

# Effectiveness of Psychotherapeutic Nursing Intervention on Infertility Stress, Uncertainty, Anxiety and Implantation Rate Among Women Undergoing In-Vitro Fertilization Treatment: A Single Centre Pilot Randomized Controlled Trial

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## Abstract:

**Background:** Within the realm of mental distress experienced by women who are unable to conceive, tension, uncertainty, and anxiety are prevalent concerns. The multitude of unpredictable elements that occur during IVF treatment process can cause anxiety and stress. This unpleasant feeling has an impact on the psycho-neurological pathways of women who are unable to conceive. As a consequence, fertilisation and implantation are inhibited, leading to adverse effects on pregnancy. The individual's experience will vary depending on the extent of social support, the coping mechanisms employed, the quality of the marital connection, and the level of stress caused by infertility.

**Material and method:** The study was carried out on 20 women undergoing IVF treatment. Participants were selected by simple random sampling technique. (COMPI) Fertility Problem Stress Scale, Uncertainty Scale for Infertile Women and Short Version of the Spielberger State—trait Anxiety Inventory were used to assess the level of stress, uncertainty and anxiety.

**Results:** The findings of the current study indicate that 80% of women undergoing IVF in the experimental group experienced a moderate degree of stress prior to the intervention. However, this percentage decreased to 60% after receiving intervention. In case of uncertainty maximum of women had mild level of uncertainty and it remain unchanged in experimental group after intervention. However, there was a significant decrease in anxiety levels (both STAIS and STAIT) in the experimental group following the intervention. Participants that received psychotherapeutic nursing intervention showed a higher rate of implantation.

**Conclusion:** Psychotherapeutic nursing intervention can decrease the anxiety among women undergoing in vitro fertilisation treatment and also enhance the implantation rate.

**Keywords:** Anxiety, In-vitro fertilization, Implantation rate, Psychotherapeutic Nursing Intervention, Stress, Uncertainty,

## Background

Infertility is a medical condition affecting the male or female reproductive system, characterised by the

inability to conceive a pregnancy after engaging in frequent unprotected sexual intercourse for a period of 12 months or more<sup>1</sup>. In April 2023, the World Health Organisation (WHO) published a report stating that a significant number of individuals experience infertility at some point in their lives. Approximately 17.5% of the global adult population, which is roughly equivalent to 1 in 6 individuals, suffers from infertility. Infertility is a global phenomenon that poses a significant challenge to individuals worldwide. Patients diagnosed with infertility undergo significant emotional distress. Infertile patients face a significant likelihood of experiencing sadness, worry, and anguish. Infertility is frequently a concealed battle. Patients experiencing difficulties in achieving pregnancy often express symptoms of melancholy, anxiety, social isolation, and a sense of diminished agency.

The estimated frequency of infertility in India ranges from 3.9% to 16.8%. The All India Institute of Medical Sciences (AIIMS) has calculated that between 10% to 15% of couples experience "fertility issues".<sup>2</sup> Although infertility may not be a life-threatening condition, acquiring a diagnosis of infertility can be an anxiety-inducing event for couples. In our society, parenthood is considered essential for achieving a sense of fulfillment in life. Therefore, couples who are unable to conceive feel sterile and lacking. Thus, infertility encompasses more than mere medical issues. It impacts every facet of life, with the most crucial one being mental well-being. Infertility can lead to psychological anguish, emotional strain, and financial hardships for both individuals involved.<sup>3</sup>

Due to recent medical developments, there are now a variety of infertility treatments available, and their utilisation has significantly risen in recent years. Infertility treatment can be classified into three main groups: pharmacological, surgical, and assisted Reproductive Techniques (ART). ART includes procedures such as in-vitro fertilisation (IVF), intrauterine insemination (IUI), aided hatching, gamete intrafallopian transfer (GIFT), and surrogacy. In vitro fertilisation (IVF) is the process of fertilising an egg in a laboratory and then placing the resulting embryo into a woman's uterus. Intracytoplasmic sperm injection (ICSI) is a technique used before the embryo is implanted in the woman's body.<sup>4</sup>

Individuals who have assisted reproductive treatment (ART) face a substantial likelihood of developing psychological illnesses. Couples may experience a range of emotions such as anger, guilt, sadness, melancholy, anxiety, and a decrease in their self-confidence and self-esteem.<sup>5</sup> In addition, the financial burden of infertility treatment also plays a crucial role in contributing to the stress experienced. The typical price for a single cycle of in vitro fertilisation (IVF) in India varies from INR 1,00,000 to 3,50,000, without including the extra expenses for meds and diagnostics. Due to the exorbitant expenses involved, certain couples are unable to afford therapy, resulting in a sense of despair.<sup>4</sup>

There is a widespread increase in the utilisation of these medical technologies by couples to address their infertility issues.<sup>6</sup> Several studies suggest that these technologies significantly affect the marriage, particularly the mental and physical well-being of the woman. The treatment is highly time-consuming, which places a significant mental burden on the individuals undergoing it. Several studies have found a tiny yet significant correlation between stress experienced during in vitro fertilisation (IVF) and a decrease in the likelihood of a successful pregnancy.

Within the realm of mental distress experienced by women who are unable to conceive, tension, uncertainty, and anxiety are prevalent concerns. The multitude of unpredictable elements that occur between one in vitro fertilisation (IVF) failure and the subsequent IVF attempt can cause anxiety. This unpleasant feeling has an impact on the psycho-neurological pathways of women who are unable to conceive.<sup>7</sup> These alterations result in vasoconstriction, reducing blood flow to the tissue and hindering the development of eggs and their release from the ovary. As a consequence, fertilisation and

implantation are inhibited, leading to adverse effects on pregnancy. The individual's experience will vary depending on the extent of social support, the coping mechanisms employed, the quality of the marital connection, and the level of stress caused by infertility.

This study aimed to establish a psychotherapy nursing intervention to assist women in managing the stress, uncertainty, and anxiety associated with infertility, with the ultimate goal of enhancing their mental well-being.

**Objectives:**

1. To assess and compare infertility stress, uncertainty, anxiety and implantation rate among women undergoing in-vitro fertilization treatment in experimental and control group.
2. To find out relationship of infertility stress, uncertainty, anxiety and implantation rate among women undergoing in-vitro fertilization treatment in experimental and control group with selected demographic variables.

**Material and methods:**

**Study design:** This was a single centre pilot randomized controlled trial study design of psychotherapeutic nursing intervention for women undergoing in-vitro fertilization treatment. Women were recruited from Bedi hospital a mother and child hospital, Sector-33, Chandigarh.

**Inclusion criteria:**

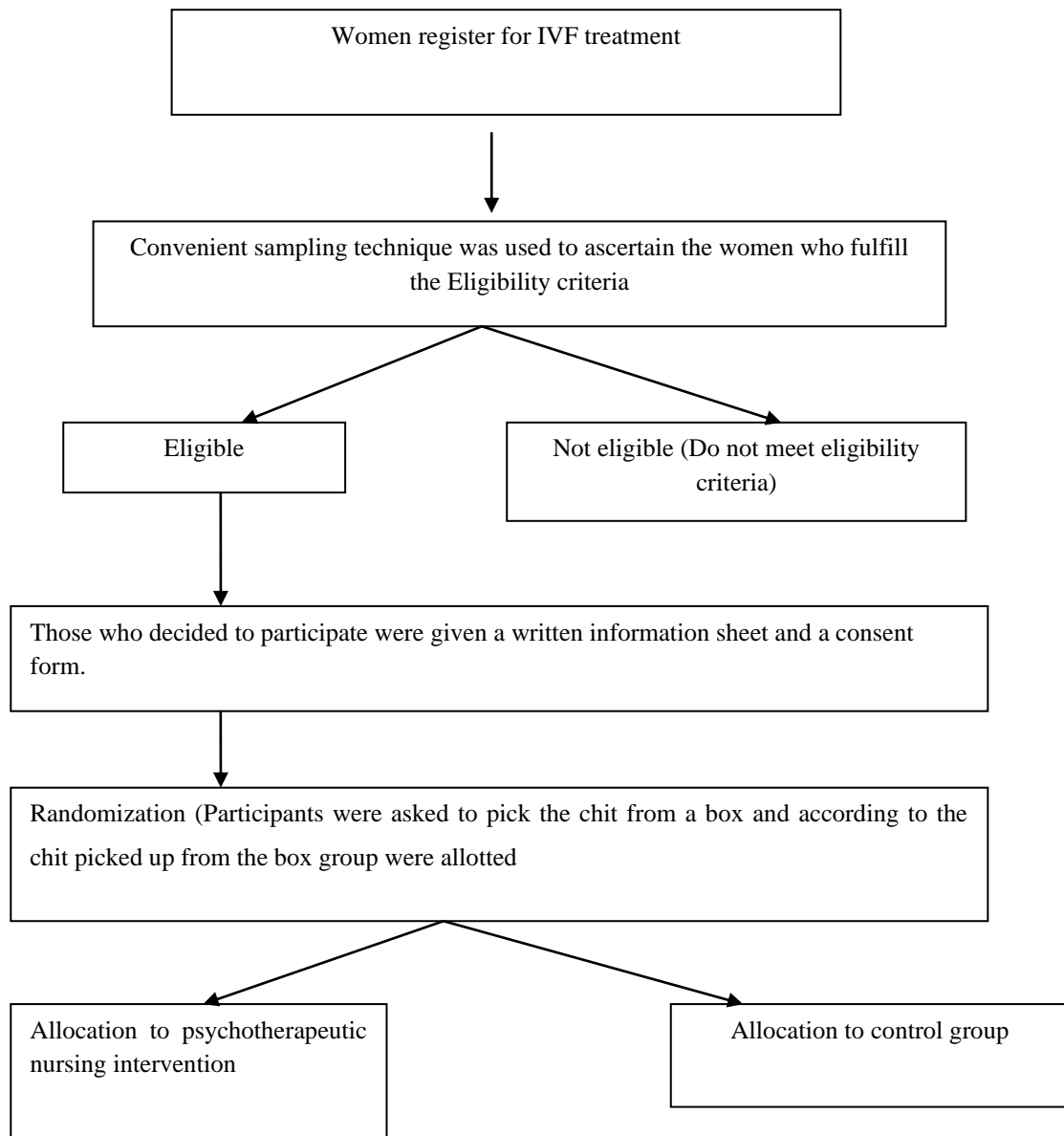
- Women age between 21-45 years.
- Not suffering from any major psychological disorder (as assessed by a physician during initial visit to the hospital).
- Not taking any psychiatric medications.
- Not suffering from any systemic disease.
- Have a stable relationship.
- Able to read and understand English/Punjabi/Hindi.
- Willing to participate.

**Exclusion criteria:**

- Attending other counseling sessions on stress and anxiety.
- Women using donor gamete.
- Women using alternative therapies such as acupuncture.
- Consulting a psychiatrist/psychologist since one month prior to the study.
- Severe family dispute.
- Death of beloved one.
- Experiencing any tragedy during study.
- Poor respondents.

**Ethical Approval:** The study was approved by the institutional ethical committee of Shri Guru Ram Dass College of Nursing, Hoshiarpur, Punjab. Written permission from the higher authorities of Bedi hospital was obtained.

**Flowchart 1: Participants selection flow chart**



**Data collection:** The study was carried out after obtaining approval from the concerned authorities of Bedi Hospital Chandigarh. The data collection procedure was done in the IVF centre. The investigator prepared 20 chits (10 for the study group and 10 for the control group) which were kept in a ballot box. As the women undergoing IVF attending IVF centre on their first day of IVF treatment with the consideration of inclusion and exclusion criteria, were approached, and clearly explained about the study and verbal consent was obtained from them. The study participants were asked to pick up the chit and according to the chit picked up from the ballot box, either the study or the control group were allotted through simple random technique and thereby randomization was done. After obtaining the written consent the investigator collected related data and conducted pretest assessment of stress, uncertainty and anxiety for both the groups using questionnaires and the results were kept confidential. Each group woman was interviewed separately according to their convenient timings in the given private room to ensure their privacy. They were allowed to withdraw from the study at any given point of time. The

importance was given for their physical comfort. The study participants clearly instructed that they into either the study group or the control group. Both the groups received routine care. Women in the experimental group received the four scheduled sessions of psychotherapy nursing intervention at different time interval. The first session was given immediately after registration for IVF treatment, the second was given one week later, the third was given on the day of embryo transplantation, and the fourth was given one week before the pregnancy test. The post test was conducted for both the experiment and control group using same tools between 12<sup>th</sup> to 14<sup>th</sup> days after embryo transplantation.

**Table: 1.**  
**PLAN OF SESSION**

SR. NO.	SESSIONS	TIMING	TIME DURATION
1	Introduction to stress, anxiety and their impact on fertility and preparing women psychologically for IVF treatment.	After registration for IVF treatment.	60mins
2	Mind and body relaxation approaches to reduce stress, anxiety and uncertainty.	1 week interval of first session	60mins
3.	Practicing the relaxation techniques to reduce stress, anxiety and uncertainty.(Including meditation and mini relaxation technique)	On the day of embryo transplantation	40mins
4.	Reinforcing positivity among women undergoing IVF. (Reviewing and practicing the content of first two sessions)	1 week before pregnancy test	40mins

**STATISTICAL METHOD USED**

The study used descriptive statistics including frequency, percentage, mean and standard deviation to assess the study related variables and describe the dependent variables and pregnancy outcome. To find the existence of homogeneity between the study group and control group the nonparametric test of Karl Pearson’s chi-square distribution was used to find the dispersion of variables in the study and control groups. To test the effect of independent variable the study adopted independent ‘t’ test to compare the data between the groups. And paired ‘t’ test was used to compare the data within the group. ANOVA and chi-square were used to associate the study related variables with outcome variables. Correlation was used to assess the relationship between the outcome variables. The statistical package used was SPSS 18.00.

**RESULTS:**

**Table 2 Compare the pre and post-assessment scores of level of stress among women undergoing in-vitro fertilization treatment in experimental and control group**

Group	STRESS SCORE								
	PRE TEST		POST TEST		Paired t test				
	Mean	SD	Mean	SD	Df	T			

<b>Experimental Group</b>	10	22.50	6.654	27.50	2.877	9	3.497	P value=0.007* Significant
<b>Control Group</b>	10	22.100	5.763	21.10	5.466	9	1.732	P value=0.117 NS
<b>Unpaired T Test</b>	Df	18		df	18			
	T	0.144		T	3.276			
	Result	P value=0.887 <sup>NS</sup>		Result	P value=0.004 *			

The data presented in table 2 shows that value of mean pretest scores (22.50 and 22.10) of experimental and control group respectively were very close. Hence, both the groups were comparable to each other with nearly the same pretest stress score. Table 2 also depicted that mean pre test score (22.50) was lower than mean post test score (27.50) in experimental group. The computed mean difference was found -5.00. Hence, it shows that there is no reduction in the level of stress after psychotherapeutic nursing intervention in experiment group.

**Table 3 Compare the pre and post-assessment scores of level of uncertainty among women undergoing in-vitro fertilization treatment in experimental and control group**

Group	UNCERTAINTY SCORE							
		PRE TEST		POST TEST		Paired t test		
		Mean	SD	Mean	SD	Df	T	P value
<b>Experimental Group</b>	10	40.10	3.957	40.90	3.178	9	0.923	P value=0.38 NS
<b>Control Group</b>	10	39.300	3.234	39.90	4.630	9	0.419	P value=0.685 NS
<b>Unpaired T Test</b>	Df	18		Df	18			
	T	0.495		T	0.563			
	Result	P value=0.627 <sup>NS</sup>		Result	P value=0.58 <sup>NS</sup>			

The data presented in table 3 shows that value of mean pretest scores (40.10 and 39.30) of experimental and control group respectively were very close. Hence, both the groups were comparable to each other with nearly the same pretest uncertainty score. Table 3 also depicted that in experimental group mean pre test score (40.10) was lower than mean post test score (40.90). The computed mean difference was found -0.8. Hence, it shows that there is no reduction in the level of uncertainty after psychotherapeutic nursing intervention in experimental group.

**Table 4 Compare the pre and post-assessment scores of level of stais anxiety among women undergoing in-vitro fertilization treatment in experimental and control group**

Group	TRAIT ANXIETY SCORE							
		PRE TEST		POST TEST		Paired t test		
		Mean	SD	Mean	SD	Df	t	
<b>Experimental Group</b>	10	12.10	5.021	7.90	1.663	9	3.422	P value=0.008 *
<b>Control Group</b>	10	14.600	2.914	13.40	1.075	9	1.585	P value=0.147 NS
<b>Unpaired T Test</b>	Df	18		df	18			
	T	1.362		T	8.782			
	Result	P value=0.19 NS		Result	P value=0.001 *			

The data presented in table 4 shows that value of mean pretest scores (12.10 and 14.60) of experimental and control group respectively were nearly close. Hence, both the groups were comparable to each other with nearly the same pretest stais anxiety score. Table 4 also depicted that in experimental group mean pre test score (12.10) was higher than mean post test score (7.90). The computed mean difference (4.2) was found to be statistically significant as evident from the ‘t’ value (3.491) in experimental group. Since the calculated ‘t’ value was more than the table value in experimental group, the results was significant. Hence research hypothesis (H<sub>1</sub>) accepted. It shows that psychotherapeutic nursing intervention was effective in reduction of stais anxiety among women undergoing in-vitro fertilization treatment in experimental group.

Since the calculated ‘t’ value was more than the Table value in experimental group, the result was significant at 0.05 level of significance

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**Table 5 Compare the pre and post-assessment scores of level of stait anxiety among women undergoing in-vitro fertilization treatment in experimental and control group**

Group	SATE ANXIETY SCORE							
		PRE TEST		POST TEST		Paired t test		
		Mean	SD	Mean	SD	Df	t	
<b>Experimental Group</b>	10	9.80	3.225	7.60	2.221	9	3.025	P value=0.014*
<b>Control Group</b>	10	9.000	2.108	10.30	3.199	9	1.361	P value=0.207 NS

<b>Unpaired T Test</b>	Df	18	df	18
	T	0.657	T	2.192
	Result	P value=0.52 NS	Result	P value=0.042 *

The data presented in table 5 shows that value of mean pretest scores (9.80 and 9) of experimental and control group respectively were very close. Hence, both the groups were comparable to each other with nearly the same pretest stait anxiety score. Table 5 also depicted that in experimental group mean pre test score (9.80) was higher than mean post test score (7.60). The computed mean difference (2.2) was found to be statistically significant as evident from the ‘t’ value (3.025) in experimental group. Since the calculated ‘t’ value was more than the table value in experimental group, the results was significant. Hence research hypothesis (H<sub>1</sub>) accepted. It shows that psychotherapeutic nursing intervention was effective in reduction of stait anxiety among women undergoing in-vitro fertilization treatment in experimental group

**Association of pre test level of stress score with demographic variables in experimental group:**

Based on the objectives the chi-square test was used to determine the association between the score levels and selected demographic variables. The Chi-square value shows that there is significance association between the pre test level of stress score in experimental group and demographic variables (education of husband, family income, and residence, duration of marriage and causes of infertility). The calculated chi-square values were more than the table value at the 0.05 level of significance.

There is no significance association between the pre test level of stress score in experimental group and other demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of stress score with demographic variables in experimental group:**

There is no significance association between the post test level of stress score in experimental group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of pre test level of stress score with demographic variables in control group:**

The Chi-square value shows that there is significance association between the pre test level of stress score in control group and demographic variables (type of family and number of IVF done). The calculated chi-square values were more than the table value at the 0.05 level of significance.

There is no significance association between the pre test level of stress score in control group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of stress score with demographic variables in control group:**

The Chi-square value shows that there is significance association between the post test level of stress score in control group and demographic variables (religion, occupation of husband and age at marriage). The calculated chi-square values were more than the table value at the 0.05 level of significance.

There is no significance association between the post test level of stress score in control group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.



**Association of pre test level of uncertainty score with demographic variables in experimental group:**

There is no significance association between the pre test level of uncertainty score in experimental group and other demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of uncertainty score with demographic variables in experimental group:**

There is no significance association between the post test level of uncertainty score in experimental group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of pre test level of uncertainty score with demographic variables in control group:**

There is no significance association between the pre test level of uncertainty score in control group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of uncertainty score with demographic variables in control group:**

The Chi-square value shows that there is significance association between the post test level of uncertainty score in control group and demographic variables (occupation of husband and age at marriage). The calculated chi-square values were more than the table value at the 0.05 level of significance.

There is no significance association between the post test level of uncertainty score in control group and demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of pre test level of anxiety score with demographic variables in experimental group:**

There is no significance association between the pre test level of anxiety score in experimental group and all demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of anxiety score with demographic variables in experimental group:**

There is no significance association between the post test level of anxiety score in experimental group and all demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of pre test level of anxiety score with demographic variables in control group:**

The Chi-square value shows that there is significance association between the pre test level of anxiety score in control group and demographic variables (family income) The calculated chi-square values were more than the table value at the 0.05 level of significance.

There is no significance association between the pre test level of anxiety score in control group and other demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

**Association of post test level of anxiety score with demographic variables in control group:**

There is no significance association between the post test level of anxiety score in control group and all demographic variables .The calculated chi-square values were less than the table value at the 0.05 level of significance.

### Implantation rate

Positive pregnancy rate was 60% among women those were under psychotherapeutic nursing intervention and 40 % among control group.

### Discussion

Women undergoing in vitro fertilisation (IVF) treatment experience elevated levels of uncertainty, anxiety, and stress in comparison to the overall population. The findings of the current study indicate that 80% of women undergoing IVF in the experimental group experienced a moderate degree of stress prior to the intervention. However, this percentage decreased to 60% after receiving psychotherapeutic nursing intervention. In case of uncertainty maximum of women had mild level of uncertainty and it remain unchanged in experimental group after psychotherapeutic nursing intervention However, there was a significant decrease in anxiety levels (both STAIS and STAIT) in the experimental group following the intervention. Evidence indicates that the psychotherapy nursing intervention successfully decreased anxiety levels in women undergoing in vitro fertilisation treatment. Participants that received psychotherapeutic nursing intervention showed a higher rate of implantation.

Stress and anxiety were shown to be prevalent in women over the course of IVF treatment. The reference for the publication is "Awtani M, et al. (2019)"<sup>8</sup>.The results of the current investigation are consistent with the findings of another study, indicating that the experimental group exhibited a higher reduction in anxiety in both premeasurements and postmeasurements compared to the control group. The source cited is a research paper authored by Kim M. and others in 2014<sup>9</sup>.Another study corroborated these findings, demonstrating that the Eastern Body-Mind-Spirit group intervention approach effectively decreases the anxiety levels of women undergoing IVF therapy. Chan C.H.Y.<sup>10</sup>

The stress and level of uncertainty remain constant during psychological nursing intervention, according to this study. The possibility of stress intensifying after embryo transplantation and during the two-week waiting period is plausible. Although the programme offered several measures for remote intervention, they may not have been adequate, and this phase may require additional proactive intervention. This finding is consistent with the results of a prior study conducted by Boivin J<sup>11</sup>, which indicated that women perceived the stress of the waiting time to be higher than their daily experience of it, as evaluated by their daily rating.

In case of implantation rate the results of present study agrees with the finding of the study showed mind/body intervention participation was associated with increased pregnancy rates for cycle 2, prior to which most subjects had attended at least half of their sessions.(Domar A.D)<sup>12</sup>.

This study provides evidence that psychological discomfort might significantly hinder the success of in vitro fertilisation (IVF). Drawing a definitive conclusion about the causal relationship between a psychotherapy intervention and increased implantation rates is premature at this stage. Nevertheless, the observation of increased implantation in patients who received psychotherapy assistance does indicate a potential association between distress and the result of in vitro fertilisation (IVF). The findings of this study corroborate the existing research on the beneficial effects of psychological intervention in the context of in-vitro fertilisation treatment. Nevertheless, additional investigation involving a more extensive sample of patients is still required.

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