


Correlation Between Fertility Stress, Psychological Capital, and Conjugal Communication Patterns in Hospitalized Patients with Ovarian Hyperstimulation Syndrome During in vitro Fertilization–Embryo Transfer Cycles

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Background: Ovarian hyperstimulation syndrome (OHSS) is a distressing complication of in vitro fertilization–embryo transfer (IVF-ET) that can amplify emotional and psychological burden. Fertility-related stress is influenced by individual psychological resources and the quality of marital communication. However, limited research has examined these associations in patients hospitalized with OHSS.

Objective: To examine the relationship between fertility stress, conjugal communication patterns, and psychological capital in hospitalized patients with OHSS following IVF-ET.

Methods: This cross-sectional study included 185 women admitted to the fertility ward of a tertiary hospital in China between June 2022 and December 2023. Participants completed the Fertility Problem Inventory (FPI), the Psychological Capital Questionnaire (PCQ), and the Chinese version of the Christensen Marital Communication Model Questionnaire. Descriptive statistics, Pearson correlation, and multiple linear regression analyses were conducted using SPSS version 26.0. Outcomes included the level of fertility stress and its associations with conjugal communication, psychological capital, and relevant demographic and clinical predictors.

Results: Participants reported elevated fertility stress (mean \pm SD: 155.08 \pm 30.58), suboptimal conjugal communication (60.15 \pm 24.06), and moderate psychological capital (120.05 \pm 18.92). Fertility stress was positively correlated with total avoidance communication ($r = 0.373, p < 0.01$) and negatively correlated with psychological capital ($r = -0.322, p < 0.01$). Regression analysis revealed that embryo transfer cycles ($\beta = 9.284, p = 0.007$), second pregnancy attempts ($\beta = 11.398, p = 0.049$), total avoidance communication ($\beta = 2.080, p < 0.001$), and psychological capital ($\beta = -0.337, p = 0.002$) were significant predictors of fertility stress.

Conclusion: Maladaptive conjugal communication and diminished psychological capital are significantly associated with heightened fertility stress in OHSS patients undergoing IVF-ET. Integrating psychosocial support to enhance marital communication and psychological resilience may help alleviate stress and improve patient outcomes.

Keywords: ovarian hyperstimulation syndrome, fertility stress, psychological capital, marital communication, IVF-ET, psychosocial care, nursing care

Introduction

Ovarian hyperstimulation syndrome (OHSS) is a serious iatrogenic complication that occurs in approximately 1–5% of in vitro fertilization, embryo transfer (IVF-ET) cycles. While its main physical symptoms include abdominal distension and dyspnea, OHSS also imposes significant psychological and emotional burdens on affected patients.^{1–3} Evidence



suggests that stress associated with OHSS can negatively impact fertility outcomes through both physiological and behavioural pathways. Physiologically, stress may disrupt the hypothalamic pituitary ovarian axis, leading to hormonal imbalances such as reduced luteal progesterone secretion.^{4,5}

Behaviourally, elevated stress levels are associated with lower adherence to treatment protocols, including missed progesterone doses and reluctance to undergo essential ultrasound monitoring, which may impair embryo implantation success.⁶ Hospital-related stressors such as repeated paracentesis and restricted mobility can further exacerbate these effects by reducing patients' sense of autonomy in medical decision-making.⁷ These complexities highlight the limitations of a purely biomedical approach and underscore the need for a biopsychosocial model that addresses the psychological and interpersonal dimensions of care for patients hospitalised with OHSS.

The complex psychosocial challenges associated with OHSS highlight the need to examine the factors that influence how patients cope with fertility-related stress. Two key pathways warrant particular attention. First, sociocultural expectations placed on women often contribute to self-stigmatization, which can lead to maladaptive patterns of marital communication. These patterns may include avoidance of fertility-related discussions and increased conflict, both of which can undermine the emotional support typically provided by partners.^{8–10} This disruption in support may further intensify stress and its impact on treatment outcomes. The timing of embryo transfer may further compound the psychological burden. Fresh embryo transfer cycles, particularly those followed by early pregnancy, may intensify both the clinical severity of OHSS and the emotional strain associated with uncertain outcomes.^{6–10} However, few studies have explored how psychosocial factors interact during this critical phase of treatment.

The second factor of interest is psychological capital (PsyCap), a multidimensional construct encompassing self-efficacy, optimism, and resilience, which may play a protective role. PsyCap can help reduce the physiological effects of stress, such as hormonal imbalance,¹¹ and may also improve how patients perceive and manage stress by promoting more effective communication between partners. Improved communication can support shared decision-making and strengthen emotional alignment during treatment.¹² However, this conceptual framework has not yet been tested in women with OHSS. Most existing studies examine these factors independently, without assessing how their interaction may influence patient well-being.¹³ This gap is especially important during the embryo transfer phase, a time when patients must manage both medical complications and the emotional anticipation of pregnancy. At this critical point, patients require timely and coordinated psychosocial support.^{12,13}

The present study addresses this gap by simultaneously examining fertility stress, PsyCap, and marital communication patterns. It aims to achieve three objectives: (1) to assess whether psychological capital mediates the relationship between fertility stress and communication patterns, to identify modifiable targets for couple-focused interventions; (2) to explore how environmental factors such as restrictions on patient mobility may affect partner communication; and (3) to integrate findings into a biopsychosocial framework tailored specifically to hospitalized patients with OHSS. This approach is intended to guide the development of evidence-based nursing strategies that enhance stress management and improve IVF-ET outcomes.

Methods

Study Design and Setting

This was a cross-sectional survey conducted at the fertility ward of Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Hangzhou, China. The study period extended from June 2022 to December 2023. A convenience sampling method was used to recruit participants. The study population comprised women diagnosed with OHSS following in vitro fertilization and embryo transfer (IVF-ET). Ethical approval was obtained from the institutional ethics committee, and written informed consent was secured from all participants before data collection.

Inclusion and Exclusion Criteria

Participants were eligible for inclusion if they met the following criteria: (1) Female inpatients aged 20 to 49 years; (2) Diagnosed with moderate to severe ovarian hyperstimulation syndrome (OHSS) following IVF-ET, confirmed by the hospital's reproductive medicine department; (3) Legally married; (4) Cognitively intact and able to complete the

questionnaire independently; (5) Provided written informed consent. The decision to include only married women was based on the study's focus on conjugal communication. Women in non-marital but stable partnerships were not included. The minimum age limit of 20 years was selected following the legal age of marriage in China and to ensure adequate cognitive and emotional maturity for informed consent.

Exclusion criteria included the following: (1) History of psychiatric illness; (2) Participation in other ongoing clinical trials; (3) Withdrawal of consent following enrolment; (4) Inability to read or understand the survey language (Chinese); (5) Presence of serious comorbid conditions such as liver or kidney dysfunction, cardiovascular or cerebrovascular disease.³

Sample Size Calculation

The sample size was calculated using the standard formula for prevalence studies:

$$n = \frac{\{Z^2 \cdot p(1-p)\}}{d^2}$$

Assuming a 95% confidence level ($Z = 1.96$), an estimated OHSS prevalence (p) of 5%, and a margin of error (d) of 5%,⁴ the minimum sample size required was 73. To improve statistical power and account for a potential 10–20% attrition rate, the final sample included 185 participants. We increased the sample size to improve the accuracy of the estimates and to ensure the study had enough statistical power to detect important clinical differences. This approach helped make the results more reliable.

OHSS Diagnosis and IVF Protocol

All participants were diagnosed with moderate to severe OHSS according to standard clinical criteria, including ovarian enlargement, ascites, and laboratory abnormalities (eg, elevated hematocrit, leukocytosis). Only patients who had undergone fresh embryo transfer cycles were included in the study, and freeze-all cycles were excluded. This decision was made to control for the confounding effect of cryopreservation strategies on both OHSS severity and psychological stress.

Pregnancy outcomes were also recorded, as early pregnancy following fresh embryo transfer may exacerbate OHSS symptoms. Of the 185 participants, 93 (50.3%) had confirmed clinical pregnancies. Subgroup analysis was conducted to assess the association between pregnancy status and fertility stress levels.

Assessment Tools and Outcome Measures

Sociodemographic and Fertility History Survey

A structured questionnaire was used to collect demographic and clinical information. Demographic data included age, place of residence, and education level. Clinical and fertility-related variables included the number of births, history of abortions, type of assisted reproductive technology used, number of IVF attempts, and current pregnancy status. This information helped establish a baseline profile of each participant's reproductive history and treatment experience.

Fertility Stress Questionnaire

Fertility-related stress was measured using the Chinese version of the Fertility Problem Inventory (FPI), originally developed by Newton et al¹³ and culturally adapted and validated by Peng et al.¹⁴ The scale consists of 46 items divided into five dimensions: social stress (10 items), sexual stress (8 items), marital relationship strain (10 items), parental role needs (10 items), and rejection of a childless lifestyle (8 items). Each item is rated on a 6-point Likert scale ranging from 1 ("completely disagree") to 6 ("completely agree"), with total scores ranging from 46 to 276. Higher scores indicate greater levels of fertility-related stress. The Cronbach's alpha for the Chinese version was 0.91, and the coefficients of each subscale ranged from 0.74 to 0.85, indicating high internal consistency.

Psychological Capital Assessment

Psychological capital was assessed using the Chinese version of the Psychological Capital Questionnaire (PCQ), developed by Zhang et al¹⁵ in 2010. The scale comprises 26 items across four dimensions: self-efficacy, hope, optimism, and resilience. Each item is rated on a 7-point Likert scale, with responses ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Items 8, 10, 12, 14, and 25 are reverse-scored to reduce response bias. Higher total scores reflect greater levels of psychological capital. The internal consistency of the scale has been well established, with a Cronbach’s alpha of 0.90 in previous studies.

Conjugal Communication Patterns Questionnaire

Marital communication patterns were assessed using the Chinese version of the Christensen Marital Communication Model Questionnaire, originally developed in 1996 and adapted by Zhang et al¹⁶ for use in Chinese populations. The scale includes 16 items designed to evaluate how couples communicate during fertility-related stress. Each item is rated on a 9-point Likert scale, ranging from 1 (“most unlikely”) to 9 (“most likely”), based on how accurately it reflects the participant’s communication with their spouse.

The questionnaire comprises three subscales that capture distinct communication patterns: constructive communication, demanding-avoidance communication, and total avoidance communication. Reported Cronbach’s alpha values for these subscales were 0.512, 0.826, and 0.739, respectively, in studies involving couples undergoing infertility treatment. Higher subscale scores reflect greater use of that particular communication style. This instrument has demonstrated adequate reliability and cross-cultural applicability in reproductive health research.

Primary and Secondary Outcomes

The primary outcome was the level of fertility stress and its associations with conjugal communication patterns and psychological capital. Secondary outcomes included identification of demographic and clinical predictors of fertility stress, including pregnancy status, number of IVF cycles, and communication patterns.

Data Reliability and Validity

The research team followed strict quality control procedures to ensure that the data were accurate and reliable. Before beginning data collection, each participant received a clear explanation of the study’s purpose, procedures, and expectations. All investigators underwent standardized training to ensure consistency in data collection. Training covered the study protocol, ethical considerations, and questionnaire administration. Only personnel who completed a competency assessment were permitted to conduct the surveys.

Each investigator’s work was regularly reviewed during data collection to maintain consistency and accuracy. If a questionnaire was found to be incomplete or unclear, it was re-administered to the participant. To confirm the authenticity of the data, quality control staff conducted telephone follow-ups with 10% of participants selected at random. All data were entered twice using Epidata 3.1 software to reduce errors. This process helped ensure that the final dataset was complete, consistent, and accurate.

Statistical Analysis

All statistical analyses were conducted using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Categorical variables were summarised as frequencies and percentages [n (%)], and comparisons between groups were made using the chi-square (χ^2) test. Continuous variables were presented as mean \pm standard deviation ($\bar{x} \pm s$). One-way analysis of variance (ANOVA) was used to compare means across multiple groups, followed by the least significant difference (LSD) *t*-test for post hoc comparisons when appropriate. Pearson correlation analysis was performed to examine the relationships among fertility stress, psychological capital, and marital communication patterns. Multiple linear regression analysis was used to identify independent predictors of fertility stress, including demographic and clinical variables. A two-tailed *P*-value of <0.05 was considered statistically significant for all analyses.

Ethical Considerations

This study received ethical approval from the Ethics Committee of Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University (Approval No. SRRSH2022-074) and was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before their enrolment. Participants were informed about the study's objectives, procedures, confidentiality measures, and their right to withdraw at any time without consequence. All responses were anonymised, and completed questionnaires were securely stored to protect participant privacy. No oral consent was used; only signed consent forms were accepted to ensure compliance with institutional and ethical standards.

Results

Patient Demographic and Clinical Characteristics

A total of 200 patients with OHSS who met the inclusion criteria were invited to participate in the study. Of these, 185 returned fully completed questionnaires, yielding a response rate of 92.5%. All returned questionnaires met the validity criteria and were included in the final analysis.

Most participants were aged 30 to 35 years (51.4%), followed by those aged 25 to 30 years (30.8%). The mean age was 33.56 ± 3.24 years. The majority of participants (87.6%, $n = 162$) were in their first marriage, while 12.4% ($n = 23$) reported being remarried. The duration of marriage varied, with 18.9% of couples married for under 2 years, 47.6% for 2–5 years, and 33.5% for more than 5 years.

Educational attainment was predominantly junior college or undergraduate (55.1%), followed by secondary or high school education (21.6%). In terms of place of residence, 38.9% lived in rural areas and 30.8% in urban areas. Data for the remaining 30.3% were unavailable and thus were not analysed by residential category. Occupationally, 29.7% were employed in enterprises or institutions, and 19.5% were self-employed or freelancers. Most families had a monthly income between 5000 and 10,000 yuan (43.8%), followed by those earning more than 10,000 yuan (33.0%).

Regarding embryo transfer type, 64.9% underwent first-generation IVF, 30.8% underwent second-generation, and 4.3% had third-generation IVF treatments. Nearly half of the participants (49.2%) had been receiving treatment for over 12 weeks. In terms of fertility history, 86.5% were preparing for their first child, while 13.5% were attempting a second child. Two out of five participants (41.6%) reported at least one prior abortion. A total of 51.9% of participants had a history of gynecological surgery, while 48.1% did not. Clinical pregnancy was achieved by 62.2% of participants ($n = 115$) during hospitalization. Notably, participants who became pregnant reported significantly higher fertility stress scores compared to those who did not conceive ($P = 0.031$). (See Table 1).

Table 1 Demographic and Clinical Characteristics of Hospitalized Patients with OHSS Undergoing IVF-ET (N = 185)

Variables	Subgroup	Number of Participant (n)	Percentage (%)
Age	Under 25 years old	2	1.1
	25-30 years old	57	30.8
	30-35 years old	95	51.4
	35-40 years old	25	13.5
	Over 40 years old	6	3.2
Marriage Duration	Within 2 years	35	18.9
	2-5 years	88	47.6
	5+ years	62	33.5

(Continued)

Table 1 (Continued).

Variables	Subgroup	Number of Participant (n)	Percentage (%)
Education Level	Junior high school and below	32	17.3
	Technical secondary school or high school	40	21.6
	College or undergraduate	102	55.1
	Master degree or above	11	5.9
Place of Residence	Rural	72	38.9
	Town	57	30.8
	City	56	30.3
Occupation	Worker	19	10.3
	Farmers	6	3.2
	Corporate/Institutional employees	55	29.7
	Civil servants or managers	8	4.3
	Self-employed	19	10.3
	Freelancer	36	19.5
	Unemployed	13	7
	Other	29	15.7
Monthly Household Income Per Capita (CNY)	<5000	43	23.2
	5000~10,000	81	43.8
	≥10,000	61	33
Marital Status	First marriage	162	87.6
	Remarry	23	12.4
IVF Treatment Type	First Generation	120	64.9
	Second Generation	57	30.8
	Third Generation	8	4.3
Duration of Current Treatment	Within 4 weeks	57	30.8
	Within 12 weeks	37	20
	12 weeks and above	91	49.2
Childbearing Intention	One child	160	86.5
	Second child	25	13.5
History of Miscarriage	Yes	77	41.6
	No	108	58.4
History of Gynecological Surgery	Have	96	51.9
	None	89	48.1

Notes: Percentages may not total 100% due to rounding.

Abbreviations: IVF, in vitro fertilization; OHSS, ovarian hyperstimulation syndrome; CNY, Chinese Yuan.

Fertility Stress, Marital Communication, and Psychological Capital

Participants had a mean fertility stress score of 155.08 ± 30.58 , indicating elevated stress levels. The marital communication score averaged 60.15 ± 24.06 . Among the subscales, avoidant communication patterns were more prevalent, while constructive communication was comparatively low. The mean psychological capital score was 120.05 ± 18.92 , reflecting a moderate level of internal coping resources (See Table 2).

Univariate Analysis of Fertility Stress

Univariate analysis identified several factors significantly associated with fertility stress, including education level, place of residence, per capita family income, number of embryo transfer cycles, and the number of previous pregnancy attempts. Participants with a master's degree or higher had the lowest mean stress score (131.18 ± 29.42), whereas those with a junior high school education reported the highest stress (172.91 ± 23.74). Rural residents (164.39 ± 31.30) experienced significantly higher stress than urban residents (152.39 ± 26.43).

Participants from families with a monthly income of less than 5000 yuan reported significantly higher fertility stress scores (170.19 ± 30.05) compared to those with an income between 5000 and 10,000 yuan (154.62 ± 29.32). With regard to fertility treatment type, individuals who underwent first-generation IVF reported lower fertility stress levels (149.66 ± 30.80) than those who received second-generation (164.98 ± 26.26) or third-generation IVF (165.88 ± 38.68). Additionally, participants attempting to conceive a second child experienced significantly higher fertility stress (175.08 ± 32.42) compared to those preparing for their first child (151.96 ± 29.16) (see Table 3).

Table 2 Mean Scores and Standard Deviations for Fertility Stress, Conjugal Communication Patterns, and Psychological Capital (N = 185)

Scale	Score ($\bar{x} \pm s$)
Fertility Stress Total Score	155.08±30.58
Social Stress	37.30±9.76
Sexual Stress	24.99±7.12
Marital Relationship	33.03±8.98
Parental Role Demands	33.57±9.12
Rejection of a Childless Lifestyle	26.19±6.77
Conjugal Communication Patterns	60.15±24.06
Constructive Communication	16.18±7.46
Request To Avoid Communication	37.91±16.48
Both Parties Avoid Communication	6.06±4.04
Psychological Capital Total Score	120.05±18.92
Self-Efficacy	32.56±6.87
Resilience	28.43±5.93
Hope	29.07±5.16
Optimism	29.99±5.51

Notes: Scores are presented as mean \pm standard deviation ($\bar{x} \pm s$). Higher scores indicate greater levels of perceived fertility stress, more pronounced communication patterns, or stronger psychological capital, depending on the domain. Scale subdomains are based on validated Chinese versions of each instrument.

Table 3 Univariate Analysis of Fertility Stress Across Demographic and Clinical Variables (N = 185)

Variable	Category	Fertility Stress	t-value/F-value	P-value
Gender	Male	152.51±32.81	-0.802	0.424
	Female	156.35±29.47		
Age	Under 25 years old	155.50±4.95	0.590	0.670
	25–30 years old	153.26±26.89		
	30–35 years old	155.58±32.36		
	35–40 years old	160.72±30.81		
	Over 40 years old	140.83±40.22		
Marriage Duration	Within 2 years	155.46±28.12	1.700	0.186
	2-5 years	151.15±27.21		
	5+ years	160.45±35.66		
Education	Junior high school and below	172.91±23.74	7.061	<0.001
	Technical secondary school or high school	156.95±35.24		
	College or undergraduate	151.33±28.05		
	Master degree or above	131.18±29.42		
Place of Residence	Rural	164.39±31.30	6.469	0.002
	Town	152.39±26.43		
	City	145.86±30.72		
Profession	Worker	154.26±27.26	1.009	0.426
	Farmers	180.83±42.72		
	Corporate/Institutional employees	152.80±30.41		
	Civil servants or managers	161.13±26.92		
	Self-employed	158.63±38.60		
	Freelancer	155.67±32.17		
	Unemployed	159.62±22.49		
	Other	147.86±25.92		
Household Income (¥/month)	<5000	170.19±30.05	9.312	<0.001
	5000~10,000	154.62±29.32		
	≥10,000	145.05±28.68		
Marital Status	First marriage	153.21±30.93	-2.233	0.027
	Remarry	168.26±24.70		
Embryo Transfer Treatment	First Generation	149.66±30.80	5.646	0.004
	Second Generation	164.98±26.26		
	Third Generation	165.88±38.68		

(Continued)

Table 3 (Continued).

Variable	Category	Fertility Stress	t-value/F-value	P-value
Treatment Time	Within 4 weeks	155.33±31.43	0.970	0.381
	Within 12 weeks	160.86±27.98		
	12 weeks and above	152.57±31.04		
Child Planning Intention	One child	151.96±29.16	-3.631	<0.001
	Second child	175.08±32.42		
Miscarriage History	Yes	154.58±25.77	-0.186	0.853
	No	155.44±33.70		
Previous Gynecological Surgery	Yes	154.35±31.55	-0.335	0.738
	None	155.87±29.65		

Notes: Fertility stress was measured using the Fertility Problem Inventory (FPI). P-values <0.05 were considered statistically significant. Comparisons were performed using independent samples t-tests or one-way ANOVA as appropriate. Values are expressed as mean ± standard deviation.

These factors may influence individual fertility stress through various mechanisms. For instance, education level can shape fertility-related knowledge and expectations, place of residence may reflect disparities in access to healthcare services and regional fertility policies, and lower family income is often associated with increased financial strain during treatment. Additionally, a higher number of embryo transfer cycles may reduce confidence in treatment success, while the number of previous pregnancy attempts may reflect differing family planning goals and fertility intentions. These findings offer a foundation for future research on the determinants of fertility-related stress and may inform targeted interventions and policy development.

Correlation Analysis

Pearson correlation analysis revealed that fertility stress was positively associated with total avoidance communication ($r = 0.373$, $P < 0.01$) and negatively correlated with psychological capital ($r = -0.322$, $P < 0.01$). Other notable findings included: (1) Constructive communication was positively correlated with request-avoidance communication ($r = 0.406$, $P < 0.01$) and total avoidance communication ($r = 0.335$, $P < 0.01$); (2) Request-avoidance and total avoidance communication were also positively associated ($r = 0.450$, $P < 0.01$); Request-avoidance communication was negatively correlated with psychological capital ($r = -0.196$, $P < 0.01$). These results indicate that maladaptive communication patterns and lower psychological capital are significantly related to elevated fertility stress (See Table 4).

Table 4 Correlation Analysis Between Fertility Stress, Conjugal Communication Patterns, and Psychological Capital (N = 185)

Variable	Mean	Standard Deviation	Fertility Pressure	Constructive Communication	Request To Avoid Communication	Total Avoidance	Psychological Capital
Fertility Stress	155.08	30.58	1.000				
Constructive communication	16.18	7.46	0.020	1.000			
Request to avoid communication	37.91	16.48	0.126	0.406**	1.000		
Total Avoidance	6.06	4.04	0.373**	0.335**	0.450**	1.000	
Psychological Capital	120.05	18.92	-0.322**	-0.002	-0.196**	-0.274**	1.000

Notes: Values represent Pearson correlation coefficients (r). * $P < 0.05$ (statistically significant). ** $P < 0.01$ (highly statistically significant). "Request to Avoid Communication" and "Total Avoidance" are subscales of conjugal communication patterns. "Psychological Capital" includes self-efficacy, optimism, hope, and resilience.

Multiple Linear Regression Analysis

Multivariate regression analysis identified the number of embryo transfer cycles, the number of previous pregnancy attempts, total avoidance communication patterns, and psychological capital as significant predictors of fertility stress. This analysis revealed that a higher number of embryo transfer cycles ($B = 9.284$, $P = 0.007$) and preparation for a second child ($B = 11.398$, $P = 0.049$) were significantly associated with increased fertility stress. Additionally, total avoidance communication was positively associated with higher fertility stress ($B = 2.080$, $P < 0.001$), whereas greater psychological capital was inversely associated with fertility stress ($B = -0.337$, $P = 0.002$). Other variables, including education level, residence, monthly per capita income, marital status, constructive communication, and demanding-avoidant communication, did not show statistically significant associations. These findings highlight key psychosocial and clinical predictors of fertility stress and may inform the development of targeted interventions and supportive policies (see Tables 5 and 6).

Table 5 Variable Coding Scheme for Multiple Linear Regression Analysis

Independent Variable	Coding Assignment
Education	Junior high school and below = 1, technical secondary school and high school = 2, junior college and undergraduate = 3, master and above = 4
Place of Residence	Rural = 1, Town = 2, City = 3
Household Monthly Income Per Capita	<5000=1, 5000~10,000=2, ≥10,000=3
Marital Status	First marriage = 1, second marriage = 2
Embryo Transfer Treatment	First generation = 1, second generation = 2, third generation = 3
Child Planning Intention	First child = 1, second child = 2

Notes: These categorical variables were assigned numerical codes for inclusion in the multiple linear regression model. The coding reflects an appropriate ordinal scale (eg, education, income), and a nominal scale where necessary (eg, marital status, IVF generation).

Table 6 Multivariate Linear Regression Analysis of Factors Associated with Fertility Stress in OHSS Patients

Variable	B	Standard Error	β	t	p
Constant term	186.018	20.231		9.195	<0.001
Education	-4.376	2.493	-0.121	-1.756	0.081
Place of Residence	-3.925	2.462	-0.106	-1.594	0.113
Household Monthly Income Per Capita	-4.694	2.801	-0.114	-1.676	0.096
Marital Status	7.473	6.143	0.081	1.216	0.225
Embryo Transfer Treatment Generation	9.284	3.403	0.174	2.728	0.007
Planned Number of Children (First or Second Child)	11.398	5.737	0.128	1.987	0.049
Constructive Communication	-0.251	0.285	-0.061	-0.881	0.380
Request to Avoid Communication	-0.133	0.137	-0.072	-0.975	0.331
Avoid Communication Completely	2.080	0.562	0.275	3.698	<0.001
Psychological Capital	-0.337	0.107	-0.208	-3.155	0.002

Notes: This multivariate linear regression model identifies significant predictors of fertility stress among patients diagnosed with OHSS. A positive β indicates a direct association with increased fertility stress, whereas a negative β suggests a protective or inverse association. Significant predictors included higher embryo transfer cycles, intention to conceive a second child, total avoidance communication pattern, and lower psychological capital. Statistical significance was set at $P < 0.05$.

Discussion

This study examined the correlation between fertility stress, psychological capital, and conjugal communication patterns in women hospitalized with OHSS following IVF-ET. The findings revealed that higher fertility stress was significantly associated with greater use of total avoidance communication and lower psychological capital. Additionally, the number of embryo transfer cycles and attempts to conceive a second child emerged as significant predictors of increased stress levels.

Fertility stress refers to the psychological burden experienced by individuals and their partners during the diagnosis and treatment of infertility. It encompasses multiple dimensions, including social and familial expectations, marital relationships, sexual functioning, the desire for a parental role, and the emotional impact of a childless lifestyle.¹⁷ The observed mean fertility stress score (155.08 ± 30.58) was slightly lower than that reported in previous studies, such as by Cai et al.¹⁷ This discrepancy may reflect differences in clinical timing and care settings. Participants in our study had already undergone embryo transfer and were hospitalized for OHSS management. At this stage, patients often receive intensive clinical monitoring, emotional support, and medication management, which may help mitigate distress. Previous research suggests that uncertainty about infertility causes and treatment outcomes contributes significantly to psychological burden. Enhanced medical support during hospitalisation, including health education and psychosocial interventions, has been shown to reduce anxiety and fertility-related stress in IVF patients.^{14–17}

Several sociodemographic factors influenced fertility stress. Women aged 36 years and older reported higher stress levels, consistent with evidence showing that advanced maternal age is linked to reduced fertility potential and increased treatment failure anxiety.¹⁸ With China's evolving fertility policies and growing emphasis on second or third-child pregnancies, older women may face amplified pressures to balance family, career, and personal health.¹⁹ This study also identified significant differences in fertility stress across income levels, highlighting the role of financial strain in exacerbating emotional distress during OHSS management. Lower income levels were associated with higher stress, which aligns with previous findings that financial burden is a key stressor during IVF.²⁰ Considering that IVF is not universally covered by insurance and often requires patients to reduce or leave employment, economic hardship can compound psychological distress during treatment.^{21,22} Moreover, repeated examinations and treatments during assisted reproduction often compel many women to leave their jobs, further increasing the family's financial burden and increasing fertility-related stress.²³

Regression analysis further highlighted the impact of marital dynamics. Total avoidance communication was a strong positive predictor of fertility stress. This communication style, characterised by emotional withdrawal and refusal to engage in discussions about treatment, undermines emotional support and mutual problem-solving between partners.^{24,25} In contrast, constructive communication did not show a significant association with stress in this sample. While previous studies have shown that positive spousal interactions can reduce distress, the lower overall stress levels in our sample may explain the absence of this relationship.^{24–26}

In this study, fertility stress was positively associated with avoidance-based communication and negatively associated with psychological capital, consistent with previous findings. Negative spousal communication, particularly withdrawal behaviors, appeared to disrupt marital harmony and intimacy, further compounding fertility-related distress. Avoidance and demand-withdrawal communication patterns remain critical targets for intervention. These behaviors are particularly detrimental during emotionally intense situations, such as hospitalization for OHSS.²⁶

PsyCap was negatively correlated with fertility stress, supporting its role as a protective psychological resource. PsyCap comprises self-efficacy, optimism, hope, and resilience. It helps patients reframe challenges and maintain motivation. Interestingly, although education level did not directly predict fertility stress in regression models, it may exert an indirect effect by enhancing psychological capital. Educated patients often have better health literacy and realistic expectations about IVF success, potentially buffering disappointment and emotional fatigue. Future studies should explore whether education mediates the relationship between stress and resilience.

Our findings also highlighted the potential role of male partners in fertility treatment. Although this study did not measure spousal involvement directly, the findings on marital communication suggest that including husbands in consultations, offering couple-based counselling, and encouraging shared decisions may help improve partner support

and reduce stress. Clinical protocols should include partner-focused education and encourage male participation, particularly during critical treatment phases such as embryo transfer and OHSS management.

The multiple linear regression analysis further confirmed that psychological capital, number of embryo transfer cycles, preparation for a second child, and total avoidance communication were significant predictors of fertility stress. These findings reinforce the importance of both individual and relational factors in shaping patients' emotional responses. From a theoretical perspective, our results support a biopsychosocial model of infertility-related stress, where psychological resilience and partner communication play key roles. Total avoidance communication appears to mediate the link between low psychological capital and elevated stress, highlighting the need for targeted interventions that strengthen both personal coping skills and marital support.

This study also found that only the “demand–withdrawal” communication pattern significantly mediated the relationship between psychological capital and fertility stress. In contrast, the other two communication styles showed no significant effect. This pattern, characterised by one partner initiating discussion or expressing concern while the other avoids, withdraws, or deflects the conversation, can erode marital intimacy and reinforce the stigma associated with infertility.²⁷ Such communication dynamics are particularly harmful in OHSS patients, who already face intense physical discomfort and emotional distress related to symptoms like haemoconcentration, pleural effusion, and treatment-related uncertainty. The financial strain of prolonged treatment and the fear of unsuccessful outcomes further diminish psychological resources. As both partners experience emotional turmoil, the absence of open communication can weaken mutual support and coping mechanisms.²⁸ Our findings underscore the need for interventions that promote constructive dialogue between partners to protect psychological capital and reduce fertility-related stress during the OHSS treatment process.

Clinical and Theoretical Implications

This study highlights the critical role of conjugal communication patterns and psychological capital in shaping fertility-related stress among women hospitalised with OHSS. The findings suggest that healthcare providers should incorporate couple-based interventions that promote open, supportive communication and enhance psychological resilience. Educating both partners about OHSS and involving them in treatment decisions may reduce stress and improve treatment adherence. Theoretically, the study supports a biopsychosocial framework in which individual psychological resources and relational dynamics interact to influence fertility outcomes. This integrated perspective offers a valuable foundation for developing targeted psychosocial interventions in reproductive medicine.

Strengths and Limitations

This study is among the first to simultaneously examine the correlation between fertility stress, psychological capital, and conjugal communication patterns in women hospitalised with OHSS during IVF-ET, offering a novel biopsychosocial perspective on this high-risk population. Its strength lies in addressing a clinically relevant gap by integrating psychological and relational dimensions into fertility care. However, the study has limitations. Its cross-sectional design captures stress levels at a single time point and cannot reflect changes throughout OHSS progression. Future longitudinal research is recommended to assess how stress evolves with symptom severity and treatment stages. Additionally, the sample was drawn from a single tertiary care hospital, limiting generalisability. Multi-centre studies with broader participant diversity would strengthen the applicability of findings across different clinical settings.

Conclusion

This study demonstrates that fertility stress in hospitalised OHSS patients is significantly influenced by conjugal communication patterns and levels of psychological capital. Specifically, negative communication styles, particularly demand–withdrawal patterns, and lower psychological resilience were associated with higher fertility stress. Furthermore, avoidance-based communication was identified as a key mediator between psychological capital and fertility stress, underscoring its critical role in emotional coping during OHSS management. These findings highlight

the importance of addressing psychological and relational dimensions in clinical care. Healthcare providers, especially nurses, should extend their care beyond managing physical symptoms by actively incorporating targeted psychosocial interventions such as spousal engagement, couple-based counselling, and structured stress-reduction strategies. Promoting effective communication and strengthening psychological resources may help reduce fertility-related stress, enhance emotional well-being, and potentially improve treatment adherence and pregnancy outcomes. Future research should explore these relationships longitudinally and across diverse clinical settings to inform broader, evidence-based reproductive health interventions.

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Author Contributions

Weili Wu and Na Zhou contributed equally to the conception, study design, and execution of the study. Ying He was responsible for data acquisition and statistical analysis. All authors made significant contributions to the work reported, including participating in the drafting, critical review, and revision of the manuscript. Furthermore, all authors gave final approval of the version to be published, agreed on the journal to which the article has been submitted, and agreed to be accountable for all aspects of the work.

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The authors declare no conflicts of interest in relation to this work.

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