

Cancer Coping, Family Support, and Post-traumatic Growth in Female Genital Cancer Patients--A Secondary Publication

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Abstract: *Objective:* The purpose of this study was to identify the relationship between cancer coping, family support and degree of post-traumatic growth in female genital cancer patients receiving chemotherapy and provide evidence for nursing intervention to enhance post-traumatic growth. *Methods:* A cross-sectional study was conducted with 114 participants. The cancer coping, family support and post-traumatic growth were measured using a self-reported questionnaire. The collected data were analyzed with independent *t*-test, one-way ANOVA and Pearson correlation using the SPSS/win 28.0 statistical programs. *Results:* The mean score of cancer coping was 62.65 ± 13.53 , that of intrapersonal coping 38.32 ± 8.34 , and that of interpersonal coping was 24.32 ± 6.56 . The mean score of family support was 49.06 ± 7.32 and post-traumatic growth was 59.66 ± 17.92 . Post-traumatic growth showed a statistically significant positive correlation among intrapersonal coping ($r = 0.80$), interpersonal coping ($r = 0.61$), and family support ($r = 0.42, p < 0.001$). *Conclusion:* To increase post-traumatic growth, it is necessary to develop coping interventions so that cancer patients can effectively and positively cope with various difficulties and problems in the process of chemotherapy.

Keywords: Chemotherapy; Genital neoplasms; Coping; Family support; Post-traumatic growth

Online publication: September 4, 2024

1. Introduction

1.1. The importance of the study

Female genital cancer is a malignancy that occurs in the female genital tract, including the cervix, uterus, ovaries, fallopian tubes, vagina and vulva. In 2020, the incidence of major cancers by gender in Korea was 3,492 cases of cervical cancer and 2,998 cases of uterine body cancer per 100,000 population per year, ranking 8th and 10th in terms of female cancer incidence, respectively, and the 5-year relative survival rate was 89.3% for uterine body cancer and 80.1% for cervical cancer in 2016–2020, an increase of 6.4% and 1.7%, respectively, from 1993–1995 ^[1]. In addition, when looking at the prevalence of cancer in women, thyroid cancer accounts for 31.2% of the total, breast cancer 21.8%, cervical cancer 4.7%, uterine body 2.6% and ovarian cancer 2.0% ^[2].

The treatment of female genital cancer is determined by the stage of the tumor and previous treatment methods and includes surgery, chemotherapy, and radiotherapy [3]. Among them, chemotherapy can cause physical side effects such as numbness, fatigue, hair loss, loss of appetite, nausea, taste changes and muscle pain, which negatively affect the patient's quality of life. In addition, unexpected problems during treatment can cause stress, so it is important to educate patients and their families about the types of side effects in terms of how often they occur, when they occur, and how to manage them to improve adherence to treatment [3].

Cancer can be recognized as a traumatic disease because the diagnosis itself has a profound impact on the patient's life and the course of the disease activates perceptions of vulnerability and mortality, which are key characteristics of traumatic events [4]. However, the experience of cancer can lead to positive psychological changes after a difficult course of treatment [5] and the assessment of post-traumatic growth in cancer patients can facilitate adaptation to the disease [4]. Post-traumatic growth typically manifests itself in various ways, including an increased appreciation for life, more meaningful interpersonal relationships, increased personal strength, shifts in priorities and a richer existential and spiritual life [6]. A systematic and critical review of studies on post-traumatic growth in cancer patients found that 46% of the 72 journal studies included breast cancer patients, with other cancers represented in colorectal, head and neck, prostate, testicular, and leukemia [4]. While post-traumatic growth is an important factor in the treatment of cancer patients, there is a relative lack of research on female genital cancers.

Hysterectomy and oophorectomy are the main surgical treatments performed after a diagnosis of cervical, uterine or ovarian cancer. After surgery, female genital cancer patients experience a decrease in body image, low self-esteem and sleep disturbances due to the loss of the uterus and ovaries [7]. In a previous study, 21.9% of ovarian cancer patients reported post-traumatic stress disorder, and the lower the social support, the higher the prevalence of post-traumatic stress disorder is [8]. Patients experience a coping process in which they utilize their resources to strive for physical and mental adjustment to ameliorate difficulties such as the stress of cancer [9]. Appropriate coping in cancer patients during a crisis such as a cancer diagnosis can reduce anxiety, stress and depression and impact quality of life [10]. In addition, coping mechanisms can be utilized to actively cope with cancer and result in positive changes in life after the cancer experience [11]. Coping is a critical factor in the health of cancer patients undergoing chemotherapy [12] and higher levels of coping are associated with higher levels of post-traumatic growth [13].

Family support is also essential to help cancer patients adjust and maintain optimal functioning from diagnosis through treatment. Family support is an essential support system for cancer patients to adapt and maintain optimal functioning from diagnosis through treatment [14]. Family members can help patients through the difficult treatment process, reducing stress and supporting them in adjusting to treatment [15]. Especially during the post-traumatic growth process of the cancer experience, family is a source of strength, reason for being, and support for patients [16].

While the importance of post-traumatic growth in cancer patients is emerging, most studies of female cancers studies have focused on breast cancer [4] and some studies have been conducted on female genital cancers [13,17]. However, this study aims to identify the relationship between cancer coping, family support and post-traumatic growth in female genital cancer patients undergoing chemotherapy to provide evidence for the development of nursing interventions for female genital cancer patients.

1.2. Research objectives

The purpose of this study is to determine the relationship between cancer coping, family support and post-traumatic growth in female patients with genital cancer undergoing chemotherapy.

- (1) The participants' general characteristics, disease- and treatment-related characteristics and coping with cancer, family support and post-traumatic growth.
- (2) Identify differences in cancer coping, family support and post-traumatic growth by participants' general characteristics and disease- and treatment-related characteristics.
- (3) Identify correlations between participants' coping with cancer, family support and post-traumatic growth.

2. Research methods

2.1. Study design

This is a descriptive correlational study to determine the relationship between cancer coping, family support and post-traumatic growth in female genital cancer patients undergoing chemotherapy.

2.2. Study subjects

This study included patients diagnosed with female genital cancer and hospitalized in the gynecology ward of Seoul, a tertiary hospital and receiving chemotherapy. The patients were aged 20 years old or older, understood the purpose of the study and voluntarily agreed to participate in the study.

Questionnaires were distributed to 114 participants; all were returned, and none were insufficient, so all 114 participants were analyzed. G*Power 3.1.9.2 was used to calculate the number of participants, and an effect size of 0.3 (medium) for correlation, a significance level of 0.05 for α , and a power of 0.95 for $1-\beta$ yielded 109 participants. 0.95, which yielded 109 subjects, so the sample size was adequate.

2.3. Research instruments

2.3.1. General characteristics of subjects, disease- and treatment-related characteristics

The general characteristics of the subjects were age, marital status, living arrangements, education, religion, occupation and average monthly family income. Disease and treatment-related characteristics included diagnosis, time since diagnosis, current stage of cancer, recurrence, number of chemotherapy treatments, surgery, radiation therapy, comorbidities, and Eastern Cooperative Oncology Group (ECOG) activity level.

2.3.2. Coping with cancer

For cancer coping, the study used the Korean-Cancer coping questionnaire, a Korean version of the cancer coping questionnaire developed by Moorey S *et al.* (2003) and modified, supplemented in Korean by Kim JN *et al.* (2004), after receiving approval ^[9,18]. This instrument consists of 23 questions and is divided into two subscales, namely intrapersonal coping and interpersonal coping. Intrapersonal coping refers to how the subject coped with himself or herself and consists of 14 items, including 6 items of positive restructuring, 5 items of active coping and 3 items of planning. Interpersonal coping refers to how the subject coped with others in close relationships and consists of 9 items. Each item is scored on a 4-point Likert scale with 1 being "never," 2 as "sometimes," 3 as "often" and 4 as "very often." Scores range from a low 23 to a high 92, with higher scores indicating higher levels of coping. In the study of Moorey S *et al.* (2003), Cronbach's α for intrapersonal coping was 0.87 and Cronbach's α for interpersonal coping was 0.82 ^[9]. In this study, Cronbach's α for cancer coping was 0.93, Cronbach's α for intra-personal coping was 0.90, and Cronbach's α for interpersonal coping was 0.92.

2.3.3. Family support

In this study, family support was measured using Cobb S (1976)'s family support instrument ^[19], which was

modified and supplemented by Kang HS (1984) ^[20] in Korean after receiving approval. There are 11 items in total, and each item is scored on a 5-point likert scale with 1 as “not at all,” 2 for “sometimes,” 3 for “usually,” 4 for “often,” and 5 for “always,” with a minimum score of 11 and a maximum score of 55, with higher scores indicating higher levels of family support. Items 6 and 7 were reverse-scaled. Cronbach’s α was 0.86 in Cobb S’s (1976) study ^[19], Cronbach’s α was 0.89 in Kang HS’s (1984) study ^[20], and Cronbach’s α was 0.92 in this study.

2.3.4. Post-traumatic growth

In this study, post-traumatic growth was measured using the Post-traumatic Growth Inventory by Tedeschi RG *et al.* (1996) ^[21], modified by Jung YM *et al.* (2017) ^[22], after approval of a cancer patient-specific post-traumatic growth tool. The instrument is a 23-item instrument with five subscales: new possibilities (6 items), coping skills (5 items), valuing life (5 items), interpersonal relationships (4 items), and personal strengths (3 items). Each item is scored on a 5-point likert scale with 0 for not experienced, 1 for experienced a little, 2 for experienced moderately, 3 for experienced a lot and 4 for experienced very much, with higher scores indicating greater post-traumatic growth. In the study by Tedeschi RG *et al.* (1996) ^[21], Cronbach’s α was 0.90; in the study by Jung YM *et al.* (2017) ^[22], Cronbach’s α was 0.94; and in this study, Cronbach’s α was 0.95.

2.4. Data collection methods

This study was approved by the institutional review board (approval number 2022-0789) and the nursing department before data collection. Female patients with genital cancer who were hospitalized in the gynecological ward of A Superior General Hospital in Seoul, Korea, and were receiving chemotherapy from June 25 to October 8, 2022, were eligible for the study after the researcher personally explained the purpose of the study and gave voluntary consent, explaining that they could withdraw their consent at any time during the study. The questionnaire was given to the patients and they were asked to fill it out by themselves, and if they had difficulty filling it out, the researcher would ask them questions, read it to them, and answer them. The personal information obtained in this study will be properly managed in accordance with the Personal Information Protection Act. It will be stored for three years after the end of the study and then destroyed.

2.5. Data analysis method

The collected data were analyzed using SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY, USA) for descriptive statistics, including frequencies and percentages for general characteristics, disease and treatment-related characteristics, cancer coping, family support, and post-traumatic growth, and independent *t*-test, one-way ANOVA, and Scheffé test for differences in cancer coping, family support, and post-traumatic growth according to general characteristics and disease and treatment-related characteristics. The relationships between cancer coping, family support, and post-traumatic growth were analyzed using Pearson’s correlation. Two-tailed tests were performed at a statistical significance level of .05.

3. Findings

3.1. General characteristics of the subjects, disease and treatment-related characteristics

A total of 114 female genital cancer patients were analyzed in this study, with a mean age of 53.9 years old. Marital status was predominantly married, with 98 (86.0%) married and 101 (88.6%) living with their families. In terms of education, 58 (50.9%) had a college degree or higher, 76 (66.7%) had a religion, and 29 (25.4%) had a job. The average monthly income of the family was more than 3 million won, with 70 (61.4%) earning more than 3 million won.

In terms of disease and treatment-related characteristics, ovarian cancer was the most common diagnosis with 60 (52.6%), followed by cervical cancer with 27 (23.8%), endometrial cancer with 16 (14.0%) and others with 11 (9.6%), including 5 leiomyosarcomas, 4 fallopian tube cancers, and 2 vaginal cancers. The median time since diagnosis was 3.52 ± 3.39 years, with 53 (46.5%) current stage IV and 78 (68.4%) relapsed, and the median number of chemotherapy treatments was 18.05 ± 16.59 (1–78). A history of surgery was present in 98 (86.0%), radiation therapy in 20 (17.5%), and comorbidities in 70 (61.4%). ECOG The most common activity level was grade 1 in 87 (76.3%) patients (**Table 1**).

Table 1. Cancer coping, family support and post-traumatic growth according to characteristics of the participants ($n=114$)

Characteristics	Category	<i>n</i> (%) or <i>M</i> ± <i>SD</i>	Cancer coping		Family support		Posttraumatic growth	
			<i>M</i> ± <i>SD</i>	<i>t</i> or <i>F</i> (<i>p</i>)	<i>M</i> ± <i>SD</i>	<i>t</i> or <i>F</i> (<i>p</i>)	<i>M</i> ± <i>SD</i>	<i>t</i> or <i>F</i> (<i>p</i>)
Age (year old)	< 50	32 (28.0)	63.25 ± 14.32		49.38 ± 7.27		59.75 ± 19.15	
	50–59	46 (40.4)	65.02 ± 13.08	2.03	49.00 ± 8.02	0.04	63.67 ± 16.66	2.76
	≥ 60	36 (31.6)	59.08 ± 13.05	(0.137)	48.86 ± 6.57	(0.957)	54.44 ± 17.49	(0.067)
		53.9 ± 10.0						
Marital status	Single	16 (14.0)	55.88 ± 14.47	-2.2	45.38 ± 8.87	-2.21	50.06 ± 19.77	-2.36
	Married	98 (86.0)	63.76 ± 13.12	(0.03)	49.66 ± 6.90	(0.029)	61.22 ± 17.20	(0.02)
Family living together	Yes	101 (88.6)	63.56 ± 13.43	-2.02	49.59 ± 6.54	-1.47	60.37 ± 18.23	-1.18
	No	13 (11.4)	55.62 ± 12.63	(0.046)	44.92 ± 11.24	(0.166)	54.15 ± 14.76	(0.241)
Education	≤ middle school	16 (14.0)	58.06 ± 14.08		49.31 ± 5.97		59.38 ± 18.63	
	High school	40 (35.1)	63.63 ± 14.30	1.08	49.23 ± 7.39	0.04	62.13 ± 15.82	0.62
	≥ College	58 (50.9)	63.24 ± 12.81	(0.343)	48.88 ± 7.70	(0.964)	58.03 ± 19.16	(0.542)
Religion	Yes	76 (66.7)	62.87 ± 14.24	0.24	48.95 ± 7.35	-0.23	59.18 ± 18.69	-0.39
	No	38 (33.3)	62.21 ± 12.16	(0.808)	49.29 ± 7.34	(0.815)	60.58 ± 16.47	(0.7)
Occupation	Yes	29 (25.4)	65.59 ± 11.74	1.36	49.72 ± 6.04	0.56	62.41 ± 17.70	0.96
	No	85 (74.6)	61.65 ± 14.01	(0.177)	48.84 ± 7.72	(0.574)	58.72 ± 18.00	(0.34)
Family income (10,000 won/month)	< 200 ^a	26 (22.8)	53.50 ± 10.97		46.04 ± 9.75	2.9	50.78 ± 16.72	
	200–299 ^b	18 (15.8)	58.94 ± 14.82	12.28 (< 0.001)	48.00 ± 6.70	(0.068)	54.72 ± 21.53	7.77 (< 0.001)
	≥ 300 ^c	70 (61.4)	58.94 ± 14.83	<i>c</i> > <i>a</i>	50.46 ± 6.04	0	64.49 ± 15.67	<i>c</i> > <i>a</i>
Diagnosis	Cervical cancer	27 (23.8)	58.94 ± 14.84		49.52 ± 8.43		66.15 ± 15.85	
	Ovarian cancer	60 (52.6)	58.94 ± 14.85		49.45 ± 6.83		58.68 ± 16.91	
	Endometrial cancer	16 (14.0)	58.94 ± 14.86	0.11	47.81 ± 8.12	0.38	58.19 ± 21.70	2.16
	Others	11 (9.6)	58.94 ± 14.87	(0.952)	47.64 ± 6.30	(0.768)	51.18 ± 19.49	(0.097)
Duration since diagnosis (year)	< 1 ^a	28 (24.6)	58.94 ± 14.88		49.64 ± 6.88		61.71 ± 16.66	
	1–< 2 ^b	18 (15.8)	58.94 ± 14.89		52.06 ± 4.86		62.94 ± 15.14	
	2–< 5 ^c	38 (33.3)	58.94 ± 14.90	1.18	49.79 ± 5.80	3 (0.039)	62.13 ± 16.74	2.17
	≥ 5 ^d	30 (26.3)	58.94 ± 14.91	(0.321)	45.80 ± 9.50	<i>B</i> > <i>d</i>	52.63 ± 20.76	(0.096)
		3.52 ± 3.39 (1–15)						

Table 1 (Continued)

Characteristics	Category	n (%) or M ± SD	Cancer coping		Family support		Posttraumatic growth	
			M ± SD	t or F (p)	M ± SD	t or F (p)	M ± SD	t or F (p)
Stage of cancer	I, II	24 (21.0)	61.21 ± 15.70		48.25 ± 8.92		59.50 ± 23.09	
	III	37 (32.5)	63.92 ± 15.20	0.3 (0.739)	49.46 ± 7.18	0.2 (0.816)	61.24 ± 17.93	0.36 (0.7)
	IV	53 (46.5)	62.42 ± 11.26		49.15 ± 6.71		59.98 ± 15.26	
Recurrence	Yes	78 (68.4)	62.33 ± 14.10	-0.37 (0.716)	48.18 ± 8.13	-2.31 (0.023)	59.22 ± 18.23	-0.38 (0.701)
	No	36 (31.6)	63.33 ± 12.37		50.97 ± 4.68		60.61 ± 17.44	
Number of chemotherapy	≤ 12	58 (50.9)	63.93 ± 13.63		50.12 ± 6.64		62.10 ± 17.71	
	13–24	29 (25.4)	61.76 ± 13.22		49.28 ± 7.69		61.45 ± 18.15	
	≥ 25	27 (23.7)	58.70 ± 13.10	2.07 (0.131)	46.56 ± 7.95	2.25 (0.11)	52.48 ± 16.82	2.95 (0.057)
History of surgery	Yes	98 (86.0)	62.77 ± 13.67	0.23 (0.822)	48.76 ± 7.31	-1.11 (0.27)	58.53 ± 18.13	1.68 (0.097)
	No	16 (14.0)	61.94 ± 13.08		50.94 ± 7.28		66.56 ± 15.28	
History of radiation therapy	Yes	20 (17.5)	63.40 ± 16.09	0.27 (0.786)	47.35 ± 10.02	-0.89 (0.385)	62.80 ± 18.43	-0.86 (0.39)
	No	94 (82.5)	62.49 ± 13.02		49.43 ± 6.62		58.99 ± 17.84	
Comorbidity	Yes	70 (61.4)	61.63 ± 12.57	-1.02 (0.312)	48.84 ± 7.06	-0.4 (0.689)	57.16 ± 17.38	-1.9 (0.06)
	No	44 (38.6)	64.28 ± 14.94		49.41 ± 7.77		63.64 ± 18.24	
ECOG	0 ^a	16 (14.1)	66.13 ± 15.95		47.75 ± 8.79		64.06 ± 20.98	
	1 ^b	87 (76.3)	62.71 ± 13.11	1.47 (0.235)	49.59 ± 6.91	1 (0.372)	60.45 ± 17.55	3.46 (0.035)
	2,3 ^c	11 (9.6)	57.09 ± 12.50		46.82 ± 8.23		47.00 ± 10.30	a > c

ECOG = Eastern cooperative oncology group; M = Mean; SD = Standard deviation.

3.2. Subject's level of cancer coping, family support and post-traumatic growth

Subjects' coping with cancer averaged 62.65 ± 13.53 (out of 92), with 38.32 ± 8.34 for intra-personal coping and 24.32 ± 6.56 for interpersonal coping. Family support had a mean of 49.06 ± 7.32 (out of 55) and post-traumatic growth had a mean of 59.66 ± 17.92 (out of 92), with sub-scales of 11.97 ± 6.27 for new possibilities, 13.37 ± 4.47 for coping skills, 15.80 ± 1.10 for valuing life, 10.11 ± 3.80 for interpersonal relationships, and 8.40 ± 2.90 for personal strengths (Table 2).

Table 2. Level of cancer coping, family support, and post-traumatic growth ($n=114$)

Variables	<i>n</i>	M ± SD	Min–Max	Item M ± SD	Scale range
Cancer coping	23	62.65 ± 13.53	30–92	2.72 ± 0.06	
Intrapersonal coping	14	38.32 ± 8.34	19–56	2.74 ± 0.06	1–4
Interpersonal coping	9	24.32 ± 6.56	9–36	2.70 ± 0.07	
Family support	11	49.06 ± 7.32	23–55	4.46 ± 0.06	1–5
Post-traumatic growth	23	59.66 ± 17.92	12–92	2.59 ± 0.07	
New possibility	6	11.97 ± 6.27	0–24	1.20 ± 1.04	
Coping skill	5	13.37 ± 4.47	2–20	2.67 ± 0.89	
Preciousness of life	5	15.80 ± 1.10	4–20	3.16 ± 0.82	0–4
Relating to others	4	10.11 ± 3.80	1–16	2.53 ± 0.95	
Personal strength	3	8.40 ± 2.90	1–12	2.80 ± 0.97	

M= mean, SD= standard deviation

3.3. Differences in cancer coping, family support, and post-traumatic growth

Cancer is based on the general characteristics of the subject and disease- and treatment-specific characteristics. When looking at differences in coping, there were statistically significant differences by marital status ($t = -2.20, p = .030$), living arrangement ($t = -2.02, p = .046$), and family's average monthly income ($F = 12.28, p < 0.001$), and post hoc analysis showed that coping with cancer was higher among those with an average monthly income of more than 3 million won than those with an average monthly income of less than 2 million won. There were no differences in age, education, religion, occupation, diagnosis, time since diagnosis, current stage of cancer, recurrence, number of chemotherapy treatments, surgery, radiotherapy, comorbidities, or ECOG activity level. Differences in family support according to participants' general characteristics and disease- and treatment-related characteristics were significantly different by marital status ($t = -2.21, p = 0.029$), time since diagnosis ($F = 3.00, p = 0.039$), and presence of recurrence ($t = -2.31, p = 0.023$), with post hoc analysis showing that time since diagnosis was higher for those with more than 1 to less than 2 years than for those with more than 5 years.

There were no differences in age, living arrangement, education, religion, occupation, average monthly family income, diagnosis, current stage of cancer, number of chemotherapy treatments, surgery history, radiation therapy history, comorbidities or ECOG activity level. When examining the differences in post-traumatic growth according to general characteristics and disease- and treatment-related characteristics, there were differences in marital status ($t = -2.36, p = 0.020$), family monthly income ($F = 7.77, p < 0.001$), and ECOG activity level ($F = 3.46, p = 0.035$), and post hoc analysis showed that family monthly income of more than 3 million won was associated with higher post-traumatic growth than family monthly income of less than 2 million won, and ECOG activity level 0 was associated with higher post-traumatic growth than ECOG activity levels 2 and 3. There were no differences in age, living arrangement, education, religion, occupation, diagnosis, time since diagnosis, current stage of cancer, recurrence, number of chemotherapy treatments, surgery history, radiotherapy history, or comorbidities (Table 1).

3.4. Relationships among participants' cancer coping, family support, and post-traumatic growth

Participants' post-traumatic growth was statistically significantly related to cancer coping subscales of intrapersonal coping ($r = 0.80, p = 0.001$) and interpersonal coping ($r = 0.80, p < 0.001$) and interpersonal

coping ($r = 0.61, p < 0.001$), and showed a statistically significant positive correlation with family support ($r = 0.42, p < 0.001$). Family support also showed a statistically significant positive correlation with the intrapersonal coping ($r = 0.46, p < 0.001$) and interpersonal coping ($r = 0.60, p < 0.001$) subscales of coping (Table 3).

Table 3. Correlations among cancer coping, family support and post-traumatic growth ($n = 114$)

Variables	Categories	Cancer coping		Family support
		Intrapersonal coping	Interpersonal coping	
		r (p)	r (p)	
Cancer coping	Intrapersonal coping	1	1	
	Interpersonal coping	0.65 (< 0.001)		
Family support	0	0.46 (< 0.001)	0.60 (< 0.001)	1
Post-traumatic growth	0	0.80 (< 0.001)	0.61 (< 0.001)	0.42 (< 0.001)

4. Discussion

This study attempted to identify and correlate cancer coping, family support, and post-traumatic growth in female genital cancer patients undergoing chemotherapy.

In this study, the subjects' coping with cancer averaged 62.65 ± 13.53 (out of 92), with 38.32 ± 8.34 for intrapersonal coping and 24.32 ± 6.56 for interpersonal coping. In a previous study of ovarian cancer survivors, cancer coping was 59.05 ± 13.37 , intra-individual coping was 36.89 ± 6.12 , and interpersonal coping was 22.16 ± 7.25 [23], and intra-individual coping and interpersonal coping were similar to the results of a previous study of breast cancer patients receiving chemotherapy. It was found that the level of cancer coping was similar to breast cancer, which is a female cancer undergoing chemotherapy, and it is thought that cancer patients are coping by managing side effects and actively controlling symptoms during the treatment process such as chemotherapy, so they have higher levels of coping than survivors. In addition, the difference in cancer coping among those who are married and have a higher average monthly family income was similar to previous studies [24].

Family support in this study was high, with a mean score of 49.06 ± 7.32 (out of 55), similar to previous studies [25]. In particular, family support was higher for those who had been diagnosed for more than 1 year to less than 2 years than for those who had been diagnosed for more than 5 years, which was higher than for those who had been diagnosed for less than 1 year and 1–3 years to more than 3 years in previous studies [25], indicating that family support was relatively high during the diagnosis and initial treatment process. Family support was lower in cases of recurrence, which was not found to be different in previous studies [25], so future studies should include this characteristic. Female cancer patients reported that the treatment process was painful. Still, they tried to overcome it because of their roles as mothers and wives, and they were able to overcome their fears of recurrence by perceiving the situation positively with their families, even under extreme stress [16]. Female genital cancer patients often experience difficulties during and after the treatment process, such as body dysmorphia, depression, decreased interest in sex due to vaginal dryness and shortening, menstrual pain and fear of recurrence [1], so family support is a very important factor.

The mean post-traumatic growth in this study was 59.66 ± 17.92 (out of 92), with an item mean of 2.59 ± 0.07 , which is lower than the mean of 3.42 ± 0.49 in the study of Yun SJ *et al.* (2019), who studied 125 female genital cancer patients undergoing chemotherapy in the same population [17]. In a study comparing post-traumatic growth in gynecologic cancer patients according to survival stage, the time elapsed since diagnosis

was higher in the acute survival stage of less than 1 year than in the extended survival stage of 2 to 5 years. The study reported that post-traumatic growth, which was higher in the acute survival stage, was lower in the extended survival stage due to higher recurrence rates and increased stress from treatment ^[26]. It has been reported that post-traumatic growth occurs within the first few months after diagnosis and increases over time ^[27]. Although the difference was not statistically significant in this study, it was found to decrease with time since diagnosis of more than 5 years.

The study population included female genital cancer patients who were hospitalized and receiving chemotherapy 26.3% of the subjects had been hospitalized for more than 5 years and 23.7% had received more than 25 chemotherapy treatments, indicating that they were receiving repeated treatments over a long period of time. In advanced or recurrent female genital cancer, patients experience challenges such as lymphedema, a side effect of radical treatment that can persist for a long time even after the disease is cured ^[1]. Although there was no difference in post-traumatic growth based on diagnosis, ovarian cancer accounted for 52.6% of the cases in this study, advanced ovarian cancer tends to recur, requiring repeated cycles of chemotherapy with changes to the second, third, or fourth line of chemotherapy, and a chronic disease course in which the disease continues to progress until there are no more specific cancer treatments available ^[1]. Although not investigated in this study, cancer survivors' perceived severity of cancer has been reported to be an influential factor in post-traumatic growth ^[24]. In addition, some studies have reported that the higher the objective cancer severity, the higher the cancer stage, and the more post-traumatic growth occurs, while other studies have not shown any difference by stage ^[24,28]. Future studies should reflect these characteristics and expand the number of subjects by type of female genital cancer. The results were similar to previous studies that showed differences in post-traumatic growth according to marital status ^[24] and economic level ^[28], and ECOG activity level 0 showed higher post-traumatic growth than ECOG activity levels 2 and 3, confirming that post-traumatic growth is higher in those with good physical activity levels.

Higher levels of cancer coping and family support were associated with higher levels of post-traumatic growth, similar to previous studies that have identified relationships between cancer coping ^[13], family support ^[23] and post-traumatic growth ^[17]. After a cancer diagnosis, it is necessary to create a therapeutic environment where patients can actively strive to cope with cancer, find their own strategies to overcome crises and cope with difficulties effectively, and interact with others to receive support and encouragement. In addition, it was reported that female cancer patients were exposed to stressful situations and experienced difficulties because they were forced to take on household responsibilities, although they should be protected as patients during the cancer treatment process, they were able to overcome them through family support ^[16]. Therefore, it is necessary to develop interventions to help female genital cancer patients receiving chemotherapy effectively cope with the various difficulties and problems they encounter during the treatment process. It is expected that family support can be improved by actively involving families in education for female genital cancer patients who experience prolonged courses of treatment with repeated chemotherapy. A meta-analysis of the effectiveness of domestic and international intervention studies for post-traumatic growth in cancer patients suggests the clinical application of cognitive behavioral stress management interventions and mindfulness meditation interventions, which may be applied to future interventions for female genital cancer patients ^[29].

This study was conducted on female genital cancer patients receiving chemotherapy at a tertiary hospital in Japan, and the subjects were limited to those who were hospitalized and receiving chemotherapy, but there are limitations to generalization due to the variation in the length of time since diagnosis and the number of chemotherapy treatments. However, this study identified the correlation between cancer coping, family support, and post-traumatic growth in female genital cancer patients receiving chemotherapy, which can be

used as a basis for future studies to improve post-traumatic growth in female genital cancer patients receiving chemotherapy.

5. Conclusions and recommendations

This study aimed to identify and correlate levels of cancer coping, family support, and post-traumatic growth in female genital cancer patients undergoing chemotherapy. The results showed that cancer coping was moderate to high, family support was high, and post-traumatic growth was low, and higher levels of cancer coping and family support were associated with higher levels of post-traumatic growth. Based on the findings of this study, it is recommended to research on the development and application of post-traumatic growth nursing interventions for female genital cancer patients receiving chemotherapy, longitudinal studies to determine the extent of post-traumatic growth according to the time elapsed since diagnosis and studies to identify the extent and influencing factors of post-traumatic growth according to the type of female genital cancer.

Disclosure statement

The author declares no conflict of interest.

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