Communal Non-profit Enterprise “Maternity Hospital No. 5” Odesa City Council, protocol No. 1 on June 6<sup>th</sup> 2024. All methods were performed according to the Declaration of Helsinki.

## Consent to participate

Written informed consent was obtained from all the participants.

## References

1. WebMD. What is subfertility? Available at: <https://www.webmd.com/infertility-and-reproduction/what-is-subfertility>
2. Farquhar CM, Bhattacharya S, Repping S, et al. Female subfertility. *Nat Rev Dis Primers*. 2019;5:7.
3. Brody DJ, Pratt LA, Hughes JP. Prevalence of depression among adults aged 20 and over: United States, 2013-2016. *NCHS Data Brief*. 2018;(303):1-8.
4. Patel V, Saxena S, Lund C, et al. The Lancet Commission on global mental health and sustainable development. *Lancet*. 2018;392(10157):1553-1598.
5. Rodríguez-Muñoz MF, Chrzan-Dętkoś M, Uka A, García-López HS, Krupelnytska L, Morozova-Larina O, Vavilova A, Molotkas A, Murawska N, Le H-N. The impact of the war in Ukraine on the perinatal period: Perinatal mental health for refugee women (PMH-RW) protocol. *Front Psychol*. 2023;14:1152478. doi:10.3389/fpsyg.2023.1152478.
6. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet*. 2017;370(9590):851-858.
7. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4.4 million participants. *Lancet*. 2016;387(10027):1513-1530.
8. Fanelli G, Raschi E, Hafez G, et al. The interface of depression and diabetes: treatment considerations. *Transl Psychiatry*. 2025;15:22.
9. Moulton DC, Pickup CJ, Khalida I. The link between depression and diabetes: the search for shared mechanisms. *Lancet Diabetes Endocrinol*. 2015;3:461-471.
10. Artyomenko VV, Velychko VI, Lahoda D, Danylchuk G. Common clinical laboratory features among women with polycystic ovary syndrome and metabolic syndrome. *JML*. 2023;16(9):1215-1219.
11. Artyomenko V, Velychko V, Lahoda D. New approaches to early detection of polycystic ovary syndrome in obese women. *Reprod Endocrin*. 2022;66:20-25.
12. Artyomenko VV, Nastradina NM, Nitochko KO, Altyieva MA. Hypomenstrual syndrome in adolescent girls as a result of reproductive dysfunction in their mothers. *Reprod Endocrin*. 2021;61:66-70.
13. Tan EJ, Raut T, Le LK, Hay P, Ananthapavan J, Lee YY, Mihalopoulos C. The association between eating disorders and mental health: an umbrella review. *J Eat Disord*. 2023;11:51.

14. Weinberger NA, Kersting A, Riedel-Heller SG, Luck-Sikorski C. Body dissatisfaction in individuals with obesity compared to normal-weight individuals: a systematic review and meta-analysis. *Obes Facts*. 2016;9:424-441.
15. Tomiyama AJ, Carr D, Granberg EM, Major B, Robinson E, Sutin AR, Brewis A. How and why weight stigma drives the obesity 'epidemic' and harms health. *BMC Med*. 2018;16:123.
16. Lahoda D. Stigmatization of the Patients Who Live with Overweight or Obesity. In: *Obesity - Recent Insights and Therapeutic Options*. IntechOpen; 2023. Available from: <http://dx.doi.org/10.5772/intechopen.109629>.
17. Artyomenko VV, Nastradina NM, Chikanchi V, Iacoban S. Vaginal microbiome and neoplasms of the female reproductive system: a marker or a factor of influence? *Reprod Endocrin*. 2024;71:84-92.
18. Artyomenko VV, Zhovtenko OV, Stasii YO, Piron-Dumitrascu M. The human microbiome and mental health: the latest views. *Family Med Eur Pract*. 2024;2(108):29-35.
19. Emmer C, Bosnjak M, Mata J. The association between weight stigma and mental health: a meta-analysis. *Obes Rev*. 2020;21:e12935.
20. Puhl RM, Andreyeva T, Brownell KD. Perceptions of weight discrimination: prevalence and comparison to race and gender discrimination in America. *Int J Obes*. 2008;32:992-1000.
21. Artyomenko V, Zhelezov D, Lahoda D, Derishov S, Velichko G, Piron-Dumitrascu M, Kugel V. Metabolic diseases and mental disorders in female subfertility: first results on assessment and correction by cognitive behavioral therapy. *Rom J Diabetes Nutr Metab Dis*. 2025;32(2):128-137. doi:10.46389/rjd-2025-1932.
22. Nakao M, Shiotsuki K, Sugaya N. Cognitive-behavioral therapy for management of mental health and stress-related disorders: Recent advances in techniques and technologies. *Biopsychosoc Med*. 2021;15(1):16.
23. Hassan Kariri HD, Almubaddel A. From theory to practice: Revealing the real-world impact of cognitive behavioral therapy in psychological disorders. *Cureus*. 2024;16(7):e65593.
24. Brent D, Emslie G, Clarke G, et al. Switching to another SSRI or to venlafaxine with or without cognitive behavioral therapy for adolescents with SSRI-resistant depression. *JAMA*. 2008;299(8):901-913.
25. March JS. Fluoxetine, cognitive-behavioral therapy, and their combination for adolescents with depression: Treatment for Adolescents with Depression Study randomized controlled trial. *JAMA*. 2004;292(7):807-820.
26. Sims J. Cognitive behavioural therapy for people with PTSD and substance use. *Nursing Times*. 2022;118(6).
27. Qaseem A, et al. Management of chronic insomnia disorder in adults: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. 2016;165:125-133.
28. Wolraich MI, et al. Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*. 2019;144(4):e20192528.
29. Artyomenko V, Mnikh L, Domakova N. Woman's microbiome and obstetric and perinatal risks: what do they have in common? *Reprod Health Woman*. 2023;(6):37-45. doi:10.30841/2708-8731.6.2023.289995. (In Ukrainian)