

The Impact of Couple Communication Patterns on Fertility-related Stress and Psychological Capital in Women with OHSS after Embryo Transfer

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Research Article

Keywords: Ovarian hyperstimulation syndrome, couple communication patterns, Psychological capital, fertility-related stress, nursing

Posted Date: June 29th, 2022

DOI: https://doi.org/10.21203/rs.3.rs-1753948/v1

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Abstract

Aims

To examine the association between couple communication patterns, psychological capital, and fertility-related stress. Also, to explore mediating effect of communication patterns on the relationship between psychological capital and fertility-related stress among patients with ovarian hyperstimulation syndrome after an embryo transfer in China.

Background

Ovarian hyperstimulation syndrome is a severe complication of the superovulation procedure. It can cause severe discomfort, infertility, and uncertainty about a successful pregnancy. Moreover, these unfavorable conditions are a source of intense stress for the patients and negatively impact their mental and emotional state and effective communication. These three patterns that regulate the fertility-related stress levels in women with OHSS remained understudied.

Design:

This study used a cross-sectional design.

Methods

We recruited 175 patients with ovarian hyperstimulation syndrome after an embryo transfer for a survey in a reproductive ward of a tertiary hospital in China. This study used the questionnaires on Psychological capital, the Fertility stress scale (FPI), and couples' communication patterns to collect the data. A structural equation model analyzed the mediating effect of a couple of communication patterns. A Strobe checklist was used to guide the reporting of this study.

Results

A combination of low levels of psychological capital and requested avoidance/complete avoidance communication patterns were associated with high levels of fertility-related stress (139.6 \pm 25.71) among participants. Psychological capital was negatively correlated with fertility-related stress. And then, requested/completed communication had a significant positive effect on the stress, but constructive communication had no relationship with the stress. In addition, the requested avoidance communication pattern had a negative mediating effect between psychological capital and fertility-related stress in patients with OHSS (95% Cl – 0.207, – 0.005).

Conclusion

A couple's communication patterns and the levels of psychological capital of patients with OHSS can partly predict fertility-related stress. While requested avoidance in couple communication can, the level of psychological capital of the patient with OHSS after an embryo transfer contributed to their excessive fertility-related stress. Health workers may reduce their stress by addressing negative communication styles.

1 Introduction

Ovarian hyperstimulation syndrome (OHSS) is an inflated response to excess hormones due to the superovulation technique's complications [1]. This condition leads to swelling of the ovaries and causes significant pain to women. Its incident rate ranges from 1–14% in all in vitro fertilization(IVF) cycles [2]. OHSS is associated with various signs and symptoms as the most severe complications, including abdominal distension, fluid accumulation in the abdominal cavity, oliguria, abnormal coagulation, respiratory distress, and blood clots [3]. Although the symptoms of OHSS may resolve spontaneously within a certain period, in the process, women experience negative emotions and even fertility-related stress caused by extreme physical discomfort, pain, infertility, and uncertainty about successful pregnancy [4]. Studies showed that besides physical interventions to minimize the stress, couples' communication patterns and psychological capital might affect fertility-related stress [5]. Nevertheless, the negative emotion and fertility-related stress can negatively impact females' mental health and fertility-related quality of life, eventually leading to undesired pregnancy outcomes [6].

From a socio-cultural perspective, infertility is seen as a female physical defect, and people tend to engage in negative commentary about infertile women [7]. Thus, women who engage in reproductive treatment experience higher levels of shamefulness and guilt than men [8]. Previous findings have shown that multiple factors, particularly couple communication patterns and psychological response skills, affected fertility-related stress in women with OHSS after embryo transfer, directly impacting women's recovery and successful pregnancy [9]. Negative communication behaviors between couples may affect the mental status of women when they experience consistent OHSS complications, and active interventions are therefore required [10]. In addition, research has demonstrated that husbands with good communication skills, such as skills in open, empathic communication, can provide adequate emotional support to their wives during treatment [11].

Moreover, spouse-based psychological interventions, such as advanced psychological interventions and spouse compassion interventions, can help wives with OHSS better adapt to the discomfort caused by the symptoms and alleviate infertility-related stress [12]. The above research results suggested that the excellent communication patterns and active psychological interventions in OHSS couples can reduce fertility-related stress; however, studies were not conclusive regarding the relationship between fertility-related stress, psychological interventions, and couple communication patterns [13]. Boivin and Schmidt [14] have concluded three communication patterns between couples: constructive communication requested avoidance of communication and complete avoidance of communication. These three patterns may regulate the fertility-related stress levels in women with OHSS, but their impact has not been evaluated.

With the emergence of positive psychology, psychological studies in OHSS have focused on psychological interventions to address fertility-related stress and its potential mechanisms [15]. Psychological capital has been identified as a critically important component of positive psychology and has thus received the widespread attention of various disciplines [15]. Psychological capital refers to a positive way of responding to stress that involves transcending social and human capital to address the overall stressor at a minimal cost [15]. In addition, a high level of psychological capital has been found to relieve fertility-related stress and can improve poor couple communications that are exacerbated by infertility [16]. A reasonable extent of psychological capital is also believed to help couples cope together as a unit with the discomfort and difficulties associated with infertility [16].

Previous studies reported the correlations between fertility-related stress, couple communication patterns, and psychological capital levels in OHSS women [5, 9, 14]. Moreover, Zhang et al. [17] suggested that three variables of a couple's communication patterns, including constructive communication, requested avoidance of communication, and

complete avoidance of communication had a strong association with an individual's psychological capital and level of fertility-related stress. However, the detailed association between these variables and the fertility-related stress in OHSS women after ET was understudied. Therefore, we came up with the following hypotheses: (1) Different couple communication patterns influence the levels of psychological capital in women with the OHSS after ET, (2) Different levels of psychological capital could affect the extent of fertility-related stress, and (3) Couple communication patterns in women with OHSS after ET mediated the effects of psychological capital on fertility-related stress.

The aim of the study was to examine the association between couple communication patterns, psychological capital, and fertility-related stress. Also, to explore mediating effect of communication patterns on the relationship between psychological capital and fertility-related stress among women with ovarian hyperstimulation syndrome after an embryo transfer in China

2 Method

2.1 Study Design and Participants

This study was a cross-sectional survey to evaluate the impact of couples' communication patterns on fertility-related stress. A convenience sampling technique was employed to recruit research participants from the reproductive ward of a tertiary care hospital in China. From June to December 2021, the participants were selected only women with OHSS after an ET treatment. The inclusion criteria were as follows: (1) Women diagnosed with OHSS and were undergoing IVF-ET treatment; (2) only married women of childbearing age (20–49 years old) [18]; (3) those who were able to understand the study and communicate without difficulty; and (4) those who were willing to participate in the study voluntarily, and gave oral informed consent. The exclusion criteria were as follows: (1) women with OHSS not caused by fertility-assisted treatment; (2) women with a previous history of mental illness or cognitive impairment; (3) women who had participated in other clinical trials; (4) women who refused to participate or who withdrew after the study was explained to them by the investigator; (5) women who had difficulty in communicating and understanding the content of survey; and (6) women who had life-threatening diseases such as severe liver and kidney dysfunction or cardiovascular and cerebrovascular disease.

2.2 Sample Size and Sampling

Sample size were calculated using an empirical formula based on types of study variables, both qualitative and quantitative. The following formula was used.

Sample size = [number of study variables \times (5 to 10)] \times [1 + (15-20%)] [19].

This formula ensured that a reasonable sample of the study population was selected. An appropriate sample was critical for study results and the stability of the established structural equation model. Based on the studied literature, this study considered 14 different variables (level of education, residence, duration of fertility treatment, social stigma, psychological capital, couple's communication, etc.) and a 20% sample dropout rate. The sample calculation estimated that the study required 101 to 201 participants in the study sample.

2.3 Instruments

2.3.1 General Information Survey

This questionnaire was self-designed based on literature, including two categories: (1) demographic data, such as age and place of residence; and (2) disease-related Information, such as a history of fertility, the number of abortions,

Newton et al. designed FPI to assess fertility-related stress among infertile women [20]. The scale has excellent reliability and validity and is widely used by researchers to study infertility-related stress. The FPI scale is composed of 46 items focused on measuring five dimensions of infertility problems: social stress (ten items), sexual stress (eight items), couple relationships (ten items), parental role demands (ten items), and rejection of a child-free lifestyle (eight items). The Cronbach's a coefficients of the total scale and subscale ranged from 0.77 to 0.93. In 2011, Peng et al. translated and devised the Chinese version of this scale [21]. The Cronbach's a coefficient of this total Chinese scale was 0.91, and subscales ranged from 0.74 to 0.85. A six-point Likert-type scoring method was applied (1–6 points) to calculate the total score, ranging from 1 "completely disagree" to 6 "completely agree." The total score ranges from 46 to 276; higher scores indicate higher levels of fertility-related stress.

2.3.3 Psychological Capital Questionnaire

To assess the psychological capital, a 26-item questionnaire comprising four dimensions: self-efficacy, hope, optimism, and resilience developed by Zhang et al. was employed [22]. A 7-point Likert-type scoring method was used to analyze the psychological capital. Among those 26 items, 8, 10, 12, 14, and 25 were reverse questions. The higher total scores of items in each dimension indicate the higher individual's psychological capital level. The Cronbach α coefficient of the questionnaire was 0.90.

2.3.4 Couple Communication Pattern Questionnaire

The questionnaire for the present study was derived from the Christensen Marital Communication Model Questionnaire (1996 version) [23] and the Chinese version of the Couple Communication Pattern Questionnaire, revised by Zhang et al. [17]. The Likert scale comprises 16 items scored from 1 "least likely" to 9 "most likely," where participants are asked to choose the degree of conformity that best reflects the actual communication pattern between them and their spouses. The scale contains three subscales measuring three communication patterns: constructive communication, requested avoidance of communication, and complete avoidance of communication. The Cronbach's a values of the three subscales were 0.512, 0.826, and 0.739, respectively.

2.4 Data Collection

The data collection method was implemented in the form of a single-center investigation through the WeChat platform. Three honest and reliable surveyors in the reproductive unit were selected to collect data. The study provided two training sessions within one week to train the surveyors on the uniform data collection methods and techniques. The survey was conducted after they passed the training examination. Before the survey, the content, objective, survey method, and project's unique requirements were made clear to the participants. The written informed consent was taken from all participants. Questionnaires' QR code was issued during morning nursing rounds in the department, and the work of each surveyor was checked regularly. Questionnaire filling time was approximately 20 minutes, and questionnaires were submitted immediately after completion of one-time filling.

2.5 Ethical Considerations

The study was approved by the Review Board of the Hospital Ethics Committee. All participants provided their verbal and written informed consent. The confidentiality and anonymity of participants' identities and responses were maintained.

2.6 Data Analysis

Data were analyzed using SPSS, version 26.0, and AOMS version 24.0 (Statistical Package for Social Sciences, Inc., Chicago, IL, USA). First, descriptive statistics were employed to describe the social-demographic and clinical features of the sample and reported as absolute values and percentages. Univariate factor analysis assessed the mean differences in categorical variables such as age and education. And then, a bivariate Pearson's correlation was conducted by calculating correlation coefficients to examine the relationships between psychological capital and fertility-related stress. Additionally, hierarchical regression was conducted to examine the association between psychological capital and couple communication patterns on fertility stress. Finally, AMOS was applied to develop a structural equation model to test the mediating role of couple communication patterns. The evaluation criteria for model fit were 2/df < 3, GFI, TLI, and CFI > 0.8 RMSEA < 0.1.

3 Results

3.1 Demographic Data and Information on Disease Characteristics of the Participants

A total of 200 questionnaires were distributed, and 183 were retrieved, with a recovery rate of 91.5%. After the survey, 175 questionnaires were selected as valid, producing a reasonable recovery rate of 87.5%. The women undergoing treatment ranged from 23 to 42 years, with an average age of 33.56 ± 3.24 years old. Table 1 displays the demographic data and medical history information.

| Variables | Categories | N | Percentage (%) |
|--------------------------------|-------------------------------|-----|----------------|
| Age | < 25 years old | 2 | 1.1 |
| | 25-30 years old | 56 | 32.0 |
| | 30–35 years old | 86 | 49.1 |
| | 36-40 years old | 25 | 14.3 |
| | >40 years old | 6 | 3.4 |
| Years of Marriage | < 2 years | 33 | 18.9 |
| | 2-5 years | 84 | 48.0 |
| | > 5 years | 58 | 33.1 |
| Education | Junior high school and below | 30 | 17.1 |
| | Junior college or high school | 37 | 21.1 |
| | College or undergraduate | 98 | 56.0 |
| | Master or above | 10 | 5.7 |
| Place of residence | Rural | 66 | 37.7 |
| | Town | 56 | 32.0 |
| | City | 53 | 30.3 |
| Monthly household income (RMB) | > 5,000 | 42 | 24.0 |
| | 5,000-10,000 | 77 | 44.0 |
| | < 10,000 | 56 | 32.0 |
| Marital status | First Marriage | 154 | 88.0 |
| | Remarriage | 21 | 12.0 |
| generations of embryo transfer | First Generation | 113 | 64.6 |
| treatment performed | Second generation | 55 | 31.4 |
| | Third generation | 6 | 3.4 |
| duration of treatment | < 4 weeks | 52 | 29.7 |
| | 4-12weeks | 36 | 20.6 |
| | >12 weeks | 87 | 49.7 |
| Currently preparing for | First child | 151 | 86.3 |
| the first or second child | Second child | 24 | 13.7 |
| Previous history of abortion | Yes | 73 | 41.7 |
| | No | 102 | 58.3 |

Table 1 General and Disease-related Characteristics of the Patients with OHSS

| Variables | Categories | Ν | Percentage (%) |
|-------------------------|------------|----|----------------|
| Any previous history of | Yes | 89 | 50.9 |
| gynecological surgery | No | 86 | 49.1 |

3.2 Correlation Analysis

The results of the Pearson correlation coefficient analysis revealed a significant positive correlation between psychological capital and constructive communication (p < 0.01); fertility-related stress and requested avoidance of communication (p < 0.01); and fertility-related stress and complete avoidance of communication (p < 0.01). A significant negative correlation was observed between psychological capital and requested avoidance of communication (p < 0.01); and fertility-related stress and psychological capital (p < 0.05). There was no correlation between fertility-related stress and communication (p > 0.05). (See Table 2)

Table 2 Correlation between Communication Patterns, Fertility-related Stress, and Psychological Capital in Patients with OHSS

| | psychological capital | fertility- related | Constrictive communication | Requested avoidance | Complete avoidance | |
|--------------------------------------|--------------------------|-----------------------|----------------------------|---------------------|-----------------------|--|
| | | 50055 | | of communication | of communication | |
| psychological capital | 1 | | | | | |
| fertility-related stress | -0.208** | 1 | | | | |
| Constrictive communication | 0.270** | -0.090 | 1 | | | |
| Requested avoidance of communication | -0.197** | 0.294** | -0.081 | 1 | | |
| Complete avoidance of communication | -0.287** | 0.358** | -0.178* | 0.758** | 1 | |
| | | | | | | |

Note:** P < 0.01, *P < 0.05

3.3 Univariate and Hierarchical Regression Analysis

Univariate analysis results presented in Table 3 revealed that literacy, place of residence, monthly household income, marital status, generation of embryo transfer treatment, currently preparing for a first or second child, psychological capital, and requested/completed avoidance communication patterns all had a significant effect on fertility-relates stress (p < 0.05). A multifactorial analysis was also conducted using the hierarchical regression technique. The significant univariate variables were taken as independent variables and fertility-related stress as the dependent variable in this analysis.

Table 3

Univariate analysis and Hierarchical multiple regressions of couple communication patterns and psychological capital on fertility-related stress in OHSS patients

| Туре | Univariate analysis | | | Hierarchical multiple regressions | | | | | |
|--|---------------------|-----------|------------|-----------------------------------|--------------------------|-------|--------------------------|--------|-------|
| Model | | | | Model1 | | | Model2 | | |
| Variables | fertility-relate | ed stress | | fertility-rela | fertility-related stress | | fertility-related stress | | |
| | В | t | р | В | t | р | В | t | р |
| Age | 0.12 | 1.589 | 0.114 | | | | | | |
| Years of Marriage | 0.021 | 0.278 | 0.781 | | | | | | |
| Education | -0.268*** | -3.66 | < 0.001 | -0.149 | -1.72 | 0.087 | -0.096 | -1.145 | 0.254 |
| Place of residence | -0.1538* | -2.03 | 0.044 | 0.018 | 0.216 | 0.829 | 0.022 | 0.283 | 0.777 |
| Monthly household income (RMB) | -0.3048*** | -4.194 | < 0.001 | -0.2218** | -2.627 | 0.009 | -0.1688* | -2.064 | 0.041 |
| Marital status | 0.1618* | 2.151 | 0.033 | 0.082 | 1.096 | 0.275 | 0.125 | 1.728 | 0.086 |
| generations of embryo transfer | 0.1498* | 1.989 | 0.048 | 0.122 | 1.668 | 0.097 | 0.066 | 0.924 | 0.357 |
| duration of treatment | 0.132 | 1.75 | 0.082 | | | | | | |
| Currently preparing for | 0.1948* | 2.602 | 0.01 | 0.136 | 1.848 | 0.066 | 0.1538* | 2.196 | 0.03 |
| the first or second child | | | | | | | | | |
| Previous history of abortion | -0.118 | -1.557 | 0.121 | | | | | | |
| Any previous history of | -0.029 | -0.379 | 0.705 | | | | | | |
| gynecological surgery | | | | | | | | | |
| psychological capital | -0.2158** | -2.9 | 0.004 | | | | -0.109 | -1.53 | 0.128 |
| Constrictive communication | -0.092 | -1.217 | 0.225 | | | | | | |
| Requested avoidance of communication | 0.2998*** | 4.115 | < 0.001 | | | | 0.016 | 0.15 | 0.881 |

| Туре | Univariate analysis | | | Hierarchical multiple regressions | | | | |
|---|---------------------|---------------------|------------|-----------------------------------|---------|-------|-------|--|
| Complete avoidance of communication | 0.3648*** | 5.133 | < 0.001 | | 0.2698* | 2.486 | 0.014 | |
| R² | | | | 0.189 | 0.283 | | | |
| ∆R² | | | | - | 0.094 | | | |
| F | | | | 5.416*** | 6.399** | | | |
| Note:***P < 0.001 | , ** P < 0.01, *F | ^D < 0.05 | | | | | | |

The F-test of Model I and II indicated (P < 0.01) that the models were statistically significant. In the Hierarchical Regression, Model I presented an R2 value of 0.189. While the R2 of Model II was 0.2836 with a variance of 0.094, suggesting that the addition of variables including psychological capital, requested avoidance of communication, and complete avoidance of communication accounted for 9.4% of the variance of fertility-related stress. The t-test significance of the regression coefficient corresponding to complete avoidance of communication was less than 0.05, indicating that complete avoidance of communication had a significant positive effect on fertility-related stress (b = 0.277, p < 0.05) and psychological capital. In contrast, requested avoidance of communication was found to have no significant effect on fertility-related stress (p > 0.05). Among the control variables, monthly household income had a significant adverse effect on fertility-related stress, higher in women preparing for a second child than those preparing for a first child (See Table 3).

3.4 Analysis of Couple Communication Patterns as A Mediator

Bootstrap sampling (N = 2000) with Analysis of AMOS version 24.0 was applied to explore the significance of the mediating effect of couple communication patterns along three dimensions concerning psychological capital and fertility-related stress. The dependent variable was fertility-related stress, and the independent and mediating variables included psychological capital and couple communication patterns. The mediating effect was significant if the 95% confidence interval (CI) for the indirect effect did not include zero. The test results revealed that the 95% CI (- 0.207, - 0.005) for requested avoidance of communication did not include zero, and the 95% CI for constructive communication and complete avoidance of communication included zero. Thus, it inferred that the mediating effect of avoidance of communication (See Table 4).

Table 4

| The mediating effect of couples' communication patterns on fertility-related stress and psychological capital (N = 175) | | | | | | | |
|---|--------|--------|-----------------------------|---------|--|--|--|
| Mediating path | | SE | Bootstrapping (N = 2000) | | | | |
| | | | LL95%CI | UL95%CI | | | |
| psychological capital> Constructive communication> Fertility- related stress | -0.019 | -0.015 | -0.092 | 0.034 | | | |
| psychological capital -> Requested avoidance of communication -> Fertility-related stress | -0.066 | -0.053 | -0.207 | -0.005 | | | |
| psychological capital> Complete avoidance of communication> Fertility-related stress | -0.040 | -0.033 | -0.139 | 0.045 | | | |

4 Discussion

In the current study, the total stress level was found to be lower in OHSS women compared with the previous studies [13, 24, 25]. The fertility-related stress mean scores (139.6 ± 25.71) in OHSS women are slightly lower than the total fertility-related stress scores identified in past studies on women with assisted reproductive treatment. The rationale for the slightly lower scores in our study could be explained as follows. First, unclear causes of infertility and uncertainty about treatment outcomes were the main reasons for increased fertility stress in women [26]. In the current study, the participants completed a full round of embryo transfer and stayed in the reproductive ward with all professionals. The cause of the patient's infertility was identified before the transfer procedure, and the infertility specialist and nurses provided pregnancy monitoring, medication intervention, psychological care, and health education to reduce the stress level to some extent. It has been reported in earlier studies that positive coping styles helped reduce anxiety and depression levels, decreasing infertility-related stress in women undergoing IVF-ET or OHSS after ET for infertility [27, 28]. Therefore, health education on coping strategies was provided to the participants by the hospital's health professionals, which further contributed to a lower level of stress among participants.

The regression analysis findings indicated that the control variables, including demographic, social, and disease factors, accounted for 18.9% of fertility-related stress. The findings also highlighted that psychological capital and the three dimensions of couple communication patterns accounted for 9.4% of the variance of infertility-related stress. Furthermore, our findings suggested that both requested avoidance and complete avoidance couple communication patterns were positively associated with infertility-related stress in women with OHSS. In contrast, psychological capital was negatively related to infertility-related stress, which was in line with a previous study [29]. Gana and Jakubowska explained the impacting mechanism of negative communication between couples on infertility-related stress [30]. They highlighted that the negative communication significantly affected relationship quality and marital happiness and caused severe consequences for the physical and mental health of OHSS women.

The correlation analysis of the current study showed that communication patterns were correlated with infertilityrelated stress, which was consistent with the findings of previous studies [31]. However, the current study found no significant correlation between constructive communication patterns and infertility-related stress. This finding was inconsistent with Falconier et al. reported earlier [32]. The difference in findings may account for the difference in the treatment phase. Their study was conducted among women initial phase of treatment when they were diagnosed with infertility. They found that positive communication helped reduce infertility-related stress by building trust and relationships between couples[32]. But the present study was conducted at a later phase of treatment, and the study population was post-ET women. Therefore, the present study's findings are important to understanding the association between constructive communication and infertility-related stress among post-ET women. The findings suggest that infertile women in the different phases of infertility treatment needed different coping strategies for infertility-related stress. However, more research is needed to confirm this relationship between constructive communication and infertility-related stress in post-ET women.

The survey also analyzed the psychological capital based on four dimensions: self-efficacy, hope, optimism, and resilience [22]. It is assessed as a positive state of mind that an individual exhibits during dealing with a difficult situation [33]. Psychological capital facilitates positive thinking and positive actions to overcome difficult situations and achieve a better way of life [34]. In recent years, psychological capital has attained much attention in research and is considered a crucial element of positive psychology [34]. A previous study highlighted that psychological capital was an essential resource for an individual coping with infertility-related stress and facilitating a positive state during treatment [29]. It is also established from past studies that post-ET women have higher levels of psychological capital and lower scores of infertility-related stress, which indicated that psychological capital helped them recover quickly and deal with challenges of daily life and illness discomforts [29, 35].

Ni et al. reported that the extent of psychological capital had a protective impact on infertility-related stress and other emotional and behavioral problems in women [36]. The findings in the current study were also aligned with the past studies. Findings revealed a mean psychological capital score of 4.65 ± 0.727 in OHSS women, and the level of psychological capital was found to have a significant negative correlation with infertility-related stress. Along with physical challenges (e.g., hemoconcentration, decreased blood volume, and chest and abdominal fluid), the infertile women also experience several family issues. The primary family issues that impact OHSS women's psychological capital include the high cost of treatment, disturbance in the family, lack of positive communication and support from spouse, social stigma, and doubts in treatment results. These findings suggested that clinical treatment to improve the extent of psychological capital could improve individuals' ability to deal with social pressure, sexual pressure, and the thoughts of parental roles leading to a decrease infertility-related stress. In recent years, there have been many attempts at psychological capital intervention programs, including training in positive thinking, biofeedback training, and emotional resilience group training, but their effectiveness in OHSS women has yet to be investigated in future studies [37].

The current study's findings also highlighted that the requested avoidance of couple communication patterns mediated the association between psychological capital and infertility-related stress. In contrast, the other two communication patterns had no statistically significant association with infertility-related stress. Requested avoidance of communication refers to complaints, criticism, blame, and other negative ways of communication between couples [31]. Our findings further supported the findings of the previous studies [32, 38]. Lam et al. reported that the requested avoidance communication induced a higher stress level by decreasing the psychological capital [38]. Falconer and Epstein stated that couples engaging in "silent treatment" as an attempt to end the discussion, change the subject, or leave the scene of the conflict, could destroy a couple's relationship and intimacy, intensifying the stigma of infertility that women experience could result in a higher level of infertility-related stress [32].

Furthermore, the higher levels of mental stress negatively affect the treatment outcomes and pregnancy rate during infertility treatment [39]. Nevertheless, the mediating effect of the request avoidance communication on psychological capital could significantly provide significant support to OHSS patients dealing with infertility-related stress. The findings suggest that changes in the communication patterns between the couples increase the psychological capital, thus leading to a lower infertility-related stress level.

5 Limitation

This study has two limitations: (1) the study employed a cross-sectional survey of infertile women in a post-ET period to examine the dynamic relationship between infertility-related stress, psychological capital, and couple communication patterns. Since the duration of OHSS can be 10- to 40 days, the stress varies with the severity of the disease symptoms. At the same time, a simple cross-sectional study can only reflect the stress at a particular time point or period but fails to reflect dynamics in the infertility-related stress of women at different time periods during treatment. Thus, a longitudinal survey is needed in the future, mainly focusing on the relationship between couple communication patterns, psychological capital, and dynamic changes infertility-related stress and stress prediction in women with OHSS after ET; (2) All the participants surveyed attended the reproductive ward of a tertiary care hospital in China. A Convenience sampling method was adopted, and all participants were recruited from the same center, which may lead to sampling bias and limit the generalizability of results. A multi-center study is suggested to improve the generalizability and diversity of results.

6 Conclusion

The results showed that couple communication patterns and the levels of psychological capital of women with OHSS could partly explain infertility-related stress. The negative communication styles especially requested avoidance communication patterns in couple relationships and low psychological capital levels can exacerbate women's infertility-related stress. Furthermore, requested avoidance communication mediates psychological capital and infertility-related stress in the couple's relationship. Therefore, although nurses need to provide clinical care to women, it is equally important to assess women's psychological capital level and the couple's communication patterns. Finally, individualized interventions based on the assessment results are needed to reduce infertility-related stress, stabilize the patient's emotional state during treatment, and increase the pregnancy rate.

7 Relevance To Clinical Practice

This study demonstrated that infertility-related stress was greatly affected by couple communication patterns and levels of psychological capital. In clinical practice, in the case of women with OHSS after the embryo transfer, health care providers should pay attention to the couple's communication patterns. Women and their families should be guided away from negative communication patterns such as requested communication avoidance/complete avoidance of communication. Efforts should be made to improve the level of women's psychological capital. Women and their spouses should be encouraged to participate in the decision-making process of disease treatment and be provided with more disease-related education. They should also be instructed to confront the patients during treatment in the best manner possible to minimize infertility-related pressure.

Declarations

Availability of data and materials

The data used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was approved by the Review Board of the Sir Run Run Shaw Hospital, Zhejiang University School of Medicine (IRB.No.20210729-127). All subjects provided their verbal and written informed consent. The participants were assured of the confidentiality and anonymity of their responses.

Consent for publication

Not applicable

Author's Contribution:

Study conception and design: Weili WU, Lili YANG, Na ZHOU

Data collection and analysis: Ying HE, Weili WU

Manuscript writing: Weili WU, Lili YANG, Na ZHOU

Manuscript revision: Lili YANG, Na ZHOU

Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding

This work was supported by the Medical Science and Technology Project of Zhejiang Province (CN) (No. 2022512202) Medical Technology and Education of Zhejiang Province of China (NO.Y201941434)

Acknowledgments

The authors thank the participants for providing the data and the funding organizations.

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Figures



Figure 1

Mediation model of couple communication patterns in the relationship between psychological capital and fertilityrelated stress.