



## Research Article

# Post-Traumatic Growth of Spouses of 230 Patients with Gynecological Malignancies And Its Influencing Factors

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## Abstract

**Objective** To investigate the level of post-traumatic growth in spouses of patients with gynecological malignancies and to explore the influencing factors of post-traumatic growth. **Methods** A cross-sectional study was conducted by questionnaire and convenience sampling. Among the spouses of patients with gynecological malignant tumors in the inpatient departments of two hospitals in Hebei Province, the respondents who met the inclusion and exclusion criteria were selected for the questionnaire survey. The data results were statistically analyzed by SPSS 19.0 software. **Results** The level of post-traumatic growth of spouses of patients with gynecological malignant tumors was ( $62.96 \pm 21.39$ ). Multiple stepwise linear regression analysis showed that the related factors affecting the level of post-traumatic growth of spouses of patients with gynecological malignant tumors were purposeful rumination, general self-efficacy, invasive rumination, and spouse education level, which explained a total of 59.5% of the variation in the sample, of which  $F = 85.128$ ,  $P > 0.05$ . **Conclusion** The level of post-traumatic growth of their spouses during hospitalization of patients with gynecological malignancies is at a moderate level. The significant influencing factors of post-traumatic growth of patients' spouses were purposeful rumination contemplation, general self-efficacy, intrusive rumination contemplation, and spouse education level.

**Keywords:** Gynecological Malignancy; Patient Spouse; Post-Traumatic Growth; Ruminative Contemplation; General Self-Efficacy.

## Introduction

Regardless of the level of development of human science and technology, cancer is an

important cause of morbidity and mortality around the world, and the health status, quality of life, and longevity of women suffering from gynecological malignancies are affected to varying degrees. After surgery and radiotherapy or chemotherapy, the sexual life quality, fertility, and even family happiness index of most patients with gynecological malignancies are affected to varying degrees. Jiang Luting (1) showed that during the treatment of patients with malignant tumors in China, the spouse of patients is the main bearer of accompanying and daily care, accounting for 50.7% of the main caregivers of patients with malignant tumors. By reviewing the literature, it is learned that individuals will also experience personal growth such as calmness, resilience, prudence, firmness, and self-confidence after being hit or traumatized (2, 3), that is, posttraumatic growth (PTG), which was proposed and started to be studied by Tedeschi (4), which refers to that individuals experience both pain and positive change and growth during experiencing adversity and stress. In this study, the spouses of patients with gynecological malignancies were used as the research object, and the status quo of post-traumatic growth level was used as the starting point to explore the post-traumatic growth level and related influencing factors of spouses of patients with gynecological malignancies.

## 1. Study subjects and methods

### 1.1 Sample sources

The spouses of patients with gynecological malignancies (including cervical cancer, endometrial cancer, ovarian cancer, fallopian tube cancer, vulvar cancer, and trophoblastic tumor) who were admitted to two tertiary hospitals in Hebei Province from January to June 2019 were selected as the study subjects.

#### 1.1.1 Inclusion criteria

(1) Patients diagnosed with gynecological malignancies.

(2) The main caregiver is the spouse of the patient during the illness.

(3) The spouse of the patient can communicate with others normally.

(4) The spouse of the patient voluntarily participates in this study and can provide written informed consent.

#### 1.1.2 Exclusion criteria

(1) the spouse of the patient is not clear about the patient's condition.

(2) the patient or his spouse has cognitive impairment or a history of mental illness.

(3) the spouse of the patient himself has important organ disease.

(4) the spouse of the patient expresses the intention to stop participating in the survey.

#### 1.1.3 Calculation of sample size

This study is a cross-sectional study in non-experimental studies, so the sample size formula when sampling the mean is selected:  $n = (\mu^2\alpha/2\sigma^2)/\delta^2$ . According to Yang (5), in this study,  $\sigma$  was taken to be 15,  $\delta$  was taken to be 2, and  $\alpha$  was taken to be 0.05. To prevent missing samples, the sample size was expanded by another 20%, and the sample size was finally determined to be 259.

## 1.2 Research methods

### 1.2.1 Literature retrieval analysis method

Retrieval of relevant literature in PubMed, Springer LINK, China National Knowledge Infrastructure, Wanfang Medical Network, VIP and other public databases, combined with their interests and specialties, to understand the research hotspots and directions, comprehensive analysis, in the selection and design of research topics, clinical data collection, and other stages play a guiding role.

### 1.2.2 Questionnaire survey method

The investigator explained the purpose, significance, and process of the study to the respondents, provided informed consent before participation, ensured the confidentiality of the personal information of the respondents, and stated that the respondents could withdraw from the study at any time. The time required to complete the survey was approximately 20 minutes. Before the patient was discharged from the hospital, the study subjects were asked to answer the relevant questions in a written form, and the questions were recovered promptly. After recovery, the subjects were examined face to face to check whether there were omissions. In the case of omissions, the spouses of the patients were asked to supplement them promptly.

(1) The general condition questionnaire was developed by group discussion and expert consultation, including the general condition of the spouse of patients with gynecological malignancies, the general condition of patients, and the disease data of patients.

(2) Posttraumatic Growth Inventory (PTGI) was developed by Tedeschi et al. (4). This scale has 21 items, including 5 dimensions, which are: 7 items for a relationship with others (6, 8, 9, 15, 16, 20, 21), 5 items for finding new possibilities (3, 7, 11, 14, 17), 4 items for personal strength gain (4, 10, 12, 19), 2 items for mental change (5, 18) and 3 items for the appreciation of life (1, 2, 13). Response levels were rated on a 6-point Likert scale ranging from 0 (no change) to 5 (much change), with a total possible score ranging from 0 to 105. The closer the score is to the full score, the better it represents post-traumatic growth. The questionnaire has been verified in different research subjects in China, with good reliability (6-8). In the study on the reliability of this scale by Dong Lu et al. (6), the  $r$  of each item and its dimension is in the range of 0.449 ~ 0.796 ( $P < 0.001$ ), Bartlett's sphericity test ( $P < 0.01$ ), KMO 0.90, and the main factor explain 67.85%

of the total variation. The total Cronbach's  $\alpha$  coefficient of the scale was 0.926, the Split-half reliability was 0.900, and the Cronbach's  $\alpha$  coefficients of each factor ranged from 0.817 to 0.864 (see the Annex for details).

(3) General Self-Efficacy Scale This study uses the General Self-Efficacy Scale (GSES) developed by German psychologist Schwarzer et al., which has a total of 10 items and mainly measures the degree of self-confidence of individuals when they encounter difficulties or frustrations. Responses were rated on a 4-point Likert scale ranging from 1 (not at all correct) to 4 (completely correct), with a total possible score ranging from 10 to 40. Spouses of patients with gynecological malignancies were selected according to their real feelings, and the score was higher, indicating that the general self-efficacy of spouses of patients with gynecological malignancies was higher. Wang Caikang et al. (9) of the Academy of Education, South China Normal University measured the reliability of the Chinese version of the General Self-Efficacy Scale. In the study of the reliability of the scale, the  $r$  of each item and the total score was more than 0.6 ( $P < 0.001$ ), the total Cronbach's  $\alpha$  coefficient of the scale was 0.87, and the Split-half reliability was 0.90 (see the Annex for details).

(4) Event-related rumination contemplation questionnaire This questionnaire was developed by Cann (10) et al., revised by Dong Chaoqun et al. (11) and has been applied and validated in many domestic studies. This questionnaire contains two dimensions, 1 ~ 10 questions is the first dimension, that is, intrusive rumination; 11 ~ 20 questions are the second dimension, that is, purposive rumination. This is scored on a 4-point Likert scale ranging from 0 (never thinking) to 3 (often thinking), with a total possible score ranging from 0 to 60. The  $r$  between each item and the corresponding dimension score in the reliability study of this questionnaire ranged from 0.52 to 0.85 ( $P < 0.001$ ), Bartlett's sphericity test ( $P < 0.001$ ), KMO 0.89, and the two-factor variance contribution rate was 56.13%. The total internal consistency coefficient

of the questionnaire was 0.92, and the internal consistency coefficients of the two dimensions were 0.94 and 0.85, respectively, with well-proven validity (see the Annex for details).

### 1.2.3 Statistical methods

Excel software was used for data entry, and the entered Excel-related data were opened in the statistical software SPSS 19.0 for statistical analysis, with a test criterion of  $\alpha = 0.05$ . Descriptive statistical analysis was performed on the general demographic data characteristics of spouses of patients with gynecological malignancies, demographic data of patients and their clinical disease data, and post-traumatic growth level, rumination level, and self-efficacy level of spouses of patients with gynecological malignancies. Two independent samples t-test or one-way analysis of variance was used to examine the differences in post-traumatic growth scores between spouses of patients with gynecological malignancies with different demographic characteristics and patient clinical data. Bivariate Pearson/Spearman correlation analysis was applied to the correlation coefficients between posttraumatic growth and event-related rumination, general self-efficacy, and their correlation coefficients in each dimension. Multiple linear regression analysis was used to obtain the influencing factors of post-traumatic growth of the study subjects.

## 2. Results

### 2.1 General data characteristics

Descriptive statistical analysis of the general data of spouses of patients with gynecological malignancies, general data of patients, and clinical data of patients after an illness. Its description includes constituent ratio, mean, standard deviation, minimum, maximum, etc.

#### 2.1.1 General demographic characteristics of

#### spouses of patients with gynecological malignancies

The above-mentioned characteristics include age, occupation, education level, income, belief, and marriage age. The age of spouses of 230 patients with gynecological malignancies collected was 23 ~ 83 ( $49.46 \pm 11.72$ ) years, of which the age of 40 ~ 49 years accounted for the most, 37.40%. The education level was mainly middle school (including junior high school and senior high school), accounting for 46.10%. Most of them had no religious belief, accounting for 80.90%. The per capita monthly income of the family was 2000 ~ 5000 yuan, accounting for 46.50%; followed by < 2000 yuan and 5000 ~ 10000 yuan; > 10000 yuan was the least, accounting for 5.70%. The relationship between husband and wife was harmonious in 79.60%. The marriage time was 1 ~ 60 ( $25.23 \pm 12.31$ ) years old, with the most in 20 ~ 30 years, 93 persons, accounting for 40.40%. Only 7.00% of the households were reorganized. About half of the patients' spouses took care of the patients for 1 to 6 months. 80.90% of the respondents had no desire to have children, 51.30% had two children, accounting for 51.30%, of which 62.20% had no minor children.

#### 2.1.2 General Demographic Characteristics of Patients with Gynecological Malignancies

In this study, the age range of hospitalized patients with gynecological malignancies was 23 ~ 79 ( $48.63 \pm 11.73$ ) years, with the highest number in the age group of 40 ~ 49 years, accounting for 34.3%; the work status accounted for the most proportion (including farmers), accounting for 52.60%. Mild effects of the disease on work, daily life, and sexual life accounted for the most, 33.50%, 41.30%, and 34.80%, respectively; 57.40% of the patients treated the disease with a positive attitude; 78.7% of the patients were informed about the disease, and 53.90% of the medical cost payment methods were NCMS.

### 2.1.3 Clinical data of patients with gynecological malignancies

The total number of patients with gynecological malignancies investigated was 230, including 58 patients (25.2%) with cervical cancer, 63 patients (27.4%) with ovarian cancer, 80 patients (34.8%) with endometrial cancer, 6 patients (2.6%) with vulvar cancer, 10 patients (4.3%) with trophoblastic tumor and 13 patients (5.7%) with fallopian tube cancer. The pathological stage was stage I in 120 patients, accounting for 52.2% of all cases: stage II in 79 patients, accounting for 34.3% of all cases. The main treatment was surgery, of which 90 patients (39.10%) underwent surgery, followed by 54 patients (23.50%) who underwent laparotomy. There were 143 patients hospitalized for the first time, accounting for 62.20%; followed by 20.40% of patients hospitalized for 3 times or more. Most of the investigated patients had no complications, comorbidities, or family history. Among them, endometrial cancer was the most common, accounting for 34.80%, followed by ovarian cancer and cervical cancer, accounting for 27.40% and 25.20%, respectively.

### 2.2 Status quo of post-traumatic growth level of spouses of patients with gynecological malignancies

This study showed that the mean score of post-traumatic growth of spouses of patients with gynecological malignancies was  $(62.96 \pm 21.39)$  points, and after dividing the scores of each dimension by the number of items in each dimension, the mean scores of items in the five dimensions from high to low were: an appreciation of life, and some studies expressed this dimension as life perception (12)  $(3.36 \pm 1.15)$ , relationship with others  $(3.00 \pm 1.04)$ , mental change  $(2.98 \pm 1.32)$ , personal strength  $(2.97 \pm 1.21)$ , and finding new possibilities  $(2.81 \pm 1.13)$ . This is shown in Table 3-4. The three items with the highest scores for posttraumatic growth were item 21 "I am more accepting that I need others", item 2 "I have more

appreciation (positive understanding) of my life value", and item 13 "I cherish each day more".

### 2.2 Status quo of general self-efficacy level of spouses of patients with gynecological malignancies

The total score obtained by spouses of patients with gynecological malignancies who participated in the survey in terms of general self-efficacy was  $(26.55 \pm 6.32)$ , of which the ninth item "When there is trouble, I can usually think of some coping methods" had the highest score in this questionnaire, and the tenth item "No matter what happens to me, I can be able to do it freely" had the lowest score in this questionnaire.

### 2.3 Status quo of rumination in spouses of patients with gynecological malignancies

The spouses of patients with gynecological malignancies who participated in this survey scored 5 ~ 59  $(31.16 \pm 9.68)$  on the event-related rumination questionnaire, and event-related rumination was divided into two dimensions: purposeful rumination dimension and invasive rumination, with ten items in both dimensions, all of which were 30 points. The score of intrusive rumination was significantly lower than the score of purposive rumination, with scores of 0 ~ 29  $(13.67 \pm 6.58)$  in the intrusive rumination dimension and 1 ~ 30  $(17.49 \pm 6.09)$  in the purposive rumination dimension. The two most highly scored intrusive rumination items were, "I would involuntarily think of that thing"  $(1.46 \pm 0.96)$  and "something or things related to that thing would cause me to think about that experience"  $(1.47 \pm 0.94)$ . The two highest-scoring purposive rumination items were "I have thought about whether I can learn something from that experience"  $(1.81 \pm 0.91)$  versus "I have thought about that and tried to figure out what happened"  $(1.84 \pm 0.95)$ .

### 2.4 Univariate analysis of post-traumatic growth

# of spouses of patients with gynecological malignancies

One-way analysis of variance or independent sample t-test was performed using the total score of post-traumatic growth of spouses of patients with gynecological malignancies as the dependent variable and general data item by item as the factor. Results As shown in Table 1, there were statistical

differences in the scores of post-traumatic growth of spouses of patients with gynecological malignancies at different ages, education levels, spouses' care time after illness and whether they had religious beliefs ( $P<0.05$ ), and there were statistical differences in the effects of patients' age, emotional response, treatment fee payment method, and self-care ability on their spouses' PTG ( $P<0.05$ ).

**Table 1: One-way analysis of variance of general data and PTG score (n = 230)**

Contributing Factors	Classification	Posttraumatic Growth Score	F/t	P
Age	≤39Years	63.10±22.83	5.97	0.00
	40-49Years	60.69±22.29		
	50-59Years	72.61±14.91		
	≥60Years	56.30±21.55		
Education level	Primary school and below	53.40±21.76	28.38	0.00
	Middle School	60.84±17.86		
	College degree or above	79.02±18.33		
Faith	Yes	70.27±19.22	2.55	0.01
	None	61.23±21.56		
Time of care	<1month	61.46±23.05	4.56	0.00
	1-6months	65.48±20.09		
	6months -1year	65.44±16.58		
Age	≤39years	63.46±22.48	2.75	0.04
	40-49 years	60.84±22.63		
	50-59 years	69.10±16.08		
	≥60 years	57.98±22.81		
Patient's emotional response	Fear anxiety	58.24±18.91	3.41	0.04
	Grief depression	59.64±22.73		
	Positive	66.08±21.73		
Payment method of medical expenses	Self-pay	52.83±24.48	10.26	0.00



Self-care ability	NCMS	59.65±19.89	3.17	0.03
	Medicare	70.70±20.43		
	No dependency required	58.48±22.43		
	Mild dependence	66.95±19.74		
	Moderate Dependence	58.63±23.29		
	Severe Dependence	57.36±22.06		

## 2.5 Correlation Analysis

### 2.5.1 Correlation Analysis between Posttraumatic Growth and Self-Efficacy in Spouses of Patients with Gynecological Malignancies

This study used a bivariate Pearson/Spearman correlation analysis. The table shows the correlation

between post-traumatic growth and general self-efficacy in spouses of patients with gynecological malignancies, and the five dimensions of interpersonal relationship, searching for new possibilities, enhancement of personal strength, appreciation of life, and mental change and the total score of post-traumatic growth were all positively correlated with general self-efficacy ( $P < 0.01$ ), details 2.

**Table 2: Correlation coefficient between post-traumatic growth and self-efficacy of spouses of patients with gynecological malignancies (r-value)**

Item	Self-efficacy r	P
Posttraumatic growth	0.568**	0.000
Relationship with others	0.510**	0.000
Look for new possibilities	0.546**	0.000
Personal strength	0.563**	0.000
Appreciating life	0.431**	0.000
Mental changes	0.437**	0.000

Note: \*\* $P < 0.01$

### 2.5.2 Correlation analysis of post-traumatic growth and event-related rumination in spouses of patients with gynecological malignancies

The results of Pearson/Spearman correlation analysis of event-related rumination and post-traumatic growth in spouses of patients with gynecological malignancies showed that

event-related rumination was significantly positively correlated with post-traumatic growth,  $r = 0.360$ ,  $P = 0.000$ , but the correlation was not close (absolute value of correlation coefficient less than 0.5); the purposive rumination dimension was significantly closely positively correlated with post-traumatic growth (absolute value of correlation coefficient greater than 0.5),  $r = 0.688$ ,  $P = 0.000$ ; the invasive rumination dimension was not

significantly correlated with post-traumatic growth in this study ( $P > 0.05$ ). Ruminative contemplation was positively correlated with all five dimensions of post-traumatic growth ( $P < 0.05$ ); purposive ruminal contemplation dimension was highly positively correlated with all five dimensions of

post-traumatic growth ( $P < 0.01$ ); intrusive ruminal contemplation was significantly negatively correlated with the two dimensions of new possibilities for finding and mental changes in post-traumatic growth ( $P < 0.05$ ), but not with any other dimension ( $P > 0.05$ ), as shown in Table 3.

**Table 3: Correlation coefficient between post-traumatic growth and event-related rumination in spouses of patients with gynecological malignancies (r-value)**

Item	Rumination	Intrusive rumination	Purposive rumination
Posttraumatic growth	0.360**	-0.108	0.688**
Relationship with Others	0.382**	-0.059	0.671**
Find new possibilities	0.297**	-0.140*	0.623**
Personal strength increased	0.362**	-0.057	0.637**
Mental change	0.247**	-0.162*	0.566**
Enjoy life	0.244**	-0.115	0.511**

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

## 2.6 Multivariate analysis of post-traumatic growth of spouses of patients with gynecological malignancies

To exclude the mutual influence between the above mentioned variable factors, identify the influencing factors of post-traumatic growth level of spouses of patients with gynecological malignancies, substitute the above-mentioned variables into independent variables, substitute the total score of post-traumatic growth of spouses of patients with gynecological malignancies into dependent variables for multiple linear regression, and select stepwise regression. Then enter the multiple regression equation with  $\alpha = 0.05$  and  $\alpha = 0.10$ . The results showed that the variables finally entered into the regression equation were: purposeful rumination contemplation, general self-efficacy, invasive rumination contemplation, and spouse education level, which explained a total of 59.5% of the variation in the sample overall; the

influencing factors of spouses' post-traumatic growth level in patients with gynecological malignancies, according to the absolute value of standardized regression coefficient  $\beta$ , were ranked as purposeful rumination ( $\beta = 0.559$ ), general self-efficacy ( $\beta = 0.240$ ), invasive rumination ( $\beta = -0.155$ ), and spouse education level ( $\beta = 0.150$ ) according to importance, suggesting that purposeful rumination had a greater effect on post-traumatic growth level in patients with gynecological malignancies than other variables; and invasive rumination was a negative influencing factor of post-traumatic growth. The relationship between the respective variables and the posttraumatic growth score of patients with gynecological malignancies can be expressed by the following regression equation: posttraumatic growth level =  $5.448 + 1.963 * \text{target rumination} + 0.813 * \text{general self-efficacy} - 0.505 * \text{invasive rumination} + 4.383 * \text{spouse education level}$ , 4.



**Table 4: Multiple linear regression analysis results of influencing factors of post-traumatic growth in spouses of patients with gynecological malignancies (n = 230)**

Item	Regression Coefficient		Standardized regression coefficient	T value	P-value
	B	Std Error	$\beta$		
Constant term	5.448	4.671		1.166	0.245
Objective Rumination	1.963	0.174	0.559	11.27	0.000
General Self-Efficacy	0.813	0.169	0.240	4.818	0.000
Invasive Ruminations	-0.505	0.144	-0.155	-3.512	0.001
Spouse Education Level	4.383	1.364	0.150	3.213	0.002

Note:  $F=85.182$ ,  $P<0.05$ ,  $R^2=0.602$ , Adjusted  $R^2=0.595$

### 3. Discussion

Affected by traditional Chinese concepts, most families still use men as the core and pillar of families. For patients with gynecological malignancies, their spouses not only assist patients in their daily life during treatment but also bear the huge economic burden caused by the treatment of tumor diseases, which is an important spiritual pillar for patients at the most difficult time in the cancer treatment stage, resulting in great mental stress for study subjects at the stage of patients' illness. In this survey, it was shown that the spouses of most patients with gynecological malignancies were in the age group of 40 ~ 59 years. The staff in this age group were the backbone and backbone of the unit. No staff was the main labor force of the family. Some patients also took care of their minor children. All the pressures and responsibilities of the patients after illness were concentrated on the spouses to bear. Therefore, the study of the level of post-traumatic growth of spouses of patients with gynecological malignancies has a positive impact

on both patients and their families. In this study, the post-traumatic growth score of 230 spouses of patients with gynecological malignancies was ( $62.96 \pm 21.39$ ), which was similar to the total post-traumatic growth score of spouses of patients of childbearing age after hysterectomy for cervical cancer ( $60.80 \pm 5.37$ ) (13), the post-traumatic growth level of spouses of patients after breast cancer surgery ( $65.7 \pm 18.7$ ) (14), the post-traumatic growth level of spouses of patients with acute myocardial infarction ( $66.31 \pm 13.83$ ) (15), and the post-traumatic growth level of spouses of patients with digestive tract malignancies ( $52.99 \pm 19.88$ ) (16).

Among the two dimensions of event-related rumination, both purposive rumination and invasive rumination entered the regression equation, and purposive rumination was positively correlated with post-traumatic growth level, while invasive rumination was negatively correlated with post-traumatic growth, and this set of data fully indicated that the post-traumatic growth level of spouses of patients with gynecological malignancies was affected by their way of thinking

and solving problems to a certain extent, and attempts should be made to guide spouses to think more about how to analyze and solve problems to improve their purposive rumination. The individual's time and energy are limited. When the main energy is released on the way to actively think about problem-solving and help the patient take care of the patient, its passive haunting negative thinking mode is automatically inhibited, indirectly helping the patient's spouse resist invasive rumination, which can effectively improve the mental health of the patient's spouse, improve their caring ability, and thus improve their family quality of life.

In this study, the general self-efficacy also entered the regression equation of the influencing factors of post-traumatic growth level of spouses of patients with gynecological malignancies, and the general self-efficacy of spouses of patients was an important influencing factor of their post-traumatic growth. Several studies have shown (17 – 19) that general self-efficacy is an important factor affecting individual post-traumatic growth, and general self-efficacy perception is positively correlated with individual post-traumatic growth levels. Spouses of patients with gynecological malignancies should be encouraged to provide resources to help them understand the characteristics of the disease suffered by their wives as soon as possible, possible situations, key points of care, and tools that can be used. When their cognition reaches a certain level and they can cope with the problems in front of them calmly, the self-confidence and self-worth of their spouses increase, and their general self-efficacy will increase.

In this study, the education level of the spouse of the patient entered the regression equation of their post-traumatic growth, indicating that the education level of the spouse of the patient was an important factor affecting their post-traumatic growth and the post-traumatic growth level of the spouse of the patient with education level. The study of post-traumatic growth of patients after radical resection of esophageal cancer by Jiayu (20)

showed that education level was positively correlated with individual post-traumatic growth levels. Dirik G et al.(21) regression analysis of posttraumatic growth in type 2 diabetes showed that patients' education was significantly positively correlated with their level of posttraumatic growth. Medical workers should pay more attention to the spouses of patients with low education levels, carry out health education in plain language, and encourage them to feedback the understood content to ensure that they truly improve their health knowledge level and improve their care ability. And guide them to actively seek relevant resources to improve their post-traumatic growth level.

The above contents suggest that the post-traumatic growth of the subjects in this study is at a moderate level, and their general self-energy efficiency, purposeful rumination, and invasive rumination, and the education level of the patients' spouses are the main influencing factors of the post-traumatic growth level. These factors together explained 59.5% of the level of posttraumatic growth in patients with gynecological malignancies, and other unconsidered influencing factors were not investigated. In the future, it is ready to carry out the qualitative study, study the psychological experience related to post-traumatic growth of spouses of patients with malignant tumors, and explore and improve the influencing factors of post-traumatic growth of patients with gynecological malignant tumors, which can not only be instructive for the future psychological nursing work but also provide the basis for more directional psychological intervention and support for spouses of patients with malignant tumors, so that they can better help patients and ultimately improve their quality of life.

## Declarations

### 1) *Consent to publication*

We declare that all authors agreed to publish the manuscript at this journal based on the signed Copyright Transfer Agreement and

followed publication ethics.

2) ***Ethical approval and consent to participants***

Not applicable.

3) ***Disclosure of conflict of interests***

We declare that no conflict of interest exists.

4) ***Funding***

None

5) ***Availability of data and material***

We declare that the data supporting the results reported in the article are available in the published article.

6) ***Authors' Contributions***

Authors contributed to this paper with the design (Gaijing Wang, Yanlin Heng, Yanling Li), literature search (Gaijing Wang), drafting (Gaijing Wang), revision (Yanlin Heng and Yanling Li), editing (Gaijing Wang and Yanlin Heng) and final approval (Yanling Li).

7) ***Acknowledgement***

None

8) ***Authors' biography***

None

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