

# Relationship Between Dyadic Coping with Anxiety and Depression in Infertile Couples: Gender Differences and Dyadic Interaction

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**Background:** This study aims to examine the relationship between anxiety and depression and dyadic coping in infertile couples, exploring gender differences and dyadic interactions in these associations.

**Methods:** A cross-sectional study was conducted involving 288 couples recruited from the First Affiliated Hospital of Lanzhou University between November 2021 and November 2022. The Dyadic Coping Scale, Anxiety Scale, and Depression Scale were utilized to measure dyadic coping, anxiety, and depression, respectively. The Actor-Partner Interdependence Model was used to analyze the actor effect and partner effect.

**Results:** Wives exhibited significantly higher anxiety and depression scores compared to husbands ( $p < 0.001$ ). No statistically significant difference was found in dyadic coping between wives and husbands. Positive dyadic coping in infertile couples had significant actor effects on anxiety and depression ( $p < 0.05$ ) and partner effects ( $p < 0.05$ ). Positive dyadic coping negatively predicted anxiety and depression of oneself and one's partner. Negative dyadic coping in infertile couples also had significant actor effects on anxiety and depression ( $p < 0.05$ ) and partner effects ( $p < 0.05$ ). Negative dyadic coping positively predicted anxiety and depression of oneself and one's partner.

**Conclusion:** The dyadic coping style of infertile couples has both actor and partner effects on their own and their partner's anxiety and depression. Anxiety and depression in infertile couples are influenced by their own and their partner's dyadic coping style, respectively. Therefore, dyadic coping serves as an important indicator for predicting psychological outcomes in these couples.

**Keywords:** infertility couple, dyadic coping, anxiety, depression

## Introduction

Infertility is a prevalent global health issue defined as the inability to conceive after at least 12 months of regular unprotected sexual intercourse.<sup>1</sup> Approximately 8% to 12% of couples worldwide experience fertility problems.<sup>2</sup> In China, the infertility rate among couples of childbearing age has increased from 2.5–3% to around 12–15% over the past two decades, with over 50 million affected individuals.<sup>3</sup> The introduction of new techniques during assisted reproductive treatments impose psychological distress and economic burden on patients and families, often leading to anxiety and depression.<sup>4–6</sup> Infertile women tend to exhibit higher levels of anxiety and depression compared to women in the general population.<sup>7</sup> Infertility also places substantial psychological pressure on husbands. Among them, anxiety and depression symptoms are the most prominent problems.<sup>8</sup> The psychological health status of spouses should also not be ignored. During fertility treatment, 56% of women and 32% of men reported significant depressive symptoms, while 76% of women and 61% of men reported significant anxiety symptoms.<sup>9</sup> Psychological health issues in both spouses can affect patients' treatment outcomes and quality of life, leading to treatment interruptions and a decrease in pregnancy rates.<sup>10</sup> Negative emotions can lead to hypothalamic amenorrhea by reducing the activity of the hypothalamic-pituitary-ovarian axis, which related to endocrine and immune system disorders.<sup>11</sup> Anxiety and depression can

also directly activate the hypothalamic-pituitary-adrenal axis, leading to the suppression of the gonadotropin releasing hormone pulse generator, thereby inhibiting the ovulation activity of the body and affecting the treatment effect of infertility.<sup>12,13</sup> For males, there is a potential inverse dose-response relationship between anxiety, depression and sperm quality.<sup>14,15</sup> Negative emotions can also lead to male sexual dysfunction and adverse reproductive outcomes.<sup>16</sup> It can be seen that there is an interactive promotion and constraint mechanism between the treatment of infertile couples and anxiety and depression, which can easily lead to a vicious cycle. At the same time, anxiety and depression can also bring about marital problems, reduce marital satisfaction, and seriously affect the quality of reproductive life.<sup>16</sup>

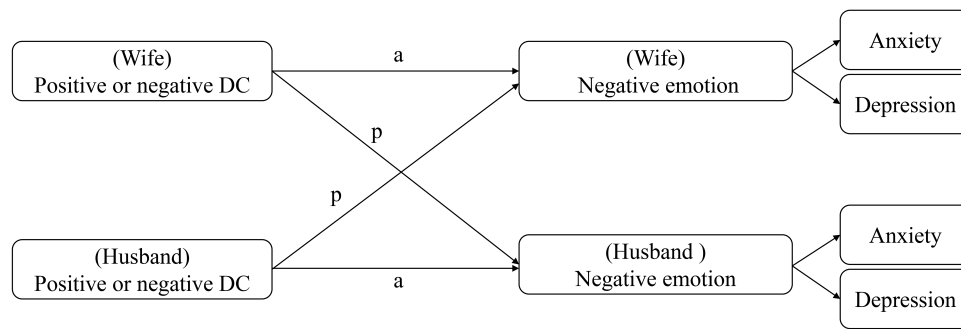
Pregnancy is a shared concern for both partners in infertile couples. Both spouses may experience anxiety during the diagnosis and treatment of infertility, with gender differences and mutual influences observed.<sup>17</sup> Previous studies have found a connection between gender, anxiety, and depression in infertile couples, with women being 2.54 times more likely to experience anxiety symptoms than men.<sup>18</sup> In a dyadic framework, stress responses occur between individuals rather than within individuals, and the cognitive assessment, emotional experiences, and coping behaviors of individuals are interconnected with those of their partners.<sup>19</sup>

Dyadic Coping (DC) is a form of marital stress management that emphasizes not only the interdependence of marital stress experiences, but also the coping process of external stressors. Couples not only respond to their personal stress, but also to partner's stress.<sup>20</sup> With the transformation of this stress coping mode, the concept of dyadic coping is a reciprocal system according to the systemic-transactional model, focusing on how couples evaluate stress, support each other, and jointly cope with stressors.<sup>21</sup> In couples with chronic diseases, it has been shown that the regulation of individual mental health is closely related to the coping styles of the individual and their spouses.<sup>22,23</sup> Therefore, it is speculated that infertile couples may also have similar processes of mutual influence in stress response and mental health. Infertility, as a dyadic stressor rooted in marital relationships, is not only influenced by individual differences, but also by specific paired relationships.<sup>24</sup> Many variables between couples are not independent, and their coping styles may affect each other, thereby affecting their anxiety and depression symptoms.<sup>25</sup> Research has shown that when couples work together, they can provide a supportive environment for each other, improve treatment outcomes and the quality of life.<sup>26</sup> A positive dyadic coping style can reduce emotional distress for both spouses, maintain good mental health and a stable relationship<sup>27,28</sup>. The negative dyadic coping style will reduce the disease adaptation ability of patients and spouses, which is not conducive to the regulation of their mental health.<sup>28</sup> Therefore, when a couple face the stressful event of illness together, they perceive continuous adjustment of support and encouragement from each other, which will form a positive behavioral cycle of great significance for their successful response and reduction of negative emotions.

Given the importance of dyadic coping in regulating mental health, this study focuses on dyadic coping variables at the marital level to explain the variability of anxiety and depression in infertile couples. The study aims to examine coping behavior characteristics among couples experiencing infertility and the impact of coping styles on their mental health. The findings will help healthcare professionals recognize the positive role of assistance and support within infertile couples in improving treatment outcomes and mental health levels. Additionally, the study provides a theoretical basis for future clinical intervention research targeting couples.

According to the systemic-transactional model, dyadic coping contains the positive and negative strategies when couples jointly handle stressors, namely positive and negative dyadic coping.<sup>29</sup> Positive dyadic coping includes stress communication, support, delegation, and common dyadic coping, while negative dyadic coping refers to control and hostility.<sup>29</sup> Positive dyadic coping enables partners to maintain or restore their mental health, improve the quality of their relationship, strengthen their self-awareness and mutual trust, while negative dyadic coping is the opposite.<sup>30</sup> Infertility can be considered as a stressor at the marital level (ie dyadic), as both partners are affected by this issue and couples need to deal with these critical experiences together. Therefore, we believe that coping with such stressful events should also include common coping strategies.

In this study, we utilize the Actor-Partner Interdependence Model (APIM) to address the issue of non-independence of interpersonal relationship variables. The APIM estimates the impact of individual attributes on one's own outcomes (Actor effect) and on their partner's outcomes (Partner effect).<sup>31</sup> By employing the APIM, we can evaluate the bidirectional influence of couples and clarify the influence of partners on each other. The hypothetical models of this study are listed as follows: (a) Positive dyadic coping would be associated with the couple's own negative emotion as well as their spouse's negative emotion (Figure 1). (b) Negative dyadic coping would be associated with the couple's own negative emotion as well as their spouse's negative emotion (Figure 1).



**Figure 1** The hypothetical model of actor and partner effects of the wife's and husband's positive or negative DC on negative emotion (a represents actor effect, p represents partner effect).

In summary, by examining the relationship between dyadic coping, anxiety, and depression, we aim to shed light on the mutual influence between coping styles and mental health outcomes in infertile couples.

## Methods

### Participants and Recruitment

A total of 288 infertile couples who sought assisted reproductive assistance at the Reproductive Center of Lanzhou University First Hospital between November 2021 and November 2022 were included in this study. The inclusion criteria for wives were: (1) clinical diagnosis of infertility, (2) awareness of the disease condition and provision of informed consent, and (3) normal language communication ability and voluntary participation. The inclusion criteria for husbands were: (1) awareness of the patient's condition and normal communication ability, (2) provision of informed consent, and (3) absence of male infertility factors. Exclusion criteria included: (1) previous history of diagnosed mental disorders or use of antidepressants in the past 6 months, and (2) presence of other serious physical illnesses or major life stress events in the past 6 months.

Two trained investigators, including the author, used standardized instructions to inform both spouses about the questionnaire's precautions and requirements. The surveys were conducted face-to-face, with each spouse independently filling out the questionnaire. The investigators ensured questionnaire completeness and verified the patients' medical record information on-site. This study complied with the Declaration of Helsinki.

## Measures

### Self-Rating Anxiety Scale (SAS)

The SAS is a widely used scale to measure subjective anxiety symptoms. It consists of 20 items, covering various psychological and physical anxiety symptoms.<sup>32</sup> Participants rated their experiences over the past week on a scale ranging from 1 (none or a little of the time) to 4 (most or all of the time). The original scale score of SAS ranges from 20 to 80. The original scale score was multiplied by 1.25 and the integer as the standard score was taken. A standard score of 50 as the cut-off value was used,  $\geq 50$  indicates the presence of anxiety symptoms. It has demonstrated considerable reliability and validity in the Chinese population.<sup>33</sup> In our study, the Cronbach's  $\alpha$  of male sample and female sample were 0.818, and 0.780.

### Self-Rating Depression Scale (SDS)

The SDS evaluates subjective feelings of depression. It contains 20 items rated on a 4-point Likert scale, reflecting the frequency of experiences over the past week.<sup>34</sup> The total score was standardized, with a cut-off value of 53 indicating the presence of depression symptoms. The original total score ranges from 20 to 80. The original total score was multiplied by 1.25 and the integer part is the standard score. A standard score of 53 as the cut-off value was applied,  $\geq 53$  indicates the presence of anxiety symptoms. The higher the total score of the scale, the more serious the depression. The Chinese version of SDS has demonstrated considerable reliability and validity.<sup>33</sup> In our study, the Cronbach's  $\alpha$  of male sample and female sample were 0.818, and 0.793.

## Dyadic Coping Inventory (DCI)

DCI is used to evaluate the stress communication and dyadic coping from one or both parties in an intimate relationship. DCI contains 37 items, which use 5-point Likert scale ranging from 1 (never) to 5 (very often).<sup>35</sup> The DCI includes 6 dimensions: stress communication, supportive coping, delegated coping, common coping, negative coping, and coping quality evaluation. According to the Systemic Transactional Model (STM) by Bodenmann,<sup>36,37</sup> DC refers to the positive and negative strategies, namely positive and negative DC.<sup>36,38</sup> Positive DC includes open communication, and supportive, delegated, and common DC.<sup>36,38</sup> Cut-off scores are established in DCI as follows: dyadic coping below average (DCI total score: <111), dyadic coping in the normal range (DCI total score: 111–145), and dyadic coping above average (DCI total score: >145). The Chinese version of DCI has been cross-culturally adjusted and presents a good internal consistency (Cronbach's  $\alpha = 0.881$ ).<sup>38</sup> In our study, the Cronbach's  $\alpha$  of male sample and female sample were 0.780, and 0.827.

## Demographic and Infertility-Related Information

The general information questionnaire for couples with infertility includes age, occupation, educational level, place of residence, birth history, per capita monthly income of households, infertility years, length of marriage, marriage type, assisted pregnancy cycle, type of infertility, type of family, etc.

## Data Analysis

The data were analyzed using SPSS 25.0 and Amos 26.0. A significance level of  $p < 0.05$  was used. Descriptive statistics were used to summarize the demographic and infertility-related information. Paired sample *t*-tests and chi-square tests were employed to compare scores and the incidence of anxiety and depression between spouses. Pearson correlation analysis was conducted to examine the associations between dyadic coping strategies, anxiety, and depression. The Actor-Partner Interdependence Model (APIM) in Amos 26.0 was employed to analyze the relationship between dyadic coping, anxiety, and depression, including actor and partner effects.

## Results

### Preliminary Analyses

The majority of the 288 couples were between 30 and 35 years old (62.2% wives, 68.8% husbands). Most patients resided in cities (68.4%) and were employed or self-employed (64.2%). 79.5% had no history of childbirth. The average monthly per capita income of households ranged between 3000 and 5000 yuan for 46.9% of participants. The majority (67%) had been diagnosed with infertility for more than 3 years, and 57.3% had not undergone assisted reproductive technology (Table 1). Paired sample *t*-tests (Table 2) showed that wives had higher anxiety scores ( $t = 15.210$ ,  $p < 0.001$ ) and depression level ( $t = 3.904$ ,  $p < 0.001$ ) than husbands. Regarding dyadic coping, wives scored higher in stress communication ( $t = 5.620$ ,  $p < 0.001$ ), while husbands scored higher in delegated coping ( $t = -2.117$ ,  $p < 0.05$ ).

There were negative correlation between wives' stressful communication ( $r = -0.383$ ,  $p < 0.01$ ), supportive coping ( $r = -0.359$ ,  $p < 0.01$ ), delegated coping ( $r = -0.335$ ,  $p < 0.01$ ), and common coping ( $r = -0.327$ ,  $p < 0.01$ ) with their own anxiety. There were also significant negative correlation between wives' stressful communication ( $r = -0.190$ ,  $p < 0.01$ ), supportive coping ( $r = -0.251$ ,  $p < 0.01$ ), delegated coping ( $r = -0.291$ ,  $p < 0.01$ ), and common coping ( $r = -0.233$ ,  $p < 0.01$ ) with husbands' anxiety. Wives' negative coping was significantly positively related to anxiety ( $r = 0.275$ ,  $p < 0.01$ ), as well as husbands' anxiety ( $r = 0.246$ ,  $p < 0.01$ ). The wives' stressful communication ( $r = -0.341$ ,  $p < 0.01$ ), supportive coping ( $r = -0.305$ ,  $p < 0.01$ ), delegated coping ( $r = -0.268$ ,  $p < 0.01$ ), and common coping ( $r = -0.323$ ,  $p < 0.01$ ) had a negative correlation with their own depression, and there were also negative correlation between wives' positive DC with their husbands' depression (Table 3). Moreover, wives' negative coping was significantly positively related to depression ( $r = 0.268$ ,  $p < 0.01$ ), as well as the husband's depression ( $r = 0.171$ ,  $p < 0.01$ ).

### APIM

Both wives' positive DC and husbands' positive DC were included as independent variables, while negative emotion was used as the dependent variable. The model results are illustrated in Figure 2 with all standard goodness-of-fit indices ( $\chi^2/df = 3.617$ ;

**Table 1** Demographic and Fertility Characteristics of the Couples (n=288)

Item		Wife n (%)	Husband n (%)
Age (years)	<30	73 (25.3%)	64 (22.2%)
	30–35	179 (62.2%)	198 (68.8%)
	>35	36 (12.5%)	26 (9.0%)
Occupation	Unemployed	103 (35.8%)	80 (27.8%)
	Employed	185 (64.2%)	208 (72.2%)
Education level	Secondary school or below	102 (35.4%)	108 (37.5%)
	High school	97 (33.7%)	110 (38.2%)
	College and above	89 (30.9%)	70 (24.3%)
Residence place	Rural areas	91 (31.6%)	–
	Urban areas	197 (68.4%)	–
Reproductive history	Yes	59 (20.5%)	–
	No	229 (79.5%)	–
Per capita monthly income of the family (yuan)	<3000	88 (30.6%)	–
	3000–5000	135 (46.9%)	–
	>5000	65 (22.6%)	–
Duration of infertility (years)	<3	95 (33.0%)	–
	3–5	106 (36.8%)	–
	>5	87 (30.2%)	–
Marriage type	First marriage	242 (84.0%)	246 (85.4%)
	Remarriage	46 (16.0%)	42 (14.6%)
ART cycle	None	165 (57.3%)	–
	I	83 (28.8%)	–
	≥2	40 (13.9%)	–
Diagnosis	Primary infertility	163 (56.6%)	–
	Secondary infertility	125 (43.4%)	–
Family type	Living with parents	102 (35.4%)	–
	Not living with parents	186 (64.6%)	–

**Table 2** The Scores of Dyadic Coping, Anxiety and Depression (n=288)

Item	Wife (mean ± standard deviation)	Husband (mean ± standard deviation)	t	p
SAS	38.27±2.56	34.89±3.77	15.210	0.000
SDS	39.78±8.11	37.26±8.74	3.904	0.000
DCI	121.73±13.33	120.31±11.52	1.705	0.089
Stress communication	28.17±6.09	26.06±4.19	5.620	0.000
Supportive coping	33.85±6.90	34.23±6.64	−0.869	0.385
Delegated coping	13.88±2.94	14.30±2.71	−2.117	0.035
Joint coping	18.13±3.17	17.99±4.08	0.496	0.620
Negative coping	27.72±5.55	27.73±5.65	−0.029	0.977

**Abbreviations:** SAS, Self-rating anxiety scale; SDS, Self-rating depression scale; DCI, Dyadic coping inventory.

GFI=0.927; AGFI=0.863; RMSEA=0.095; NFI=0.916; IFI=0.938; CFI=0.937). Positive DC negatively influences one's own anxiety and depression, with a significant actor effect ( $\beta_{\text{Wife}}=-0.823$ ,  $\beta_{\text{Husband}}=-0.930$ ,  $p<0.001$ ), as well as on the other spouse, indicating a significant partner effect ( $\beta_{\text{Wife}}=-0.160$ ,  $\beta_{\text{Husband}}=-0.341$ ,  $p<0.05$ ).

If wives' negative DC and husbands' negative DC were set as independent variables, the model results are presented in [Figure 3](#) ( $\chi^2/\text{df}=2.023$ ; GFI=0.991; AGFI=0.952; RMSEA=0.060; NFI=0.968; IFI=0.984; CFI=0.983). Negative DC positively influence one's own anxiety and depression, with a significant actor effect ( $\beta_{\text{Wife}}=0.798$ ,  $\beta_{\text{Husband}}=0.805$ ,  $p<0.001$ ), as well as on the other spouse, indicating a significant partner effect ( $\beta_{\text{Wife}}=0.350$ ,  $\beta_{\text{Husband}}=0.359$ ,  $p<0.05$ ).

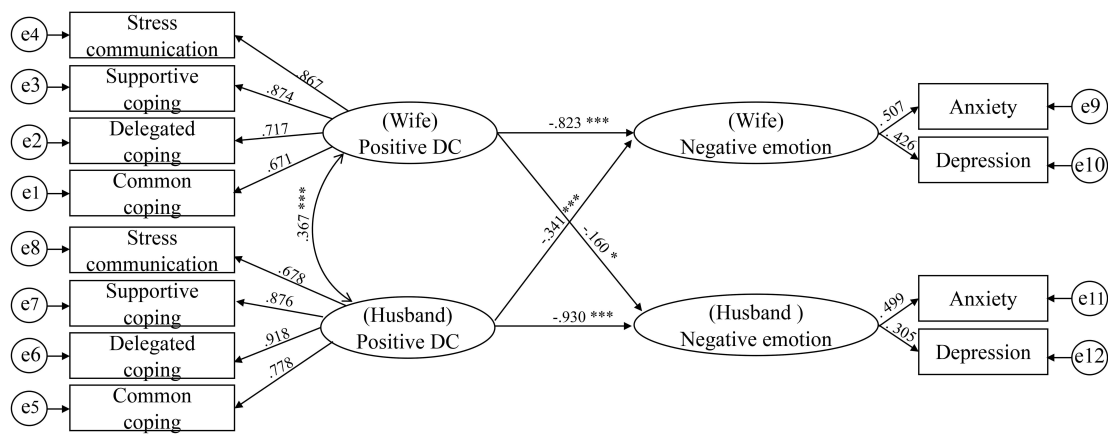
**Table 3** Correlation Between DCI, SAS and SDS Scores in Infertile Couples (n=288)

		Wife								Husband							
		DCI	Stress Comm unication	Sup portive Coping	Dele gated Coping	Negative Coping	Common Coping	SAS	SDS	DCI	Stress Comm unication	Sup portive Coping	Dele gated Coping	Negative Coping	Common Coping	SAS	SDS
Wife	DCI	1															
	Stress communication	0.904**	1														
	Supportive coping	0.878**	0.760**	1													
	Delegated coping	0.649**	0.559**	0.733**	1												
	Negative coping	-0.452**	-0.507**	-0.701**	-0.772**	1											
	Common coping	0.747**	0.594**	0.604**	0.485**	-0.437**	1										
	SAS	-0.398**	-0.383**	-0.359**	-0.335**	0.275**	-0.327**	1									
Husband	SDS	-0.338**	-0.341**	-0.305**	-0.268**	0.268**	-0.323**	0.284**	1								
	DCI	0.353**	0.282**	0.345**	0.270**	-0.192**	0.276**	-0.229**	-0.294**	1							
	Stress communication	0.346**	0.275**	0.336**	0.310**	-0.208**	0.276**	-0.239**	-0.492**	0.793**	1						
	Supportive coping	0.315**	0.232**	0.405**	0.349**	-0.348**	0.285**	-0.223**	-0.195**	0.838**	0.567**	1					
	Delegated coping	0.273**	0.188**	0.336**	0.268**	-0.251**	0.243**	-0.244**	-0.159**	0.756**	0.511**	0.820**	1				
	Negative coping	-0.266**	-0.185**	-0.399**	-0.364**	0.406**	-0.269**	0.241**	0.193**	-0.492**	-0.425**	-0.767**	-0.785**	1			
	Common coping	0.316**	0.269**	0.300**	0.203**	-0.157**	0.244**	-0.209**	-0.168**	0.825**	0.538**	0.675**	0.699**	-0.568**	1		
	SAS	-0.234**	-0.190**	-0.251**	-0.291**	0.246**	-0.233**	0.343**	0.218**	-0.469**	-0.366**	-0.480**	-0.487**	0.430**	-0.440**	1	
	SDS	-0.239**	-0.156**	-0.181**	-0.221**	0.171**	-0.406**	0.374**	0.154**	-0.187**	-0.177**	-0.226**	-0.232**	0.237**	-0.154**	0.248**	1

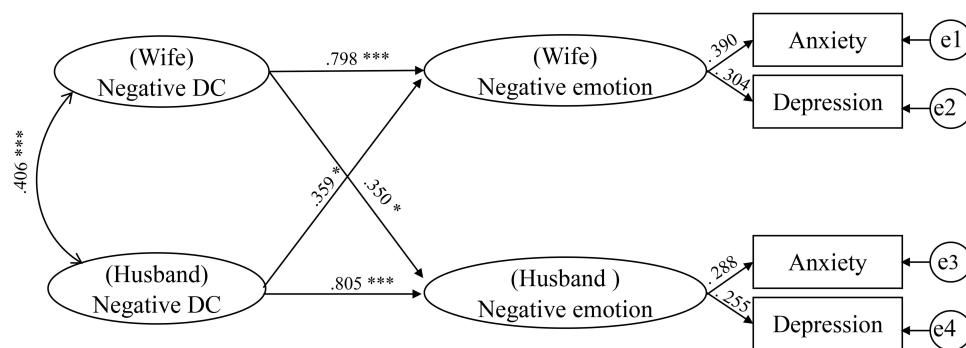
Notes: \*\*p<0.01.

Abbreviations: SAS, Self-rating anxiety scale; SDS, Self-rating depression scale; DCI, Dyadic coping inventory.





**Figure 2** Standardized parameter estimates of actor and partner effects of the wife's and husband's positive DC on negative emotion. \* $P < 0.05$ ; \*\*\* $P < 0.000$ .



**Figure 3** Standardized parameter estimates of actor and partner effects of the wife's and husband's negative DC on negative emotion. \* $P < 0.05$ ; \*\*\* $P < 0.000$ .

## Discussion

The primary objective of this study was to examine gender differences in negative emotions and the dyadic effects of positive and negative dyadic coping on anxiety and depression in infertile couples. The findings revealed that wives reported higher levels and incidence of anxiety and depression, which is consistent with previous research.<sup>18</sup> Women in infertile couples tend to experience more negative emotions than their husbands, possibly due to societal pressures and criticism surrounding infertility.<sup>39</sup> However, it is crucial to acknowledge the importance of the husband's mental health, as studies have shown its negative impact on sperm quality<sup>40</sup> and assisted reproductive therapy.<sup>41</sup> Therefore, it is essential to focus on the psychological well-being of both spouses, identify and manage symptoms of anxiety and depression early, and promote better treatment outcomes and marital relationships.

The study also found gender differences in dyadic coping scores among infertile couples, specifically in the domains of stressful communication and delegated coping. Wives scored higher in stressful communication, indicating that they perceive themselves as better at conveying stress and expressing pain to their partners compared to their husbands.<sup>42</sup> On the other hand, husbands tend to employ more avoidance behaviors.<sup>43</sup> Stressful communication is considered a crucial first step in positive dyadic response, allowing couples to openly discuss and address physical and psychological stress factors such as anxiety, despair, and fatigue. These conversations facilitate mutual adjustment and joint responses.<sup>44</sup> If couples can communicate openly, confide in each other's feelings, make effective use of their spouses' support and help, and adopt positive coping strategies, it will help ease their own psychological stress.<sup>7</sup> Effective stress communication has been linked to marital satisfaction and mental health promotion.<sup>45</sup> Additionally, wives scored lower in delegated coping compared to husbands. Delegated dyadic coping occurs when one partner takes on responsibilities to alleviate their partner's stress.<sup>46</sup> This indicates that husbands take on more responsibilities and obligations, and constantly shift from seeking support to providing emotional support. Usually, delegated coping is typically associated with positive coping strategies, skills and empathy.<sup>47</sup>

The way a couple copes with the stress of infertility can determine whether they perceive it as “our disease” or “my disease”.<sup>48</sup> This attitude towards illness influences the couple’s coping strategies. Couples with high levels of emotional interaction and mutual trust are more likely to view infertility as a shared challenge and work together to solve problems, share information, and provide support.<sup>37</sup> In addition, displaying empathy and understanding can alleviate the impact of stress and improve their physical and mental well-being.<sup>49</sup> On the contrary, a lack of sympathy, support, and love in intimate relationships among infertile couples may lead to emotional instability, poor communication, and an inability to respond to their partner’s needs, resulting in negative coping behaviors and compromised mental health. Therefore, clinical interventions should focus on improving communication skills, enhancing stress coping abilities, and promoting positive coping methods for infertile couples.<sup>6</sup>

Regarding the actor effect, both wives and husbands exhibited associations between their own dyadic coping and their levels of anxiety and depression, confirming our hypothesis. Specifically, positive dyadic coping in infertile couples negatively predicted their own anxiety and depression levels, while negative dyadic coping positively predicted these levels. This aligns with previous research.<sup>50</sup> Couples who adopt positive coping strategies in the face of infertility can effectively communicate their stress and face it together. This fosters empathy, understanding, and unity, leading to reduced occurrence of negative emotions such as anxiety and depression.<sup>25</sup> In contrast, negative dyadic coping involves uninspired or arrogant support from partners. Although support is provided, the receiver perceives a dominant negative tone. Over time, this weakens the coping effectiveness of both partners, leading to avoidance or indifference in dealing with stress.<sup>51</sup> This negative and avoidant coping style is detrimental to mental health, quality of life, and marital satisfaction.<sup>51,52</sup>

Apart from the actor effect, the partner effect of dyadic coping on anxiety and depression in infertile couples is a significant finding, supporting the systemic-transactional model’s emphasis on the interdependence between partners.<sup>53</sup> Specifically, in infertile couples, the wife’s positive coping strategies have a negative predictive effect on the husband’s anxiety and depression levels, while the husband’s positive coping strategies have a negative predictive effect on the wife’s anxiety and depression levels. The negative coping strategies of wives positively predicted their husbands’ anxiety and depression levels, and the negative coping strategies of husbands positively predicted their wives’ anxiety and depression levels. The systemic-transactional theory highlights the interaction between marital stress and coping processes, emphasizing the interdependence of marital stress experiences and the mutual influence of coping processes in response to external stressors.<sup>54</sup> Both spouses share common concerns and goals, and these commonalities promote joint problem-solving and emotional balance.<sup>55</sup> This study demonstrates the correlation between the positive and negative dyadic coping styles of wives and husbands. Therefore, the use of positive or negative dyadic coping styles by one infertile couple may lead the spouse to adopt positive or negative coping styles as well. The strong emotional bond between partners positions each other as their primary supporters, and their coping styles can impact each other’s emotions.<sup>56</sup>

Assisted reproductive technology (ART) cycles involve a highly interactive process where one partner conveys feelings and information to the other, and the other responds with sympathy or understanding. This approach treats the partner not only as an “assistant” but also as a source of support in overcoming the painful experiences of infertility, thereby reducing anxiety and depression.<sup>48</sup> As couples have been living together for a long time, one partner’s coping style and psychological state can interactively influence their spouse. Thus, high levels of positive dyadic coping (stress communication, delegated coping, supportive coping, and common coping) can help both partners manage the stress associated with infertility, reducing their own and their spouse’s anxiety and depression. Conversely, avoidance, withdrawal, and hostility in infertile couples may lead to negative coping styles, as they attempt to protect themselves by concealing emotions or avoiding communication. However, these coping styles can exhaust the other partner physically, emotionally, and mentally, making it difficult to address problems effectively and leading to increased anxiety and depression.<sup>51</sup>

Coping styles have long been a focus of research on psychological problems and intervention strategies. Dyadic coping styles reflect the collaborative coping characteristics of infertile couples during their response to the disease. Infertility is a challenge faced by both partners, and it has a significant impact on their psychological well-being, including anxiety and stress related to infertility.<sup>57</sup> By understanding, supporting, and assisting each other, couples can enhance their communication and reduce negative emotions. In addition to standard treatment and routine care, healthcare professionals should consider providing group psychotherapy and couples coping enhancement training for infertile couples to promote positive dyadic coping and improve their ability to cope with the disease, ultimately enhancing their mental health.



There are several limitations to this study. Firstly, the study only recruited patients from a single reproductive medicine center, limiting the generalizability of the findings. Cultural and economic differences may affect dyadic coping scores and levels of anxiety and depression in infertile couples in other regions. Conducting a multi-center study would yield more representative results. Secondly, the study only included infertile couples, which prevented a comparison of anxiety and depression levels between infertile couples and couples without infertility. Thirdly, the study design was cross-sectional, and future research could incorporate qualitative methods to explore the psychological experiences of infertile couples. Additionally, intervention studies focusing on dyadic coping could be conducted to enhance the coping abilities of infertile couples and improve their mental health.

## Conclusion

The dyadic coping of infertile couples has actor and partner effects on their own and their partner's anxiety and depression. Anxiety and depression in infertile couples are influenced by their own and their partner's dyadic coping style, respectively. A higher degree of positive dyadic coping corresponds to lower levels of anxiety and depression in both oneself and the partner. Conversely, negative dyadic coping tends to promote anxiety and depression. Therefore, dyadic coping in infertile couples serves as an important indicator for predicting psychological outcomes. These findings indirectly support the association between psychological well-being and couples' coping styles, underscoring the importance of early joint intervention for couples. Promoting positive dyadic coping and reducing negative dyadic coping in infertile couples may help healthcare professionals better to improve the psychological well-being of couples undergoing infertility treatment.

## Data Sharing Statement

All data generated or analysed during this study are included in this published article.

## Ethics Approval and Consent to Participate

The study was approved by the ethics committee of the Nursing School, Lanzhou University, Lanzhou, China (LZUHLXY20210053). The informed consents were obtained from participants.

## Consent for Publication

All participants agree the publication of this study.

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## Disclosure

The authors declare no conflicts of interest in this work.

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