

## Effects of a WeChat-Based Self-Guided Stress Reduction Program on Fertility Quality of Life and Fertility Stress in Patients Undergoing In Vitro Fertilization and Embryotransfer

Yanmei Li<sup>1</sup>, Haiqin Zeng<sup>1</sup>, Xiaocheng Yao<sup>1</sup>, Guofeng Wu<sup>1</sup>, Zhaohui Jiang<sup>1</sup>, Liqiong Jiang<sup>1</sup>, Yan Fu<sup>1</sup>, Hui wei<sup>1\*</sup>, Mengjie Li<sup>1\*</sup>

1. The Reproductive Hospital of Guangxi Zhuang Autonomous Region, Nanning 530029, China  
[610536735@qq.com](mailto:610536735@qq.com)

**Abstract: Objective:** To investigate the intervention effect of a WeChat-based self-guided audio stress reduction program on fertility quality of life and fertility stress in patients undergoing in vitro fertilization and embryo transfer (IVF-ET). **Methods** From January to December 2025, 236 infertile patients who received IVF-ET treatment at Guangxi Zhuang Autonomous Region Reproductive Hospital and met the inclusion and exclusion criteria were enrolled. From the first day of ovulation induction to the day of embryo transfer, personalized audio stress reduction courses were sent daily to patients' WeChat accounts via the hospital's psychosomatic health management system. Patients were required to practice for at least 30 minutes per day and complete daily check-ins on WeChat, with supervision and support provided by nurses. The Fertility Quality of Life Questionnaire (FertiQoL) and the Chinese version of the Fertility Problem Inventory (FPI) were used to assess fertility quality of life and fertility stress on the first day of ovulation induction (before intervention) and on the day of embryo transfer (after intervention). Scores of fertility quality of life and fertility stress scales were compared before and after the intervention. **Results** After the intervention, the mean score of fertility quality of life was  $109.93 \pm 10.38$ , which was significantly higher than the pre-intervention score of  $95.16 \pm 18.17$  ( $t = -11.15$ ,  $P < 0.05$ ). After the intervention, the mean score of fertility stress was  $147.53 \pm 18.09$ , which was significantly lower than the pre-intervention score of  $159.57 \pm 28.52$  ( $t = 5.48$ ,  $P < 0.05$ ). Pearson correlation analysis showed that fertility quality of life was negatively correlated with fertility stress both before and after the intervention ( $r = 0.03$ ,  $-0.355$ , both  $P < 0.01$ ). **Conclusion** The self-guided stress reduction program can effectively alleviate fertility stress, improve the overall treatment experience and psychological adaptation of IVF-ET patients, and enhance their fertility quality of life.

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WHO surveys indicate that in 2023, approximately 17.5% of couples of reproductive age worldwide were affected by infertility. With the increasing population experiencing infertility and the successive opening of national policies for second and third children, the number of people realizing their reproductive dreams through assisted reproductive technology (ART) is also gradually increasing. According to statistics, the total number of ART application cycles in China exceeds 1 million annually, resulting in over 300,000 live births. ART includes in vitro fertilization and embryo transfer (IVF-ET) and its derivative technologies, as well as artificial insemination (AI). The IVF-ET treatment process is complex and its outcome is uncertain, making patients prone to various psychological issues such as depression, anxiety, and stigma. The treatment process itself is a significant psychosomatic stressor, often leading to high

levels of fertility stress in infertile patients. Fertility stress refers to the psychological pressure patients experience due to various factors such as family issues, social discourse, and personal reproductive needs, often accompanied by prolonged infertility. This stress not only affects their fertility quality of life but may also reduce their treatment motivation and compliance. Some studies have found that mindfulness-based stress reduction (MBSR) therapy can alleviate depression and anxiety symptoms in pregnant and postpartum women. However, MBSR requires group sessions, which greatly affects patient convenience and compliance. Self-help mindfulness-based stress reduction (Self-MBSR) is an intervention method based on mindfulness training, following a standardized treatment plan that can be completed independently at home without the need for group sessions. Zhang Miaomiao et al. found that Self-MBSR can improve negative emotions, increase

mindfulness, and alleviate menopausal symptoms in perimenopausal women. Zhang Shanming et al. found that both self-paced and online course models of self-guided mindfulness practice can effectively improve depressive emotions and enhance self-acceptance levels in college students. This study applies a WeChat-based self-guided stress reduction program to infertile patients undergoing IVF-ET treatment, observing its effects on their fertility quality of life and fertility stress, exploring psychological healthcare models for infertile patients, and providing more convenient psychological intervention measures for the clinical treatment and nursing care of IVF-ET patients. The aim is to reduce patients' fertility stress, improve their fertility quality of life, and ultimately contribute to increasing the success rate of IVF-ET treatment.

## 1. Objects and Methods

### 1.1 Objects

236 infertile patients undergoing IVF-ET treatment at our hospital from January to December 2025 were selected as the study subjects.

Inclusion criteria: ① Meeting the indications for IVF-ET as defined in the 10th edition of Obstetrics and Gynecology, with the indication being tubal factor; ② Female age 20-48 years; ③ Ovulation induction protocol being antagonist protocol; ④ Education level of junior high school or above, able to understand questionnaire content and fill it out correctly; ⑤ Proficient in using WeChat, able to accept WeChat-based intervention and follow-up; ⑥ No major negative life events in the past six months; ⑦ Informed consent and voluntary participation in the study.

Exclusion criteria: ① IVF-ET indications excluding non-tubal factors such as endometriosis, adenomyosis, etc.; ② Severe visual or hearing impairment that may affect correct understanding and response to the questionnaire; ③ Withdrawal during the study, or incomplete questionnaire or clinical data collection; ④ No fresh embryo transfer performed in this cycle.

This study was approved by the Medical Ethics Committee of Guangxi Zhuang Autonomous Region Reproductive Hospital (Ethics Approval No.: KY-LL-2023-013).

## 1.2 Methods

### 1.2.1 Intervention Method

On the first day of ovulation induction, a nurse with psychological counselor qualification introduced the significance, usage, and precautions of the stress reduction program to the patient one-on-one. Based on the patient's medical history, the nurse explained in detail the significance of the self-guided audio stress reduction program for alleviating fertility stress, as well

as the usage method and precautions, and obtained the patient's understanding and cooperation. Secondly, based on the results of the Fertility Quality of Life Questionnaire and the Fertility Stress Questionnaire administered on the first day of ovulation induction, the psychosomatic health management system was used to accurately push different audio stress reduction courses daily to each patient and explain the usage method in detail. The course is not restricted by location or time and can be conducted anytime, anywhere, meaning patients use their mobile phones independently for stress reduction practice. The practice content includes raisin exercise, mindful breathing exercise, stress-reducing listening, stress-reducing stretching exercise, stress-reducing walking exercise, mindful thinking and emotion exercise, meditation, and long sitting meditation. Each session lasts 5-39 minutes. From the first day of the IVF-ET treatment cycle (i.e., the first day of ovulation induction) to the last day of the IVF-ET treatment cycle (i.e., embryo transfer day), patients independently scanned a WeChat QR code daily to practice using the stress reduction audio course pushed by the nurse in a quiet environment for  $\geq 30$  minutes, and completed daily WeChat check-ins.

Nurses used the psychosomatic management system to monitor patients' course usage and WeChat check-ins daily. For patients who had not practiced on a given day, timely SMS or phone reminders were sent, and problems encountered during use were promptly resolved.

### 1.2.2 Observation Indicators and Evaluation Criteria

#### 1.2.2.1 General Information:

A self-designed questionnaire was used, including: age, place of residence, education level, occupation, combined monthly income of the couple, family type, marital type, duration of infertility, duration of infertility treatment (including all time receiving Chinese and Western medicine treatments), whether IVF treatment had been received before, and whether they had biological children.

#### 1.2.2.3 Fertility Quality of Life Questionnaire (FertiQoL):

The Fertility Quality of Life Questionnaire consists of 36 items, containing a core module (emotional, physical/mental, marital, social relationships) and a treatment module (environment, tolerability). A 0-4 point Likert scale was used, with higher scores indicating better quality of life. The Cronbach's alpha for the Chinese version was 0.93.

#### 1.2.2.4 Fertility Stress Questionnaire (FPI):

The Fertility Problem Inventory, created by Newton CR et al. in 1999, consists of 46 items covering five dimensions: social pressure, sexual pressure, couple relationship, need for parenthood, and rejection of a childfree lifestyle. A 1-6 point Likert scale was used,

with a total score ranging from 46 to 276, where higher scores indicate greater stress. The Cronbach's alpha for the Chinese version was 0.91.

### 1.3 Data Collection Method

A nurse with psychological counselor qualifications explained the purpose of the survey, the filling method, the use of the WeChat-based self-guided stress reduction program, and daily check-ins in detail to patients receiving IVF-ET treatment. After patients fully understood and agreed to participate in the study, they signed an informed consent form. Questionnaires were then activated through the psychosomatic management system, and patients were guided to complete them independently. After patients completed the WeChat questionnaires, nurses immediately checked, collected, and saved them. In this study, 236 questionnaires were distributed to 236 patients before the intervention (first day of ovulation induction) and after the intervention (embryo transfer day), and 236 valid questionnaires were successfully collected each time, with a 100% effective recovery rate.

### 1.4 Statistical Analysis

All data were exported from the psychosomatic assessment system in Excel format and double-checked. SPSS 25.0 software was used for statistical analysis. Measurement data are expressed as mean  $\pm$  standard deviation ( $X \pm SD$ ). Comparisons between groups were performed using t-tests; comparisons among multiple samples were performed using F-tests (analysis of variance); enumeration data are expressed as rates (%), and comparisons between groups were performed using chi-square tests.  $P < 0.05$  was considered statistically significant.

## 2. Results

### 2.1 Basic Patient Information

The age of the 236 IVF-ET patients ranged from 22 to 48 years, with an average age of  $35.95 \pm 5.23$  years. The duration of infertility ranged from 0.5 to 13 years, with an average of  $4.78 \pm 3.31$  years. The duration of infertility treatment ranged from 0 to 15 years, with an average of  $3.23 \pm 2.75$  years. See Table 1.

**Table 1: Basic Information of Patients**

Item	Category	Number	Proportion
Age	20-30years	43	18.22%
	31-35years	55	23.31%
	36-40years	94	39.83%
	$\geq 41$ years	44	18.64%
Place of Residence	City	151	63.98%
	Town	40	16.95%
	Rural	45	19.07%
Education Level	Bachelor's degree or above	63	26.69%
	College degree	44	18.64%
	High school or technical secondary school	34	14.41%
	Junior high school	81	34.32%
	Primary school	14	5.93%
Occupation	Science, education, culture, and health personnel	19	8.05%
	Worker	12	5.08%
	Self-employed	27	11.44%

Item	Category	Number	Proportion
	Farmer	34	14.41%
	Other	85	36.02%
	Unemployed	59	25.00%
Monthly Income	≤5000 yuan/month	124	52.54%
	5001-8000 yuan/month	66	27.97%
	8001-10000 yuan/month	23	9.75%
	10001-15000 yuan/month	14	5.93%
	>15000 yuan/month	9	3.81%
Family Type	Couple living alone	114	48.31%
	Living with parents	122	51.69%
Marital Type	First marriage	172	72.88%
	Remarriage	64	27.12%
Have you received IVF treatment before?	Yes	107	45.34%
	No	129	54.66%
Do you have biological children?	No children	133	56.36%
	Have one child	70	29.66%
	Have two children	33	13.98%

## 2.2 Comparison of Fertility Quality of Life and Fertility Stress Scores

The FertiQoL and FPI scores of 236 patients before and after the intervention were compared. The results showed that the post-intervention FertiQoL score was  $109.93 \pm 10.38$ , which was significantly higher than

the pre-intervention score of  $95.16 \pm 18.17$  ( $t = -11.15$ ,  $P < 0.05$ ). The post-intervention FPI score was  $147.53 \pm 18.09$ , which was significantly lower than the pre-intervention score of  $159.57 \pm 28.52$  ( $t = 5.48$ ,  $P < 0.05$ ). See Table 2.

**Table 2: Comparison of Fertility Quality of Life and Fertility Stress Questionnaire Scores Before and After Intervention (points,  $X \pm S$ )**

Item	Number	Fertility Quality	Fertility Stress Score
Before Intervention	236	$95.16 \pm 18.17$	$159.57 \pm 28.52$
After Intervention	236	$109.93 \pm 10.38$	$147.53 \pm 18.09$
t-value		-11.15	5.48
P-value		<0.005	<0.005

### 2.3 Correlation between Fertility Quality of Life and Fertility Stress Before and After Intervention

Pearson correlation analysis showed that fertility quality of life scores were negatively correlated with fertility stress both before and after the intervention ( $r = 0.03, -0.355$ , both  $P < 0.01$ ).

## 3. Discussion

### 3.1 Infertile patients undergoing IVF-ET have a relatively low level of fertility quality of life.

The pre-intervention FertiQoL score of the 236 infertile patients undergoing IVF-ET in this study was  $95.16 \pm 18.17$ , indicating a relatively low level of fertility quality of life, which is consistent with findings from existing studies. Psychological interventions can help patients maintain a good mental state and improve fertility quality of life. The Chinese Women's Development Outline (2021-2030) emphasizes the importance of focusing on women's mental health. Therefore, improving the fertility quality of life for women of childbearing age is particularly crucial, and how to enhance it is an area worthy of attention.

### 3.2 Infertile patients undergoing IVF-ET experience relatively high fertility stress.

The pre-intervention fertility stress score of patients in this study was  $159.57 \pm 28.52$ , indicating a relatively high level, consistent with the research of Li Dong et al. Most infertile patients undergoing IVF-ET treatment often bear significant fertility stress, which may even affect pregnancy outcomes. Repeated IVF-ET failures greatly increase the financial burden on families and, to some extent, exacerbate patients' fertility stress, creating a vicious cycle. Fertility stress not only seriously affects patients' mental health but also reduces their fertility quality of life. Therefore, how to alleviate the fertility stress of IVF-ET patients and improve their treatment outcomes is an important issue in infertility treatment.

### 3.3 Patient-centered self-guided stress reduction courses can effectively alleviate patients' fertility stress and improve fertility quality of life.

The results of this study show that the post-intervention FertiQoL score was  $109.93 \pm 10.38$ , significantly higher than the pre-intervention score of  $95.16 \pm 18.17$  ( $P < 0.05$ ). The post-intervention fertility stress score was  $147.53 \pm 18.09$ , significantly lower than the pre-intervention score of  $159.57 \pm 28.52$  ( $P < 0.05$ ). Patient-centered self-guided stress reduction courses can effectively alleviate patients' fertility stress and improve fertility quality of life. This is consistent with the results of existing studies. Edwards KL et al. believe that numerous stress-related reactions have the potential to disrupt fertility at multiple levels, ultimately affecting health. Mindfulness-based interventions have been

widely proven to effectively reduce stress, alleviate mood disorders, and improve quality of life. Taylor H et al. implemented a mindfulness-based self-help (MBSH) intervention on 2180 healthcare staff in the UK and found that MBSH intervention can improve concentration and reduce stress among healthcare workers. Juul L et al. conducted a randomized controlled trial (RCT) on 71 Danish adults regarding stress-related issues and found that mindfulness-based stress intervention (MBSR) is effective and feasible. Peerani F et al. conducted a 12-week online stress reduction course intervention for 150 patients with inflammatory bowel disease, where each person independently chose to engage in 20-30 minute video courses of yoga, breathing techniques, and meditation 2-3 times per week. After 12 weeks, perceived stress was significantly reduced. This study suggests that the 12-week online stress reduction course intervention had high adherence and is a beneficial measure affecting stress, mental health, and quality of life. Riley TD et al. found that online live-streamed stress reduction courses are feasible and acceptable for the public, potentially beneficial, and helpful in expanding access to mindfulness-based stress reduction and addressing health inequalities.

### 3.4 Correlation between Fertility Stress and Fertility Quality of Life in Infertile Patients Undergoing IVF-ET

This study shows that patients' fertility quality of life scores were negatively correlated with fertility stress both before and after the intervention (both  $P < 0.01$ ), meaning higher fertility stress is associated with lower fertility quality of life. This is consistent with the conclusions of research by Zheng Lihua et al. and Xi Huiqin et al. Liu Chenxia et al. also found that fertility stress acts as a mediating factor between mental state and fertility quality of life. Providing corresponding intervention measures can improve fertility quality of life. Therefore, providing patients with precise self-guided stress reduction courses to help IVF-ET patients alleviate negative emotions such as anxiety and depression, thereby reducing fertility stress, improving assisted reproduction treatment outcomes, and increasing clinical pregnancy rates, is an important topic worthy of clinical attention.

In summary, IVF-ET patients experience significant fertility stress and have a relatively low level of fertility quality of life. This study provides patients with precise self-guided stress reduction courses, moving the stress reduction intervention forward and empowering patients with stress reduction methods. It effectively reduced patients' fertility stress while improving fertility quality of life, providing a theoretical basis for reproductive nursing work. The findings of this

study have certain limitations, such as the lack of a control group, a relatively small sample size, and data collection limited to a single reproductive center. Future multi-center, large-sample studies are anticipated.

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#### Corresponding Author:

Hui Wei

Associate Research Fellow

Research focus:Health Management

The Reproductive Hospital of Guangxi Zhuang Autonomous Region, Nanning 530029, China

Telephone:+86 18777170968

E-mail:1461647456@qq.com

Mengjie Li

Chief Nurse

Research focus: Nursing Management, Reproductive Medicine Nursing, Psychological Nursing

The Reproductive Hospital of Guangxi Zhuang Autonomous Region, Nanning 530029, China

Telephone:+86 13517819199

E-mail: Lmj2120@163.com

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