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Factors associated with posttraumatic growth among spouses of women diagnosed with gynaecological cancer: A cross-sectional study

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Abstract

Aim: The aim of this study was to explore the factors that are associated with posttraumatic growth among spouses of women diagnosed with gynaecological cancer.

Design: A cross-sectional descriptive study.

Methods: A convenience sample of 312 spouses of women diagnosed with gynaecological cancer was recruited from two comprehensive hospitals in China, from March 2018 to March 2020. Demographic characteristics, cancer-related characteristics, posttraumatic growth, perceived social support and coping were assessed using self-reported questionnaires. Descriptive statistics and multiple linear regression analysis were performed. The methods were guided by the STROBE checklist.

Results: The mean score of posttraumatic growth was 46.7 (standard deviation = 16.7). The associated factors of posttraumatic growth were spouses' age, perceived social support, problem-focused coping, dysfunctional coping (e.g. denial) and cancer treatment received by partners, which accounted for 34% of total posttraumatic growth score.

Patient or public contribution: All participants contributed to the conducting of this study by completing self-reported questionnaires.

KEYWORDS
coping, gynaecological cancer, posttraumatic growth, social support, spouses

1 | INTRODUCTION

Gynaecological cancer (GC) includes cervical, ovarian, uterine, vaginal and vulvar cancer (Ge et al., 2020) and is the most common cancer diagnosis for women, globally, including China (Cao et al., 2021; Sung et al., 2021). Of these, cervical, uterine and ovarian cancers are the main cancers of women's reproductive organs in the world, including China (Sung et al., 2021). It is expected that there will be

approximately 258,657 new gynaecological cancer diagnoses (responsible for 12% of 2.2 million cancer incidents in women) in China, in 2022, which means that the trend in cancer burden is probably to continue to increase (Cao et al., 2021).

Cancer can be described as a "we-disease"—this signifies that cancer-related stressors not only influence the individual who has been diagnosed, but also affect the lives of their spouses when couples must cope with this disease (Kayser et al., 2007). Spouses typically become the primary caregivers and the most crucial resources to support women diagnosed with gynaecological cancer, which could provide assistance for women to meet their medical and non-medical needs and manage the conditions of the disease (Camara et al., 2019; Heynsbergh et al., 2018; Oldertrøen Solli et al., 2019; Teskereci & Kulakaç, 2018). Although the potentially traumatic nature of a diagnosis of gynaecological cancer often places spouses on a path towards new challenges, such as the treatment of cancer, the couple's relationship, financial problems and the opportunity of losing loved one (Camara et al., 2019; Ge et al., 2020; Teskereci & Kulakaç, 2018), at the same time, positive changes and growth (e.g. posttraumatic growth, PTG) have been found in spouses of women diagnosed with gynaecological cancer when they care for these women during a long illness trajectory (Camara et al., 2019; Ge et al., 2020; Oldertrøen Solli et al., 2019; Song et al., 2021). Furthermore, previous studies have shown that it is important to focus on providing support to both people who have been diagnosed with cancer and their spouses for enhancing the benefit of sharing their mutual posttraumatic growth (Camara et al., 2019; Lim, 2019). However, cancer services have traditionally focused on patient care (Lopes et al., 2018), whereas the recognition of and research about spouses' psychological health is usually explored to a lesser degree (Ge et al., 2020; Heynsbergh et al., 2018). Therefore, it is crucial that health professionals and researchers pay more attention to posttraumatic growth and its associated factors among spouses of women diagnosed with gynaecological cancer to enhance spouses' psychological health (Ge et al., 2020; Kleine et al., 2019).

1.1 | Background

People who experience traumatic events may experience negative psychological changes; however, the literature suggests that traumatic experiences can also be catalysts for growth (Henson et al., 2020). Several terms have been used to describe such positive growth after a diagnosis of cancer (Casellas-Grau et al., 2017), including posttraumatic growth (Tedeschi et al., 2018). According to Tedeschi et al. (2018), posttraumatic growth (PTG) can be seen in cognitive, emotional, behavioural and biological changes when people cope with a trauma, and which can occur in days or over years afterwards.

Social support has been considered as an important predictor of positive consequences after a traumatic experience in the theoretical model of posttraumatic growth (Tedeschi et al., 2018), because the need for receiving appropriate social support in adversity is an intrinsic part of human nature that contributes to health and well-being (Pourmand et al., 2021). In a sample of cancer patients affected by cancer and their spouses, Chen et al. (2021) found that a high level of perceived social support is helpful to promote an individual's adaptive coping. However, in a qualitative literature review by Ge et al. (2020), researchers found that spouses experienced posttraumatic growth in the caring process for women diagnosed with gynaecological cancer, although their perceived supportive care needs were not always valued. In a systematic review, Henson et al. (2020) found that social support does not have a direct effect on individual's posttraumatic growth. Moreover, the influence of social support on individuals varies between different cultural backgrounds, for example, those living in the USA who receive support are probably to produce more self-esteem, whereas those living in Japan are probably to experience shame (Ishii et al., 2017).

Coping success has been considered as another important predictor of PTG in the theoretical model of posttraumatic growth (Tedeschi et al., 2018). Although coping plays a statistically significant role in PTG in a western cultural context (Henson et al., 2020; Nouzari et al., 2019; Tedeschi et al., 2018), the various kinds of coping behaviour in broader approaches that are beneficial to individuals when they cope with challenges depend on the context of the stressor and the different characteristics of each culture (Ishii et al., 2017; Lloyd et al., 2019). For example, dysfunctional coping strategies are usually considered to be maladaptive strategies, which are related to increased caring burden (Lloyd et al., 2019). However, Zhai et al. (2020) proposed that culture-specific coping, such as a "let-go attitude" (a non-action coping), could correlate with PTG in Chinese spouses after their partners encounter a diagnosis of cancer.

The differences in socio-cultural contexts, events-related characteristics and individual pre-trauma conditions have also been considered as important predictors of an individual's PTG (Tedeschi et al., 2018). However, previous results relating to the association between age and PTG were shown to be inconsistent in a systematic review by Henson et al. (2020). Another inconsistency is time since diagnosis, which was not significantly associated with PTG in Zhou et al.'s (2021) study, while it was significantly associated with PTG in Song et al.'s (2021) and Zheng et al.'s (2016) studies. Furthermore, spiritual support has been described as a facilitator of spouses' meaning-making and acceptance, which is helpful for achieving psychological well-being (Boamah Mensah et al., 2021). The role that spiritual support plays in such change is rarely found in Chinese samples (Qu et al., 2020).

To date, there is limited evidence about the association between PTG, social support and coping among spouses of women diagnosed with GC. Furthermore, it is important to explore PTG, social support and coping in various cultures, because an understanding of the process of PTG was developed based on cultural context (Qu et al., 2020; Tedeschi et al., 2018). These limitations in the evidence in this area restrict the development of culturally appropriate psychosocial interventions for spouses. Given that obtaining a greater understanding of spouses' PTG and its associated factors will contribute not only to

improving spouses' psychological well-being, but also to that of their partners (Kleine et al., 2019), this study thus aimed to explore the associated factors of PTG among spouses of women diagnosed with GC. Based on the literature review, we hypothesized that higher levels of perceived social support would be significantly associated with higher posttraumatic growth, while higher levels of dysfunctional coping would be significantly associated with lower posttraumatic growth. Moreover, we assumed that demographic and cancer-related characteristics (e.g. age and time since diagnosis) would be significantly associated with posttraumatic growth.

2 | METHODS

2.1 | Design, setting and participants

This study was a cross-sectional and descriptive study. A convenience sample of spouses of women diagnosed with gynaecological cancer was recruited from two comprehensive hospitals providing cancer services in China. The inclusion criteria for spouses were (1) aged 22 years or older; (2) the primary caregiver for women diagnosed with at least one kind of gynaecological cancer; (3) partner had undergone surgery; and (4) agreed to participate in this study. Spouses diagnosed with a mental illness were excluded. The sample size was calculated by G*Power 3.1.9.7 (Faul et al., 2007) as follows: multiple regression, 13 predictive variables (i.e. four variables of personal factors, four variables of cancer-related factors, three variables of coping behaviours and three variables of perceived social support), medium effect size (Cohen's $f^2 = 0.15$), significance level of .05, α value of .05 and power of .85. The required minimum sample size was 143. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) was chosen as a checklist for this study (Vandenbroucke et al., 2014).

2.2 | Measurements

2.2.1 | Demographic and cancer-related characteristics

The information form, developed by the researchers, gathered spouses' demographic characteristics (i.e. age, educational level, residence and number of children) and women's cancer-related characteristics (e.g. time since diagnosis, cancer stage). The women's cancer diagnoses were classified according to Berek et al. (2021) and Bhatla et al. (2018).

2.2.2 | Posttraumatic growth

The Posttraumatic Growth Inventory (PTGI) was developed by Tedeschi and Calhoun (1996). It includes 21 items and five subscales: relating to others (seven items), new opportunity (five items), personal strength (four items), appreciation of life (three items) and spiritual change (two items). A six-score Likert scale method was used in the scoring. The total possible score for the PTGI ranges from 0–105, with higher scores indicating greater levels of PTG. The Cronbach's alpha for PTGI was .92 in the present study.

2.2.3 | Perceived social support

The Multidimensional Scale of Perceived Social Support (MSPSS) was developed by Zimet et al. (1990). It includes 12 items and three subscales: support from family (four items), support from friends (four items) and support from a statistically significant other (four items). A seven-score Likert scale method was used in the scoring. The total possible score for the MSPSS ranges from 12–84, with higher scores indicating greater perceived social support. The Cronbach's alpha for MSPSS was .87 in the present study.

2.2.4 | Coping behaviour

The Brief Coping Orientation to Problems Experienced Scale (Brief COPE) was developed by Carver (1997). It includes 28 items and 14 subscales. A four-score Likert scale method was used in the scoring. In accordance with previous studies (Lloyd et al., 2019; Yoo et al., 2021), three Brief COPE subscales were created: problem-focused coping (i.e. active coping, instrumental support and planning), emotion-focused coping (i.e. acceptance, emotional support, humour, positive reframing and religion comprise) and dysfunctional coping (i.e. behavioural disengagement, denial, self-distraction, self-blame, substance use and venting). The Cronbach's alpha for Brief COPE was .81 in the present study.

2.3 | Data collection

This study was conducted between March 2018 and March 2020. Two research assistants were trained in data collection techniques and were responsible for recruiting participants in four gynaecological wards of two comprehensive hospitals in China. Participants were screened by checking their partners' medical records. Research assistants provided women who had had a diagnosis of GC and who had undergone surgery with information about this study and then asked for permission to contact their spouses. A total of 621 eligible spouses were invited to participate. Of these, 237 eligible spouses declined to participate (i.e. 40 were not interested and 197 did not have enough time). Thereafter, 384 eligible spouses completed the questionnaire independently and anonymously in a quiet room located in a gynaecological ward.

Seventy-two questionnaires with missing data (e.g. where more than 20% of items were unanswered in the whole questionnaire, or where any information about personal factors or cancer-related factors was missing) were deleted before analysis. For those participants who responded to <20% of the items in the whole questionnaire, average scores were calculated as the mean value for non-missing data items. Finally, a descriptive statistical analysis was performed with 312 questionnaires. To verify the robustness of the results, a sensitivity analysis was conducted to check whether the final model fit with the 294 respondents who answered all items in the whole questionnaire.

2.4 | Data analysis

Statistical Package for Social Sciences (SPSS) version 24.0 was used. Descriptive statistics, mean and standard deviation (*SD*, for continuous variables), and numbers and percentages (for dichotomous variables) were computed first to describe the sample. Considering that the number of items in each subscale of the PTGI and the Brief COPE were different, the researchers converted the scores of the subscales into centesimal scores to compare their values (Zhou et al., 2021). The scores of PTG according to demographic and cancer-related characteristics were analysed using an independent sample *t*-test and one-way analysis of variance (ANOVA). An independent sample *t*-test was also used to analyse the difference in two subscales scores in PTGI, MSPSS and Brief COPE. The association between PTG, perceived social support and coping behaviours was analysed using the Pearson correlation coefficient. Variance inflation factors (VIFs) were used to test whether there was multicollinearity among the explanatory variables. Multiple regression analysis was performed to assess the relative contribution of each possible factor in explaining variance in the increased PTG. The PTG was considered to be the dependent variable, whereas spouses' age, educational level, residence, number of children, perceived social support, problem-focused coping, emotion-focused coping, dysfunctional coping and partners' cancer-related characteristics (i.e. time since diagnosis, cancer stage, cancer type and cancer treatment) were considered as independent variables. All statistical tests were two-tailed with a significance score of $p < .05$.

2.5 | Ethical considerations

The study protocol, in accordance with the Helsinki Declaration, was approved by the Ethics Committee of a medical university. All eligible participants were offered the information about the study, including the purpose of the study, and the voluntary nature and expected duration of their participation. Participants signed an informed consent form before participating in the investigation. They were told that they had the right to withdraw at any time.

TABLE 1 Demographic and cancer-related characteristics ($N = 312$)

Characteristics	*N*	%	Mean ± *SD* (min-max)
Age			
20–39	46	14.7%	49.9 ± 10.2 24–78
40–59	218	69.9%	
60–78	48	15.4%	
Education level			
Junior school and lower	213	68.3%	
Senior high school	59	18.9%	
College and higher	40	12.8%	
Residence			
City	98	31.4%	
Countryside	214	68.6%	
Number of children			
≤1	140	44.9%	1.7 ± 0.9 0–4
≥2	172	55.1%	
Cancer type			
Cervical cancer	115	36.9%	
Endometrial cancer	56	17.9%	
Ovarian cancer	117	37.5%	
Other	24	7.7%	
Time since diagnosis			
≤1 month	135	43.3%	1.7 ± 0.7 1–3
>1 month	177	56.7%	
Cancer stage			
Stage I	126	40.4%	
Stage II	78	25.0%	
Stage III	88	28.2%	
Stage IV	20	6.4%	
Cancer treatment			
Surgery only	184	59.0%	
Combination therapy	128	41.0%	

3 | RESULTS

3.1 | Demographic and cancer-related characteristics

Table 1 displays the participants' demographic characteristics and their partners' cancer-related characteristics. The mean age of participants was 49.9 years (*SD* = 10.2, range 24–78), and 85% of the participants were over the age of 40. More than 68% of the participants had an education level of junior school and lower (68.3%) and lived in the countryside (68.6%). The mean time since diagnosis of GC in participants' partners was 1.7 months (*SD* = 0.7, range 1–3). About two-third of the participants' partners were diagnosed at

stage I (40.4%) and stage II (25.0%), one-third were stage III (28.2%), and 6.4% were stage IV. In total, 41% of the participants' partners experienced combination therapy (i.e. surgery and radiotherapy/chemotherapy).

3.2 | Scores of PTGI, MSPSS and brief COPE

Table 2 provides the descriptive statistics of PTGI, MSPSS and Brief COPE. The mean score of PTGI was 46.7 (range 5–82). The mean centesimal scores of five subscales in the PTGI were 55.6 (appreciation of life), 48.4 (personal strength), 45.7 (relating to others), 38.6 (new opportunities) and 30.7 (spiritual change), respectively. The mean score of MSPSS was 68.4 (range 44–84). The average score for support from family (24.4, range 12–28) was significantly higher than support from statistically significant other (23.1, range 13–28) and support from friends (20.9, range 8–28), respectively. The mean centesimal scores of subscales in the Brief COPE were 62.0 (dysfunctional coping), 60.0 (emotion-focused coping) and 59.6 (problem-focused coping), respectively.

3.3 | Differences in PTG scores by demographic and cancer-related characteristics

The level of PTG was significantly correlated with cancer stage ($F = 2.704$, $p = .046$) and cancer treatment ($t = -2.953$, $p = .003$) (Table 3). Participants with partners who had been diagnosed with stage IV of GC had the highest PTG scores (52.5 ± 17.3), which were significantly higher than participants with partners who had been diagnosed with stage I of GC (44.6 ± 16.9). Furthermore, the PTG scores of participants with partners who had been diagnosed with stage III of GC (49.8 ± 16.4) were significantly higher than participants with partners who had been diagnosed with stage I. In addition, the PTG scores of participants with partners who had been given combination therapy (50.0 ± 16.4) were significantly higher than participants with partners who had been given surgery only (44.4 ± 16.6).

3.4 | Correlation between PTGI, MSPSS and Brief COPE

The analysis of the Pearson's correlation coefficient showed statistically significant positive correlations between PTGI, MSPSS and Brief COPE (Table 4). There was a positive correlation between PTG and perceived social support ($r = .407$, $p < .01$), emotion-focused coping ($r = .207$, $p < .01$), problem-focused coping ($r = .105$, $p < .05$) and dysfunctional coping ($r = .414$, $p < .01$). Perceived social support had a moderate correlation with some dimensions in PTGI: relating to others ($r = .446$, $p < .01$), personal strength ($r = .344$, $p < .01$) and new opportunities ($r = .307$, $p < .01$). Dysfunctional coping also had a moderate correlation with some dimensions in PTGI: relating to others ($r = .409$, $p < .01$), new

TABLE 2 Scores of PTGI, MSPSS and Brief COPE ($N = 312$)

Dimensions	Mean (*SD*)	Possible range	Range	Centesimal score
PTGI	46.7 (16.7)	0–105	5–82	44.5
Appreciation of life	8.3 (2.7)	0–15	0–12	55.6
Personal strength	9.7 (4.0)	0–20	0–16	48.4
Relating to others	16.0 (6.4)	0–35	2–28	45.7
New opportunities	9.7 (4.9)	0–25	0–20	38.6
Spiritual change	3.1 (1.9)	0–10	0–8	30.7
MSPSS	68.4 (9.1)	12–84	44–84	81.5
Support from family	24.4 (3.2)	4–28	12–28	87.1
Support from statistically significant other	23.1 (3.2)	4–28	13–28	82.6
Support from friends	20.9 (4.4)	4–28	8–28	74.7
Brief COPE	68.0 (10.2)	28–112	29–98	60.7
Dysfunction coping	29.7 (4.7)	12–48	13–43	62.0
Emotion-focused coping	24.0 (4.6)	10–40	10–37	60.0
Problem-focused coping	14.3 (2.5)	6–24	6–21	59.6

Note: PTGI: the difference in two subscales scores between (1)–(2), (1)–(3), (1)–(4), (1)–(5), (2)–(3), (2)–(4), (2)–(5), (3)–(4), (3)–(5), (4)–(5) were all statistically significant ($p < .01$). MSPSS: the difference in two subscales scores between (1)–(2), (1)–(3), (2)–(3) were all statistically significant ($p < .001$). Brief COPE: the difference of s two subscales cores between (1)–(2), (1)–(3) were all statistically significant ($p < .001$).

Abbreviation: MSPSS, Multidimensional Scale of Perceived Social Support; PTGI, Posttraumatic Growth Inventory.

TABLE 3 PTG scores by demographic and cancer-related characteristics ($N = 312$)

Characteristics	Mean	*SD*	*t/F*	*p*
Age				
20–39	42.9	17.6	1.486	.228
40–59	47.5	16.0		
60–78	47.0	18.8		
Education level				
Junior school and lower	46.3	17.3	0.369	.692
Senior high school	47.2	15.2		
College and higher	48.6	16.0		
Residence				
City	46.9	16.0	0.088	.930
Countryside	46.7	17.0		
Number of children				
≤1	46.1	16.4	−0.639	.523
≥2	47.3	17.0		
Cancer type				
Cervical cancer (1)	46.3	16.5	2.803	.040*
Endometrial cancer (2)	42.3	17.3		
Ovarian cancer (3)	50.0	16.4		
Other (4)	44.5	15.6		
Time since diagnosis				
≤1 month	45.7	16.1	−0.966	.335
>1 month	47.5	17.2		
Cancer stage				
Stage I (1)	44.6	16.9	2.704	.046*
Stage II (2)	45.3	16.0		
Stage III (3)	49.8	16.4		
Stage IV (4)	52.5	17.3		
Cancer treatment				
Surgery only	44.4	16.6	−2.953	.003*
Combination therapy	50.0	16.4		

Note: Cancer type: (2)–(3), $p < .01$; Cancer stage: (1)–(3), $p < .05$; (1)–(4), $p < .05$.

opportunities ($r = .351$, $p < .01$), spiritual change ($r = .342$, $p < .01$) and personal strength ($r = .300$, $p < .01$).

3.5 | Multiple linear regression model

The VIFs (1.094, 2.047, 1.631 and 1.988, respectively) showed weak multicollinearity among the independent variables (e.g. perceived social support, emotion-focused coping, problem-focused coping and dysfunctional coping), which suggests that each independent variable was sufficiently independent of the other (Kim, 2019). Multiple regression analysis showed spouses' age, perceived social support, dysfunctional coping, problem-focused coping and partners' cancer treatment were recognized as predictors of PTG (adj. $R^2 = .338$) (Table 5). The regression model explained 34% of the total variance in PTG. Dysfunctional coping (ß = 1.451, $p < .001$) and perceived social support (ß = 0.580, $p < .001$) had the greatest effect on PTG (Table 5).

4 | DISCUSSION

To the best of our knowledge, this study is the first to explore the association between PTG, perceived social support and coping among spouses of women diagnosed with GC. The findings from the present study indicated that spouses with high levels of perceived social support and dysfunctional coping showed high levels of PTG, while spouses of younger age and spouses of partners who had been given surgery only showed low levels of PTG.

The encouraging finding in this study was that perceived social support was found to be positively associated with PTG and had the highest correlation with the dimension of relating to others in PTGI. Moreover, the subscale score of support from family was significantly higher than support from statistically significant other and support from friends. This finding indicates that perceived support from family may be more helpful in supporting spouses to experience more PTG during their caring experience. Although social support is a distinct cultural phenomenon (Lawley et al., 2019), similar findings have emerged in other studies (Lim, 2019; Reblin et al., 2020). The potential explanation is that the assistance from other family members (e.g. visiting, offering food, giving money, psychological support and emotional support) can help spouses effectively manage emotions, balance their own needs, make decisions during uncertainty, cope with the situation and alleviate caregiving burden (Boamah Mensah et al., 2021; Heynsbergh et al., 2018). In addition, the subscale score of support from statistically significant other was significantly higher than support from friends in the present study. This finding was supported by several studies (e.g. Boamah Mensah et al., 2021; Camara et al., 2019; Heynsbergh et al., 2018). For example, in the study of Boamah Mensah et al. (2021), they found that healthcare professionals, as a critical resource, contributed significantly to spouses' coping and adaptation by providing educational support and positive feedback, which indicates that nurses should respond to spouses' supportive care needs to promote their well-being. Heynsbergh et al. (2018) also found that cancer caregivers (64.4% were spouses) seek support through a variety of sources, including actively asking questions to healthcare professionals and seeking support from others cancer caregivers who have had a similar caring experience. According to Tedeschi et al. (2018), a person may become involved with a support group (e.g. peer support) and experience positive changes in their relationships after experiencing

TABLE 4 Correlation of PTGI, MSPSS and brief COPE ($N = 312$)

	1	2	3	4	5	6	7	8	9
1. PTGI	1								
2. Appreciation of life	.713**	1							
3. Personal strength	.863**	.590**	1						
4. Relating to others	.904**	.562**	.672**	1					
5. New opportunities	.891**	.517**	.751**	.721**	1				
6. Spiritual change	.648**	.388**	.471**	.525**	.548**	1			
7. MSPSS	.407**	.229**	.344**	.446**	.307**	.242**	1		
8. Emotion-focused coping	.207**	.196**	.101	.227**	.135*	.217**	.106	1	
9. Problem-focused coping	.105*	.041	.025	.156**	.041	.181**	.058	.590**	1
10. Dysfunction coping	.414**	.277**	.300**	.409**	.351**	.342**	.269**	.652**	.527**

Abbreviation: MSPSS, Multidimensional Scale of Perceived Social Support; PTGI, Posttraumatic Growth Inventory.
*$p < .05$.; **$p < .01$.

the crisis, which can exert statistically significant influence over the potential for PTG. In addition, receiving effective support from colleagues in the workplace could help improve an individual's mood and reduce stress (Pourmand et al., 2021).

The most interesting finding of this study is that dysfunctional coping was positively associated with PTG, which was inconsistent with several previous studies. For example, Yoo et al. (2021) found that maladaptive responses or avoidance coping (e.g. denial, behavioural disengagement, substance use) may increase the risk of reactive embitterment when people experience negative events. Lloyd et al. (2019) found that the use of dysfunctional coping was associated with an increase in caregiver burden. Despite the above evidence, the finding in the present study is still supported by other studies (e.g. Mwaka et al., 2018; Perndorfer et al., 2019). A potential explanation is that denial may be a protective buffering to protect spouses from upset and burden (Perndorfer et al., 2019), particularly in the early stages of a trauma (Mwaka et al., 2018). Another potential explanation is that cultural differences have an influence on spouses when they cope with stress (Ishii et al., 2017). This assumption could be supported by Tedeschi et al. (2018), who suggest that specific cultural contexts influence the use of various different coping strategies when responding to a traumatic event. For example, in Chinese culture, spouses' negative experiences (e.g. causing trouble to others and reduced masculinity) when seeking social support from others increase their tendency to use avoidant coping strategies (Yeung et al., 2020). The main reason is that individuals living in collectivistic cultures (e.g. Chinese culture) often consider cancer to be solely a family challenge and thus seldom seek support from others (Yeung et al., 2020). Furthermore, when compared to other traumatic events (e.g. earthquake and major car accident), cancer has some special characteristics, for example experiencing difficulties in diagnosis and treatment, its long duration and potential recurrence, which may affect individual coping behaviours (Yeung et al., 2020).

Demographic and cancer-related characteristics were significantly associated with PTG, as proposed by the third hypothesis. Although previous results relating to the relationship between age and PTG remain inconsistent (Henson et al., 2020), it is notable that younger spouses were negatively associated with PTG in this study, that is younger age was correlated with a lower PTG score in spouses of women diagnosed with GC. Furthermore, spouses with partners who experienced combination therapy had higher PTG scores than those with partners who experienced only surgery in the current study. The possible reason is that spouses with partners who experienced combination therapy may obtain more social support and experience more growth in relating to others and in personal strength (Zheng et al., 2016).

Another interesting finding of this study is that appreciation of life was the main growth. This is inconsistent with Ge et al. (2020), who found that spouses' posttraumatic growth mainly existed in personal growth and a closer relationship with family members. The finding that appreciation of life was the most common growth could be supported by Song et al. (2021) and Qu et al. (2020) in a Chinese cultural context. Qu et al. (2020) found that appreciation of life is the most common growth for Chinese people when they cope with a trauma (including accidental trauma, earthquake, burn and amputation). Yeung et al. (2020) also proposed that adopting a more positive attitude towards life is a commonly used coping strategy in Chinese spouses to cope with cancer-related stressors. Conversely, spiritual growth was the least common growth found in this study. The difference between results for spiritual change in this study and previous studies (e.g. Henson et al., 2020) may be due to the variety of perspectives relating to spiritual change (Nouzari et al., 2019). Also, the PTGI used in this study may be a less suitable instrument to use in cultures with a less understanding and practice of spirituality, such as the Chinese cultural context (Qu et al., 2020; Tedeschi et al., 2017). However, PTGI is the most common tool used to assess positive changes in the area of cancer (Casellas-Grau et al., 2017).

4.1 | Limitations and future directions

The study has several limitations. First, although a relatively large sample was involved in this study, a convenience sampling method was applied, and the sample was recruited from two comprehensive

TABLE 5 Influencing factors of PTG ($N = 312$)

	β	*t*	*p*	Tolerance	VIF
Age					
20–39	0				
40–59	5.297	2.195	.029*	0.512	1.955
60–79	4.522	1.432	.153	0.483	2.071
Education level					
Junior school and lower	0				
Senior high school	4.403	1.950	.052	0.802	1.247
College and higher	4.117	1.409	.160	0.657	1.522
Residence					
Countryside	0				
City	−2.427	−1.168	.244	0.674	1.483
Number of children					
≤1	0				
≥2	1.904	1.073	.284	0.806	1.241
Cancer type					
Cervical cancer	0				
Endometrial cancer	2.454	0.759	.449	0.258	3.881
Ovarian cancer	−1.922	−0.547	.585	0.344	2.905
Other	1.824	0.538	.591	0.233	4.295
Time since diagnosis					
≤1 month	0				
>1 month	0.834	0.441	.660	0.715	1.399
Cancer stage					
Stage I	0				
Stage II	1.492	0.707	.480	0.750	1.333
Stage III	0.618	0.265	.791	0.568	1.759
Stage IV	3.420	0.921	.358	0.758	1.319
Cancer treatment					
Surgery only	0				
Combination treatment	2.414	2.005	.046*	0.460	2.176
Perceived Social Support	0.580	6.172	<.001***	0.859	1.164
Emotion-focused coping	−0.092	−0.365	.715	0.471	2.122
Problem-focused coping	−0.902	−2.115	.035*	0.575	1.740
Dysfunctional coping	1.451	5.968	<.001***	0.474	2.110
R	.582				
R^2	.338				
F	8.320				
p	<.001				
Durbin-Watson	1.312				

Note: Age: 40–59, 60–79, 20–39 (dummy variable); Education level: senior high school, college and higher, junior school and lower (dummy variable); Residence: city, countryside (dummy variable); Number of children: ≥2, ≤1 (dummy variable); Cancer type: cervical cancer, endometrial cancer, ovarian cancer, other (dummy variable); Time since diagnosis: >1 month, ≤1 month (dummy variable); Cancer stage: stage II, stage III, stage IV, stage I (dummy variable); Cancer treatment: combination treatment, surgery only (dummy variable); MSPSS (continuous score); Emotion-focused coping (continuous score); Problem-focused coping (continuous score); Dysfunctional coping (continuous score).

*$p < .05$.; **$p < .01$.; ***$p < .001$.

hospitals, which may limit the generalizability of the results. Second, the participants exclusively comprised Chinese spouses of women diagnosed with GC. The Chinese culture may have influenced their experience of growth, so the findings from this study may not be consistent with those in other cultural contexts. Third, although spouses who frequently use dysfunctional coping had higher PTG scores in this study, the possible reason for this, such as the role of avoidance/denial in spouses' growth, is unknown. Finally, the way in which perceived support from family/statistically significant other influences spouses' growth is unclear.

Based on these limitations, more cross-cultural research studies on PTG in spouses of women diagnosed with GC are warranted in the future. First of all, future research should generalize the findings in this study to more representative samples across cultures. Second, the possible effectiveness of dysfunctional coping on PTG must be further explored in a Chinese cultural context. Third, more research is also needed to further identify the possible mechanism between perceived support from family/statistically significant other and spouses' PTG. For example, the association between spouses' PTG and their partners' PTG needs to be further explored by examining dyad-level data (Tedeschi et al., 2018). Additionally, a longitudinal design deserves attention to help to develop a clearer understanding of the progress of PTG and its associated factors in the caregiving trajectory.

5 | CONCLUSION

The current study provides evidence that spouses' age, perceived social support, problem-focused coping, dysfunctional coping and cancer treatment received by partners were associated with PTG among spouses of women diagnosed with GC. Importantly, the findings in this study suggest that positive support-seeking and perceiving more social support from family and others, and using dysfunctional coping, could be intervention strategies to facilitate spouses' PTG, particularly in young spouses and spouses of women who receive surgery only. Specifically, these findings are meaningful for the development of family-based interventions, which could focus on perceived social support and coping to help spouses to foster more PTG. For example, spouses who have low levels of perceived support from family may benefit from disclosure between family members and promote/maintain intimacy relationship.

5.1 | Relevance to clinical practice

The findings from this study provide a deeper understanding of PTG and its associated factors in a Chinese cultural context, which has valuable implications for clinical practice. First, the positive association between perceived social support and PTG suggests that health professionals should be aware of the need for increased attention and should provide appropriate support to spouses, such as developing a support intervention based on the spouses' care needs. Perceived support from family was most common in spouses, suggesting that the family members should be the first consideration for spouses to increase their PTG in a Chinese cultural context. For example, encouraging spouses to communicate with family members, building and maintain meaningful relationships with family members, and ensuring that spouses make use of the existing family support available to them. Second, the positive association between dysfunctional coping and PTG indicates that health professionals need to evaluate spouses' coping behaviours and help spouses to choose the appropriate coping behaviours via nursing intervention. In particular, according to the recommendation proposed by Tedeschi et al. (2018), a nursing intervention comprising coping and social support should be integrated into existing cancer care practice because the early phase of cancer diagnosis and its treatment offer important moments for promoting health behaviour change and PTG. Third, given that spouses' age and partners' cancer treatment are associated factors of spouses' PTG, health professionals should provide person-centred care to younger spouses and spouses of women who have been prescribed with surgery only.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (http://www.icmje.org/recommendations/)]:

- substantial contributions to conception and design, acquisition of data or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

ETHICAL APPROVAL

This study was reviewed by the Ethics Committee of Anhui Medical University (No. 2018005).

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