*Original Research*

# The Mediating Role of Personality Compatibility, Couple Communication, and Sexual Life in Psychological Resilience and Marital Satisfaction of Women with Breast Cancer

Mei He[1], Ling Chen[2], Ningning Wang[1], Xinxin Ma[1], Yajun Wang[1], Yaming Zhang[1], Li Wang[3],*, Bing Zhao[1],*

[1]Department of Breast Medicine, Cancer Hospital Affiliated to Xinjiang Medical University, 830011 Urumqi, Xinjiang, China
[2]Department of Nursing, Cancer Hospital Affiliated to Xinjiang Medical University, 830011 Urumqi, Xinjiang, China
[3]Department of Breast Surgery, Cancer Hospital Affiliated to Xinjiang Medical University, 830011 Urumqi, Xinjiang, China
*Correspondence: 676686325@qq.com (Li Wang); hm13699365325@163.com (Bing Zhao)
Academic Editor: Michael H. Dahan
Submitted: 22 September 2023   Revised: 14 December 2023   Accepted: 26 December 2023   Published: 1 March 2024

## Abstract

**Background**: We investigated the mediating role of personality compatibility, couple communication, and sexual life in the psychological resilience and marital satisfaction of women with breast cancer. **Methods**: This is a cross-sectional survey. From March 2022 to June 2022, we enrolled 212 women with breast cancer from a tertiary tumor hospital in Xinjiang, China using a convenient sampling method. The basic information of patients was collected. The marriage quality and psychological resilience were assessed with the Enrich Marital Inventory and Connor-Davidson resilience scale, respectively. Counting data are expressed using the number and frequency while measuring data are presented using mean ± standard deviation. Statistical tests included one-way ANOVA and *t*-test. Pearson correlation was performed. The mediating effects were analyzed using the Baron and Kenny stepwise method. **Results**: The mean marriage quality score of women with breast cancer in marital satisfaction was 31.38 ± 8.36, in couple communication was 31.28 ± 7.15, in sexual life was 31.16 ± 7.76, in personality compatibility was 29.61 ± 7.32, and in psychological resilience was 53.60 ± 12.05, all of which were lower than the corresponding female norms. Correlation analysis showed that the three factors of psychological resilience (tenacity, strength, and optimism) of women with breast cancer were positively correlated with marital quality (marital satisfaction, personality compatibility, couple communication, and sexual life). The mediating effects of personality compatibility, couple communication, and sexual life on psychological resilience and marital satisfaction of women with breast cancer were significant ($p < 0.001$). Their effect values accounted for 48.6%, 63.1%, and 64.4% of the total effects, respectively. **Conclusions**: The level of psychological resilience and marital satisfaction of women with breast cancer is low. Psychological resilience can not only directly affect the marital satisfaction of women with breast cancer, but also indirectly affect marital quality through personality compatibility, couple communication, and sexual life. Medical workers should pay attention to the psychological status and marital satisfaction of women with breast cancer.

**Keywords**: personality compatibility; couple communication; sexual life; psychological resilience; marital satisfaction

## 1. Introduction

Breast cancer is one of the most common malignant tumors that seriously affect women's physical and mental health [1]. According to statistics, there are 2,261,419 new cases of breast cancer worldwide in 2020, ranking first among emerging female malignant tumors. Its incidence accounts for 25.84% of the global incidence of female malignant tumors. Once breast cancer is diagnosed, almost all patients will undergo surgical treatment, and most patients will undergo comprehensive treatment such as chemotherapy and radiotherapy, which may bring heavy psychological trauma to breast cancer [2,3]. The psychological trauma may be present throughout the processes of disease treatment, rehabilitation, and follow-up, and causes a series of serious impacts on the marriage and family of women with breast cancer. Some patients exhibit psychological problems such as anxiety, fear, and disappointment, which are not only detrimental to the recovery of patients but also affect couple communication, thereby seriously affecting the quality of life of patients [4]. Women with breast cancer also face obstacles in fertility and sexual life, leading to communication barriers between spouses, thus seriously affecting their marital quality. Marital quality is the most important and direct predictive indicator for measuring marital happiness, family harmony, and social stability [5]. In recent years, the marital quality of women with breast cancer patients has gained increasing attention [6].

The American psychologist Anthony proposed the concept of psychological resilience in the 1970s. It refers to the ability of individuals to maintain good psychological adaptability when facing crisis or stress. Psychological resilience is the main factor determining whether individuals can successfully recover from stress and crises [7]. Some scholars believe that people with higher marital quality have higher levels of mental health, while those with poor marital

**Publisher's Note**: IMR Press stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

quality have lower levels of mental health [6]. From the perspective of positive psychology, individuals with good psychological resilience have better mental health, indicating that psychological resilience can predict the state of mental health [8]. Currently, there is a lack of research on the relationship between psychological resilience and marital quality. In particular, there is a lack of research on the mediating effects of personality compatibility, marital communication, and sexual life on the psychological resilience and marital satisfaction of women with breast cancer.

Herein, we investigated the mediating role of personality compatibility, couple communication, and sexual life in the psychological resilience and marital satisfaction of women with breast cancer. Our findings may provide a basis for the development of psychological intervention measures for women with breast cancer, therefore improving the quality of life and marriage quality of women with breast cancer.

## 2. Materials and Methods

### 2.1 Study Participants

From March 2022 to June 2022, 212 women with breast cancer were selected from a tertiary tumor hospital in Xinjiang using a convenient sampling method. Inclusion criteria: (1) Female patients; (2) Patients with pathologically diagnosed breast cancer; (3) Patients who received treatment for breast cancer for at least 6 months; (4) Patients who were married; (5) Patients willing to participate in this study. Exclusion criteria: (1) Patients with multiple distant metastases to the heart, lung, brain, liver, etc., who were critically ill and unable to complete the questionnaire; (2) Patients who were not conscious, had communication difficulties, or could not complete the questionnaire even with assistance; (3) Unmarried or divorced patients; (4) Male patients with breast cancer; (5) Patients who refused to participate in this study. This study was approved by the Ethics Committee of Cancer Hospital Affiliated to Xinjiang Medical University. All patients signed informed consent.

### 2.2 Basic Information Collection

The basic information of patients, including age, gender, ethnicity, education level, monthly income, occupation status, and disease duration, was collected through the self-designed questionnaire.

### 2.3 Marriage Quality Questionnaire

The marriage quality was assessed with the Enrich Marital Inventory developed by Professor Olson in 1981. The Enrich Marital Inventory was translated into the Chinese version by Li *et al.* [9] in 1993. It included 12 factors and 124 items. A 5-level scoring method was used, with a total score of 60 points for each dimension [10]. A higher score indicated higher marriage quality. The Cronbach's $\alpha$ coefficient was 0.74. The test-retest reliability was

0.87, and the validity coefficient was 0.789. The accuracy of discriminating marital satisfaction from dissatisfaction (discriminant validity) is 85–90% (with a sample of 7261 subjects). This study used the Chinese version and evaluated four factors, namely marital satisfaction, personality compatibility, couple communication, and sexual life, which included 40 items. The female norm of the Enrich Marital Inventory was used.

### 2.4 Psychological Resilience Questionnaire

Psychological resilience was assessed with the Connor-Davidson resilience scale, which has satisfactory psychometric properties [11]. This study used the Chinese version translated and revised by Yu and Zhang [12] in 2007, which included 25 items and 3 factors, namely resilience (13 items), strength (8 items), and optimism (4 items). A 5-level method was used for scoring (score range 25–125), and a higher score suggested a higher level of psychological resilience. The Cronbach's $\alpha$ was 0.88. The Cronbach's $\alpha$ for each subscale was 0.88, 0.80, and 0.60, respectively. The scale had good internal consistency.

### 2.5 Survey Method

The survey was conducted using the Questionnaire Star system. The investigators used unified guidelines to explain the filling methods and precautions of the questionnaires. The participants independently filled out the questionnaires on mobile phones. For those who had difficulty reading or could not fill out the questionnaires themselves, the investigators would fill out the questionnaires for them using their answers. The investigators promptly reviewed and rectified any misinterpretations or ambiguous inputs during the survey, and promptly confirmed accuracy with the participants. The questionnaire must be completed before submission, and the submission deadline was on the spot. Following the participants' completion of the survey, the investigators delivered oral feedback on the survey results.

### 2.6 Statistical Analysis

SPSS22.0 statistical software (IBM Corp., Armonk, NY, USA) was used for analysis. Counting data are expressed using the number and frequency while measuring data such as marital quality score and psychological resilience score are presented using mean $\pm$ standard deviation. Statistical tests included one-way ANOVA and $t$-test. Pearson correlation analyzed the correlation between various variables. The mediating effects were analyzed using the Baron and Kenny stepwise method [13–15]. There was a statistically significant difference when $p < 0.05$.

## 3. Results

### 3.1 Baseline Information of Study Participants

In this study, we issued 223 questionnaires and recovered 212 valid questionnaires, with an effective recov-

**Table 1. Baseline information of study participants.**

| Variables | Number of cases | Composition ratio (%) |
|---|---|---|
| Age (years) | | |
|   20–30 | 4 | 1.9 |
|   31–40 | 36 | 17 |
|   41–50 | 80 | 37.7 |
|   51–60 | 68 | 32.1 |
|   >60 | 24 | 11.3 |
| Ethnicity | | |
|   Han | 130 | 61.3 |
|   Uyghur | 50 | 23.6 |
|   Hui | 18 | 8.5 |
|   Kazakh | 10 | 4.7 |
|   Others | 4 | 1.9 |
| Education level | | |
|   Master or Ph.D. | 12 | 5.7 |
|   Junior college or undergraduate | 74 | 34.9 |
|   Senior high school | 54 | 25.5 |
|   Junior high school or below | 72 | 33.9 |
| Monthly income (¥) | | |
|   >10,000 | 4 | 1.9 |
|   8000–10,000 | 22 | 10.4 |
|   6000–8000 | 64 | 30.2 |
|   4000–6000 | 46 | 21.7 |
|   2000–4000 | 76 | 35.8 |
| Disease duration (years) | | |
|   <2 | 122 | 57.5 |
|   2–5 | 62 | 29.2 |
|   5–8 | 12 | 5.7 |
|   8–10 | 4 | 1.9 |
|   >10 | 12 | 5.7 |
| Occupational status | | |
|   Currently employed | 44 | 20.7 |
|   On sick leave | 28 | 13.2 |
|   Retired | 68 | 32.1 |
|   Unemployed | 72 | 34 |

$1 = ¥7.12.

ery rate of 95.0%. Finally, 212 women with breast cancer were included in this study. Their baseline information is shown in Table 1. Their mean age was ($45.73 \pm 9.76$) years old. For ethnicity, there were 130 Han patients (61.3%), 50 Uyghur patients (23.6%), 10 Kazakh patients (4.7%), 18 Hui patients (8.5%), and 4 patients of other ethnicities (1.9%). For the education level, there were 72 cases (33.9%) of junior high school or below, 54 cases (25.5%) of senior high school, 74 cases (34.9%) of junior college or undergraduate, and 12 cases (5.7%) of master or Ph.D. The monthly income of 76 (35.8%) patients was between ¥2000 ($1 = ¥7.12) and ¥4000, of 46 (21.7%) were between ¥4000 and ¥6000, of 64 (30.2%) was between ¥6000 and ¥8000, of 22(10.4%) was between ¥8000 and ¥10,000, and of 4 (1.9%) was above ¥10,000. The disease duration of 122 (57.5%) patients was less than 2 years, of 62 (29.2%) was

2–5 years, of 12 (5.7%) was 5–8 years, of 4(1.9%) was 8–10 years, and of 12 (5.7%) was more than 10 years. In terms of occupational status, 72 (34%) patients were unemployed, 28(13.2%) were on sick leave, 68 (32.1%) were retired, and 44 (20.7%) were currently employed.

*3.2 Marital Quality and Psychological Resilience of Women with Breast Cancer with Different Demographic Characteristics*

As shown in Table 2, there was a significant difference in marital quality scores between patients of Han and Uyghur ethnicity ($p = 0.001$), and between currently employed patients and patients on sick leave ($p = 0.026$). Regarding psychological resilience score, there was a significant difference between patients of Han and Uyghur ethnicity ($p < 0.001$), between patients of Han and other ethnicities ($p = 0.020$), between patients of Uyghur and other

**Table 2. Comparison of marital quality and psychological resilience scores of women with breast cancer among different demographic characteristics.**

| Variable | $n$ | Marital quality score | $F$ | $p$ | Psychological resilience score | $F$ | $p$ |
|---|---|---|---|---|---|---|---|
| Total | 212 | $256.745 \pm 55.23$ | | | $53.60 \pm 12.05$ | | |
| Age (years) | | | | | | | |
| 20–30 | 4 | $225.00 \pm 54.27$ | 1.001 | 0.408 | $52.00 \pm 0.00$ | 1.579 | 0.181 |
| 31–40 | 36 | $262.00 \pm 53.78$ | | | $51.78 \pm 14.30$ | | |
| 41–50 | 80 | $261.18 \pm 46.72$ | | | $55.53 \pm 9.31$ | | |
| 51–60 | 68 | $256.00 \pm 62.77$ | | | $53.97 \pm 13.81$ | | |
| >60 | 24 | $241.50 \pm 60.76$ | | | $49.17 \pm 11.32$ | | |
| Ethnicity | | | | | | | |
| Han | 130 | $267.86 \pm 55.13**$ | 4.038 | 0.004 | $55.83 \pm 13.44**$ | 10.109 | 0.000 |
| Uyghur | 50 | $232.92 \pm 53.28**$ | | | $46.28 \pm 8.46**$ | | |
| Hui | 18 | $247.11 \pm 58.85$ | | | $52.11 \pm 8.46*$ | | |
| Kazakh | 10 | $250.80 \pm 25.00$ | | | $56.00 \pm 8.66$ | | |
| Others | 4 | $251.50 \pm 21.36$ | | | $73.50 \pm 12.05**$ | | |
| Education level | | | | | | | |
| Master or Ph.D. | 12 | $222.83 \pm 66.25$ | 1.650 | 0.179 | $36.67 \pm 18.25**$ | 10.230 | 0.000 |
| Junior college or undergraduate | 74 | $257.38 \pm 61.84$ | | | $56.19 \pm 10.92**$ | | |
| Senior high school | 54 | $260.63 \pm 49.46$ | | | $53.56 \pm 11.15**$ | | |
| Junior high school or below | 72 | $258.83 \pm 49.15$ | | | $53.81 \pm 10.44**$ | | |
| Monthly income (¥) | | | | | | | |
| >10,000 | 4 | $317.00 \pm 47.34$ | 1.411 | 0.231 | $67.00 \pm 11.55*$ | 2.490 | 0.044 |
| 8000–10,000 | 22 | $264.09 \pm 68.59$ | | | $50.36 \pm 10.68*$ | | |
| 6000–8000 | 64 | $254.22 \pm 53.25$ | | | $53.47 \pm 15.08*$ | | |
| 4000–6000 | 46 | $257.35 \pm 49.19$ | | | $51.35 \pm 9.60*$ | | |
| 2000–4000 | 76 | $253.21 \pm 55.80$ | | | $55.32 \pm 10.30$ | | |
| Disease duration (years) | | | | | | | |
| <2 | 122 | $252.46 \pm 55.95$ | 1.071 | 0.372 | $54.59 \pm 11.49*$ | 2.723 | 0.031 |
| 2–5 | 62 | $266.03 \pm 52.80$ | | | $51.61 \pm 13.32*$ | | |
| 5–8 | 12 | $259.67 \pm 47.65$ | | | $50.67 \pm 13.37*$ | | |
| 8–10 | 4 | $221.00 \pm 64.66$ | | | $42.50 \pm 1.73**$ | | |
| >10 | 12 | $261.33 \pm 63.33$ | | | $60.50 \pm 5.52**$ | | |
| Occupational status | | | | | | | |
| Currently employed | 44 | $275.00 \pm 37.94*$ | 2.923 | 0.035 | $56.36 \pm 7.70$ | 2.047 | 0.108 |
| On sick leave | 28 | $237.00 \pm 48.44*$ | | | $49.21 \pm 12.48$ | | |
| Retired | 68 | $255.21 \pm 63.56$ | | | $53.44 \pm 12.20$ | | |
| Unemployed | 72 | $254.72 \pm 55.88$ | | | $53.78 \pm 13.55$ | | |

Note: Data are expressed as mean $\pm$ standard deviation. $**p < 0.01$, $*p < 0.05$. \$1 = ¥7.12.

ethnicities ($p < 0.001$), and, between patients of Hui and other ethnicities ($p = 0.006$). Patients with master's or Ph.D. degrees had significantly lower psychological resilience scores than patients of other education levels ($p < 0.001$). Patients with monthly incomes of over ¥10,000 had significantly higher psychological resilience scores than those with monthly incomes of ¥8000 to ¥10,000 ($p = 0.011$), ¥6000 to ¥8000 ($p = 0.028$), and ¥4000 to ¥6000 ($p = 0.012$). For disease duration, there was a significant difference in psychological resilience score between patients with disease duration <2 years and 8–10 years ($p = 0.046$), between patients with disease duration 2–5 years and >10 years ($p = 0.018$), between patients with disease duration 5–8 years and >10 years ($p = 0.044$), and, between patients with disease duration 8–10 years and >10 years ($p = 0.009$).

### 3.3 Marital Satisfaction, Personality Compatibility, Sexual Life, and Psychological Resilience of Women with Breast Cancer

The scores of marital satisfaction ($31.38 \pm 8.36$), couple communication ($31.28 \pm 7.15$), sexual life ($31.16 \pm 7.76$), personality compatibility ($29.61 \pm 7.32$), and psychological resilience ($53.60 \pm 12.05$), were significantly lower than those of the female norm [9] ($p < 0.001$), as shown in Table 3.

### 3.4 The Relationship between Marital Quality and Psychological Resilience of Women with Breast Cancer

The relationship between marital quality and psychological resilience of women with breast cancer was analyzed with Pearson correlation. As shown in Table 4, mar-

**Table 3. Comparison of marital satisfaction, personality compatibility, couple communication, sexual life, and psychological resilience of women with breast cancer with the female norm.**

| Variable | Women with breast cancer (n = 212) | Female norm | $t$ | $p$ |
|---|---|---|---|---|
| Marital satisfaction | $31.38 \pm 8.36$ | $37.04 \pm 7.03$ | $-9.87$ | $<0.001$ |
| Personality compatibility | $29.61 \pm 7.32$ | $34.43 \pm 6.35$ | $-9.58$ | $<0.001$ |
| Couple communication | $31.28 \pm 7.15$ | $34.10 \pm 6.94$ | $-5.73$ | $<0.001$ |
| Sexual life | $31.16 \pm 7.76$ | $37.60 \pm 6.90$ | $-12.09$ | $<0.001$ |
| Psychological resilience | $53.60 \pm 12.05$ | $65.40 \pm 13.90$ | $-14.252$ | $<0.001$ |

Note: Data are expressed as mean $\pm$ standard deviation.

**Table 4. Pearson correlation analysis of marital quality and psychological resilience of women with breast cancer (r).**

| | Marital quality | Personality compatibility | Couple communication | Sexual life | Resilience | Strength | Optimism |
|---|---|---|---|---|---|---|---|
| Marital quality | 1 | | | | | | |
| Personality compatibility | 0.691** | 1 | | | | | |
| Couple communication | 0.791** | 0.729** | 1 | | | | |
| Sexual life | 0.754** | 0.732** | 0.763** | 1 | | | |
| Resilience | 0.391** | 0.351** | 0.354** | 0.352** | 1 | | |
| Strength | 0.493** | 0.331** | 0.405** | 0.515** | 0.660** | 1 | |
| Optimism | 0.381** | 0.399** | 0.383** | 0.354** | 0.490** | 0.416** | 1 |

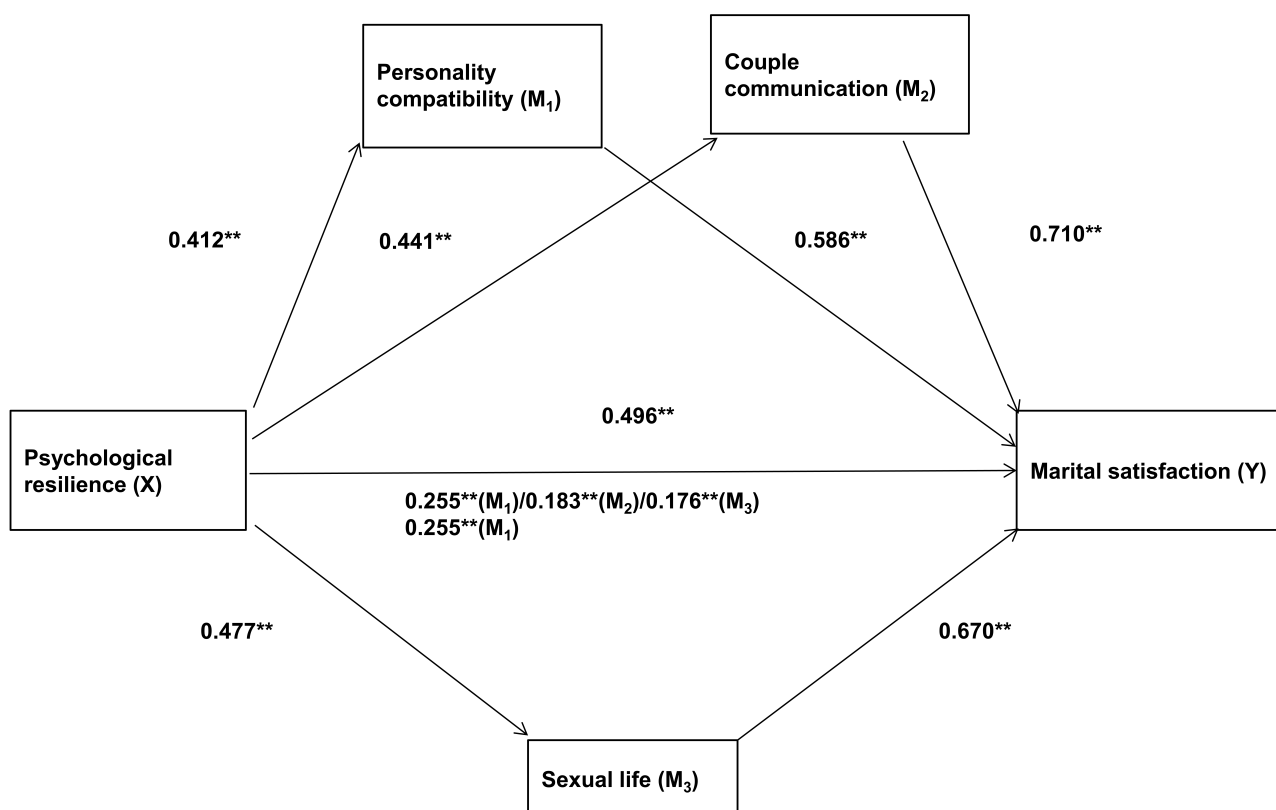Note: Data are expressed as mean $\pm$ standard deviation. **$p < 0.01$.



**Fig. 1. A parallel mediating model of personality compatibility, couple communication, and sexual life in psychological resilience and marital satisfaction.** **$p < 0.01$.

ital satisfaction, personality compatibility, marital communication, and sexual life of marital quality were all positively correlated with the resilience, strength, and optimism of psychological resilience ($p < 0.01$).

**Table 5. The mediating effect of personality compatibility on psychological resilience and marital satisfaction of women with breast cancer.**

| Standardized regression equation | $t$ | $p$ | $R_2$ | $F$ of model | $p$ |
|---|---|---|---|---|---|
| Step 1: $Y = 0.496X$ | 8.280 | <0.001 | 0.246 | 68.556 | $p < 0.001$ |
| Step 2: $M_1 = 0.412X$ | 6.555 | <0.001 | 0.170 | 42.971 | $p < 0.001$ |
| Step 3: $Y = 0.255X + 0.586M_1$ | 4.897 | <0.001 | 0.531 | 118.391 | $p < 0.001$ |
|  | 11.273 | <0.001 |  |  |  |

X, psychological resilience; Y, marital satisfaction; $M_1$, personality compatibility.

**Table 6. The mediating effect of couple communication on psychological resilience and marital satisfaction of women with breast cancer.**

| Standardized regression equation | $t$ | $p$ | $R_2$ | $F$ of model | $p$ |
|---|---|---|---|---|---|
| Step 1: $Y = 0.496X$ | 8.280 | <0.001 | 0.246 | 68.556 | $p < 0.001$ |
| Step 2: $M_2 = 0.441X$ | 7.111 | <0.001 | 0.194 | 50.561 | $p < 0.001$ |
| Step 3: $Y = 0.183X + 0.710M_2$ | 4.035 | <0.001 | 0.653 | 196.514 | $p < 0.001$ |
|  | 15.648 | <0.001 |  |  |  |

X, psychological resilience; Y, marital satisfaction; $M_2$, couple communication.

*3.5 The Mediating Effects of Personality Compatibility, Couple Communication, and Sexual Life on Psychological Resilience and Marital Satisfaction of Women with Breast Cancer*

Few studies have used the marriage quality scale as a mediator, and most of them have analyzed the mediation of psychological resilience and marital satisfaction through coping strategies [16] and cognitive reappraisal [17]. Professor Lingjiang Li, the translator of the Chinese version of the Enrich Marital Inventory, stated in the Chinese Mental Health Assessment Scale Manual that according to the research situation, the marriage quality scale could be used. We considered the physical and mental conditions of women with breast cancer and selected the marriage quality scale (marital satisfaction, marital communication, sexual life, and personality compatibility) for the mediation of psychological resilience and marital satisfaction. Since marriage quality and psychological resilience are both correlated with each other, we used the Baron and Kenny stepwise method [13–15] to analyze and verify the mediation effects of personality compatibility, couple communication, and sexual life on psychological resilience and marital satisfaction. The parallel mediation model is shown in Fig. 1.

*3.6 The Mediating Effect of Personality Compatibility on Psychological Resilience and Marital Satisfaction of Women with Breast Cancer*

The analysis was conducted using psychological resilience as the independent variable X, marital satisfaction as the dependent variable Y, and personality compatibility as the intermediary variable personality compatibility ($M_1$). The assumptions of the regression analysis included Assumption 1: female patients with breast cancer had different psychological resilience and marriage quality in demographic variables; Assumption 2: marriage satis-

faction, personality compatibility, couple communication, and sexual life of female breast cancer patients were respectively related to the three factors of psychological resilience: tenacity, strength, and optimism; and, Assumption 3: resilience could not only directly affect the marital satisfaction of female patients with breast cancer, but also indirectly affect marital satisfaction through personality compatibility, couple communication, and sexual life. The regression coefficients and equations in the first and second steps were significant ($p < 0.001$), indicating that psychological resilience had a significant effect on marital satisfaction and personality compatibility (Fig. 1) (Table 5). In the third step, the intermediary variable $M_1$ was added, and the coefficient of the independent variable X was reduced from 0.496 to 0.255. The coefficient of the intermediary variable $M_1$ was significant. The results showed that personality compatibility played a mediating role in the effect of psychological resilience on marital satisfaction. Psychological resilience could directly affect marital satisfaction (Step 1) and indirectly affect marital satisfaction by influencing personality compatibility (Step 2 and Step 3). The proportion of this mediating effect in the total effect was $0.486$ ($0.412 \times 0.586/0.496$), which means that the mediating effect of personality compatibility accounted for 48.6% of the total effect of psychological resilience on marital satisfaction (Fig. 1) (Table 5).

*3.7 The Mediating Effect of Couple Communication on Psychological Resilience and Marital Satisfaction of Women with Breast Cancer*

We performed the analysis using psychological resilience as the independent variable X, marital satisfaction as the dependent variable Y, and couple communication as the intermediary variable couple communication ($M_2$) (Fig. 1) (Table 6). The regression coefficients and equations in Step 1 and Step 2 were significant ($p < 0.001$),

**Table 7. The mediating effect of sexual life on psychological resilience and marital satisfaction of women with breast cancer.**

| Standardized regression equation | $t$ | $p$ | $R_2$ | $F$ of model | $p$ |
|---|---|---|---|---|---|
| Step 1: Y = 0.496X | 8.280 | <0.001 | 0.246 | 68.556 | $p < 0.001$ |
| Step 2: M$_3$ = 0.477X | 7.871 | <0.001 | 0.228 | 61.947 | $p < 0.001$ |
| Step 3: Y = 0.176X + 0.670M$_3$ | 3.509 | <0.001 | 0.593 | 152.236 | $p < 0.001$ |
| | 13.345 | <0.001 | | | |

X, psychological resilience; Y, marital satisfaction; M$_3$, sexual life.

suggesting that psychological resilience X had a significant impact on marital satisfaction Y and couple communication M$_2$. In Step 3, with the addition of the intermediary variable M$_2$, the coefficient of the independent variable X decreased from 0.496 to 0.183. The coefficient of the intermediary variable M$_2$ was significant. We found that the couple communication exerted a mediating role in the effect of psychological resilience on marital satisfaction, i.e. psychological resilience could directly affect marital satisfaction (Step 1), and indirectly affect marital satisfaction by affecting couple communication (Step 2 and Step 3). The proportion of this mediating effect in the total effect was 0.631 (0.441 × 0.710/0.496), demonstrating that the effect of couple communication accounted for 63.1% of the total effect of psychological resilience on marital satisfaction (Table 6).

*3.8 The Mediating Effect of Sexual Life on Psychological Resilience and Marital Satisfaction of Women with Breast Cancer*

Finally, we analyzed the mediating effect of sexual life (Fig. 1) (Table 7). In the regression equation, psychological resilience was used as the independent variable X, marital satisfaction was used as the dependent variable Y, and sexual life was used as the intermediary variable sexual life (M$_3$). Psychological resilience X had a significant effect on marital satisfaction Y and couple communication M$_3$, as evidenced by the significant regression coefficients and equations of Step 1 and Step 2 ($p < 0.001$). In Step 3, the coefficient of the independent variable X was reduced from 0.496 to 0.176 after adding the intermediary variable M$_3$. The coefficient of the intermediary variable M$_3$ was significant. Additionally, there was a mediating role of sexual life in the effect of psychological resilience on marital satisfaction. Psychological resilience not only directly affected marital satisfaction (Step 1), but also indirectly affected marital satisfaction (Step 2 and Step 3) by influencing sexual life. The proportion of this mediating effect of sexual life in the total effect of psychological resilience on marital satisfaction was 0.644 (0.477 × 0.670/0.496) (Table 7).

## 4. Discussion

*4.1 Marital Quality and Psychological Resilience of Women with Breast Cancer*

In this study, the scores of marital satisfaction, couple communication, sexual life, personality compatibility, and psychological resilience of women with breast cancer were lower than the female norms, indicating that the marital quality and psychological resilience of women with breast cancer are not optimistic, which is consistent with previous studies [16,18]. Due to the negative influence of cancer, women with breast cancer tend to be anxious, fearful, sensitive, and suspicious, may have low tolerance, and fear disease recurrence [19,20]. They often bring bad emotions into the marriage relationship. High treatment costs, lack of role of housewives, increased pressure on caregivers, obstacles in couple communication [21,22], low personality compatibility, and low level of psychological resilience make it difficult for them to be satisfied with the marriage relationship [23]. It is shown that the more negative family life events couples experience in marriage, the poorer their personality compatibility [24–27], which is also consistent with the results of this study. Both women with breast cancer and their husbands are worried that sexual life may increase the risk of breast cancer recurrence [28,29]. In addition, the sexual desire of women with breast cancer may be reduced after surgery, radiotherapy, chemotherapy, endocrine therapy, and ovarian function suppression treatment [30]. Therefore, the sexual life of women with breast cancer is not harmonious, or there is no sexual life for a long time.

Further analysis showed that the score of marital quality and psychological resilience of Han patients was higher than that of Uyghur patients. This may be because we enrolled patients from a tertiary tumor hospital in Xinjiang, which is a remote area in China. In addition, marital quality is also related to the educational level and economic conditions of women with breast cancer [31]. Moreover, for occupational status, the marital quality score of currently employed patients was higher than that of patients on sick leave. This may be related to the high proportion of medical insurance reimbursement and economic income of currently employed patients, which may have a lesser impact on marital quality. Furthermore, when the patients are on sick leave, the financial burden of the family becomes heavier, which may further affect marital quality [32]. For psychological resilience, patients with a high level of education had a low score of psychological resilience, incon-

sistent with the study by Wister *et al*. [33]. This may be because of the small number of participants with a bachelor's degree or higher education level in this study. Patients with a monthly income of more than ¥10,000 in this study had the highest psychological resilience score. Patients with low monthly incomes may have more concerns about medical expenses and are accompanied by greater psychological pressure in terms of individual treatment and family expenses [34]. Sometimes, patients may experience greater feelings of helplessness and even give up treatment. Additionally, the score of psychological resilience in patients with a disease duration of more than 10 years was also high. This is related to the fact that the stress tolerance and psychological endurance of patients may be enhanced over time, which also confirms the view that psychological resilience can be improved [35]. Moreover, patients with a disease duration of more than 10 years have formed a dependent and supportive marital relationship with their spouses, and the support of their spouses also affects the psychological resilience of the patients [36].

### 4.2 Correlation Analysis of Psychological Resilience and Marriage Quality in Women with Breast Cancer

Correlation analysis showed that the tenacity, strength, and optimism of psychological resilience of women with breast cancer were positively correlated with marital quality (marital satisfaction, personality compatibility, couple communication, and sexual life), suggesting that psychological resilience is an important predictor of marital quality. This result is in line with the previous study [17]. Individuals with high levels of psychological resilience are more likely to receive long-term treatment from experts, and they expect the diagnosis and treatment of diseases to develop in a positive direction. Therefore, they seek higher levels of personal growth, such as social support, family support, positive emotions, and self-reliance. Individuals with good psychological resilience can effectively and positively respond to adverse environments or events, have higher individual coping resources [37], and thus feel higher marital quality.

### 4.3 The Mediating Effects of Personality Compatibility, Couple Communication, and Sexual Life on the Psychological Resilience and Marital Satisfaction in Women with Breast Cancer

This study showed that personality compatibility, couple communication, and sexual life exerted significant mediating effects on the psychological resilience and marital satisfaction of women with breast cancer. This indicates that psychological resilience can not only directly affect the marital satisfaction of women with breast cancer, but also indirectly affect their marital quality through personality compatibility, couple communication, and sexual life. Patients with good psychological resilience also have a stronger ability to rationally analyze issues and obtain positive results [37]. The positive attitude towards the life of

women with breast cancer can affect their husbands [36]. Couples with positive and optimistic attitudes can have harmonious marital relationships, higher personality compatibility, higher marital quality, and longer marriage duration [38]. Furthermore, people with positive attitudes are more inclined to solve problems encountered in marriage and life, to communicate with family and friends, and to receive support and encouragement from family and friends, which can greatly help maintain marriage [39]. A harmonious sexual life is the guarantee of a good marriage. Patients with high levels of psychological resilience have more confidence in facing the disease, better adapt to the disease, and take various measures to actively respond to the negative impacts of the disease. Meanwhile, they are more likely to accept expert treatment and advice, expect the disease to develop in a better direction, and seek a higher level of personal growth, thereby promoting the harmony of marital relationships and improving the quality of marriage [40]. In 2006, the International Health Organization included malignant tumors as a chronic disease [41]. Breast cancer is one of the malignant tumors with the longest survival time and the highest cure rate. In addition to standardized diagnosis and treatment, as well as regular follow-up, more attention should be paid to life management. Medical workers can develop psychological intervention measures for women with breast cancer by using multi-disciplinary team, the internet, and the nursing services, guide patients to actively respond to the negative impacts of the disease, enhance their self-confidence, stimulate their internal potential, and promote harmonious relationships of couples, thereby creating a harmonious and happy family environment and social relationships [16].

This study has some limitations. First, this study is a single-center cross-sectional study. Second, the results of this study showed that patients with higher education levels had lower psychological resilience scores, which is inconsistent with previous studies and may be related to a small sample size. Third, this study did not differentiate between treatment methods or surgical methods, which may have led to data bias. Fourth, the population surveyed in this study was only from tertiary A hospitals, which may have certain representativeness limitations. Fifth, after using Baron and Kenny's stepwise method, if the Bootstrap method is used to directly test the coefficient product to increase power, the results would be more convincing. Additionally, the Enrich scale provides male and female norms. This study used the female norm, but the psychological elasticity norm is not divided by gender. Gender may have a certain impact on psychological elasticity and marital satisfaction, which is also a limitation of this study. In the future, multicenter studies should be conducted to explore the mediating effects of personality compatibility, marital communication, and sexual life in psychological resilience and marital satisfaction among breast cancer patients in different regions.

## 5. Conclusions

Women with breast cancer exhibit low levels of both psychological resilience and marital satisfaction. This may be because of the small number of participants with a bachelor's degree or higher education level in this study. The populations who were patients of ethnic minorities, on sick leave, with a bachelor's degree or higher education level, low monthly income, and disease duration exceeding 8 years are the primary focus with poor psychological resilience. Psychological resilience can impact the marital satisfaction of women with breast cancer, not only directly, but also indirectly through personality compatibility, couple communication, and sexual life. Healthcare workers should pay attention to the psychological condition and marital quality of women with breast cancer, help patients obtain support from family, peers, and the community, and cultivate positive coping skills such as adjusting their mindset, reducing negative emotions, calmly facing difficulties, and enhancing their confidence, thereby improving their level of psychological resilience and actively solving problems encountered in marriage and life to promote a harmonious marital relationship and improve marital quality.

## Availability of Data and Materials

The data used to support the findings of this study are available from the corresponding author upon request.

## Author Contributions

All authors contributed to the study conception and design. MH, LC, NW, XM, YW, and LW performed the research. MH and BZ analyzed the data. YZ searched the literature. MH wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

## Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of Cancer Hospital Affiliated to Xinjiang Medical University (approval number: [2022] 01-133-11). All patients signed informed consent.

## Acknowledgment

Not applicable.

## Funding

## Conflict of Interest

The authors declare no conflict of interest.

## References

[1] Ren W, Chen M, Qiao Y, Zhao F. Global guidelines for breast cancer screening: A systematic review. Breast (Edinburgh, Scotland). 2022; 64: 85–99.

[2] Ferlay J, Ervik M, Lam F. Global cancer observatory: cancer today. 2020. Available at: https://gco.iarc.fr/today (Accessed 27 February 2021).

[3] Dan A, Swain R, Belonce S, Jacobs RJ. Therapeutic Effects of Medicinal Mushrooms on Gastric, Breast, and Colorectal Cancer: A Scoping Review. Cureus. 2023; 15: e37574.

[4] Pandey M, Sarita GP, Devi N, Thomas BC, Hussain BM, Krishnan R. Distress, anxiety, and depression in cancer patients undergoing chemotherapy. World Journal of Surgical Oncology. 2006; 4: 68.

[5] Thompson T, Davis M, Pérez M, Jonson-Reid M, Jeffe DB. "We're in this together": Perceived effects of breast cancer on African American survivors' marital relationships. Journal of the Society for Social Work and Research. 2022; 13: 789–815.

[6] Zhou Y, Che CC, Chong MC, Zhao H, Lu Y. Effects of marital self-disclosure on marital relationship and psychological outcome for cancer patients: a systematic review. Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer. 2023; 31: 361.

[7] Connor KM, Davidson JRT. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). Depression and Anxiety. 2003; 18: 76–82.

[8] Chen SY, Yan SR, Zhao WW, Gao Y, Zong W, Bian C, et al. The mediating and moderating role of psychological resilience between occupational stress and mental health of psychiatric nurses: a multicenter cross-sectional study. BMC Psychiatry. 2022; 22: 823.

[9] Li X. Olson Marital Enrich Inventory. Rating Scale for Mental Health. Chinese Mental Health Journal. 1993; 7: 113–116. (In Chinese)

[10] Fowers BJ, Olson DH. Enrich marital inventory: a discriminant validity and cross-validation assessment. Journal of Marital and Family Therapy. 1989; 15: 65–79.

[11] Alarcón R, Cerezo MV, Hevilla S, Blanca MJ. Psychometric properties of the Connor-Davidson Resilience Scale in women with breast cancer. International Journal of Clinical and Health Psychology: IJCHP. 2020; 20: 81–89.

[12] Yu X, Zhang J. A Comparison between the Chinese Version of Ego-Resiliency Scale and Connor-Davidson Resilience Scale. Psychological Science. 2007; 30: 1169–1171. (In Chinese)

[13] Wen ZL, Zhang L, Hou JT. Mediation analysis and its application. Acta Psychologica Sinica. 2004; 36: 614–620. (In Chinese)

[14] Wen Z, Ye B. Mediation Analysis: Methods and Model Development. Advances in Psychological Science. 2014; 22: 731–745.

[15] Wen Z, Fang J, Xie J, Ouyang J. Methodological Research on Mediation Effects in China. Advances in Psychological Science. 2022; 30: 1692–1702.

[16] Bitz C, Kent EE, Clark K, Loscalzo M. Couples coping with cancer together: Successful implementation of a caregiver program as standard of care. Psycho-Oncology. 2020; 29: 902–909.

[17] Liu L, Cheng Q, Zhu H. The impact of psychological resilience on marital satisfaction: The chained mediating effect of cognitive reappraisal and parenting stress. Advances in Psychology. 2022; 12: 308–316.

[18] Mohlin Å, Axelsson U, Bendahl PO, Borrebaeck C, Hegardt C, Johnsson P, et al. Psychological Resilience and Health-Related Quality of Life in Swedish Women with Newly Diagnosed Breast Cancer. Cancer Management and Research. 2020; 12: 12041–12051.

[19] Greenlee H, DuPont-Reyes MJ, Balneaves LG, Carlson LE, Cohen MR, Deng G, et al. Clinical practice guidelines on the evidence-based use of integrative therapies during and after

breast cancer treatment. CA: a Cancer Journal for Clinicians. 2017; 67: 194–232.

[20] Wang X, Wang N, Zhong L, Wang S, Zheng Y, Yang B, *et al*. Prognostic value of depression and anxiety on breast cancer recurrence and mortality: a systematic review and meta-analysis of 282,203 patients. Molecular Psychiatry. 2020; 25: 3186–3197.

[21] Martínez ME, Unkart JT, Tao L, Kroenke CH, Schwab R, Komenaka I, *et al*. Prognostic significance of marital status in breast cancer survival: A population-based study. PloS One. 2017; 12: e0175515.

[22] Zhai Z, Zhang F, Zheng Y, Zhou L, Tian T, Lin S, *et al*. Effects of marital status on breast cancer survival by age, race, and hormone receptor status: A population-based Study. Cancer Medicine. 2019; 8: 4906–4917.

[23] Hinyard L, Wirth LS, Clancy JM, Schwartz T. The effect of marital status on breast cancer-related outcomes in women under 65: A SEER database analysis. Breast (Edinburgh, Scotland). 2017; 32: 13–17.

[24] Hasson-Ohayon I, Goldzweig G, Braun M, Galinsky D. Women with advanced breast cancer and their spouses: diversity of support and psychological distress. Psycho-oncology. 2010; 19: 1195–1204.

[25] Su JA, Yeh DC, Chang CC, Lin TC, Lai CH, Hu PY, *et al*. Depression and family support in breast cancer patients. Neuropsychiatric Disease and Treatment. 2017; 13: 2389–2396.

[26] Neuling SJ, Winefield HR. Social support and recovery after surgery for breast cancer: frequency and correlates of supportive behaviours by family, friends and surgeon. Social Science & Medicine. 1988; 27: 385–392.

[27] Ozkaraman A, Culha I, Fadiloglu ZC, Kosgeroglu N, Gokce S, Alparslan GB. Relationships between social support and social image concerns in Turkish women with breast cancer. Asian Pacific Journal of Cancer Prevention: APJCP. 2015; 16: 1795–1802.

[28] Gass JS, Onstad M, Pesek S, Rojas K, Fogarty S, Stuckey A, *et al*. Breast-Specific Sensuality and Sexual Function in Cancer Survivorship: Does Surgical Modality Matter? Annals of Surgical Oncology. 2017; 24: 3133–3140.

[29] Boquiren VM, Esplen MJ, Wong J, Toner B, Warner E, Malik N. Sexual functioning in breast cancer survivors experiencing body image disturbance. Psycho-oncology. 2016; 25: 66–76.

[30] Streicher L, Simon JA. Sexual Function Post-Breast Cancer.

[31] Xie JC, Yang S, Liu XY, Zhao YX. Effect of marital status on survival in glioblastoma multiforme by demographics, education, economic factors, and insurance status. Cancer Medicine. 2018; 7: 3722–3742.

[32] Aizer AA, Chen MH, McCarthy EP, Mendu ML, Koo S, Wilhite TJ, *et al*. Marital status and survival in patients with cancer. Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology. 2013; 31: 3869–3876.

[33] Wister AV, Coatta KL, Schuurman N, Lear SA, Rosin M, MacKey D. A Lifecourse Model of Multimorbidity Resilience: Theoretical and Research Developments. International Journal of Aging & Human Development. 2016; 82: 290–313.

[34] Qiu Y, Huang Y, Wang Y, Ren L, Jiang H, Zhang L, *et al*. The Role of Socioeconomic Status, Family Resilience, and Social Support in Predicting Psychological Resilience Among Chinese Maintenance Hemodialysis Patients. Frontiers in Psychiatry. 2021; 12: 723344.

[35] Izydorczyk B, Kwapniewska A, Lizinczyk S, Sitnik-Warchulska K. Psychological Resilience as a Protective Factor for the Body Image in Post-Mastectomy Women with Breast Cancer. International Journal of Environmental Research and Public Health. 2018; 15: 1181.

[36] Yang Y, Lin Y, Sikapokoo GO, Min SH, Caviness-Ashe N, Zhang J, *et al*. Social relationships and their associations with affective symptoms of women with breast cancer: A scoping review. PloS One. 2022; 17: e0272649.

[37] Song L, Cao Y, Li J, Lu M, Tang L. Psychological distress and resilience in patients with gastroenteropancreatic neuroendocrine tumor. Frontiers in Endocrinology. 2022; 13: 947998.

[38] Frye-Cox NE, Hesse CR. Alexithymia and marital quality: the mediating roles of loneliness and intimate communication. Journal of Family Psychology. 2013; 27: 203–211

[39] Kristofferzon ML, Löfmark R, Carlsson M. Myocardial infarction: gender differences in coping and social support. Journal of Advanced Nursing. 2003; 44: 360–374.

[40] Niebauer E, Fry N, Auster-Gussman LA, Wahbeh H. Patient perspectives on the causes of breast cancer: a qualitative study on the relationship between stress, trauma, and breast cancer development. International Journal of Qualitative Studies on Health and Well-being. 2021; 16: 1983949.

[41] Rowland JH. What are cancer survivors telling us? Cancer Journal. 2008; 14: 361–368.