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**ORIGINAL ARTICLE**

**Observational Study**

- 1 Assessing quality of life using the brief cancer-related worry inventory for gynecological surgery  
*Kikuchi A, Koide R, Iwasaki M, Teramoto M, Satohisa S, Tamate M, Horiguchi M, Niwa N, Saito T, Mizuguchi T*

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## Observational Study

# Assessing quality of life using the brief cancer-related worry inventory for gynecological surgery

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## Abstract

### BACKGROUND

The mental status of gynecologic patients has an important influence on their quality of life (QOL). Although high-quality QOL studies into breast cancer patients have been performed internationally, few QOL studies have examined patients with gynecological cancer.

### AIM

To investigate the brief cancer-related worry inventory (BCWI) could evaluate the mental status of gynecological patients.

### METHODS

Between July 2018 and December 2018, 19 consecutive gynecological cancer patients were prospectively recruited for this study. The BCWI is a 15-item self-reported questionnaire that assesses cancer-related worries on a numeric scale (0-100).

### RESULTS

The high BCWI group was significantly younger than the low BCWI group. Regarding social status, the absence of a spouse and children was significantly more common in the high BCWI group than in the low BCWI group. The operation time was longer in the worsening BCWI group than in the stable BCWI group ( $305.3 \pm 140.5$  min *vs*  $171.1 \pm 97.2$  min;  $P = 0.026$ ).

### CONCLUSION

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Being young, having no family, and a long operation time were found to be risk factors for increased anxiety. Therefore, gynecological cancer patients should be assessed using the BCWI, and specific perioperative mental care should be considered for highly anxious patients.

**Key words:** Gynecology; Brief cancer-related worry inventory; Quality of life; Surgery

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**Core tip:** The aim of this study was to evaluate the mental status of patients with gynecological cancer and identify their worries using the brief cancer-related worry inventory (BCWI). Regarding social status, the absence of a spouse and children was significantly more common in the high BCWI group than in the low BCWI group. The operation time was longer in the worsening BCWI group than in the stable BCWI group. Being young, having no family, and a long operation time were found to be risk factors for increased anxiety after gynecological surgery.

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## INTRODUCTION

The mental status of cancer patients has an important influence on their quality of life (QOL)<sup>[1]</sup>. In addition, surgery for cancer can have a greater effect on mental status in females than in males, as it can involve the loss of breasts or the uterus<sup>[2,3]</sup>. Although high-quality QOL studies into breast cancer patients have been performed internationally<sup>[4-6]</sup>, few QOL studies have examined patients with gynecological cancer.

A number of tools for assessing anxiety or worries have been established, such as the state-trait anxiety inventory, hospital anxiety and depression scale (HADS)<sup>[7]</sup>, diagnostic and statistical manual of mental disorders-revised, impact of events scale-revised<sup>[8]</sup>, short form health survey<sup>[9]</sup>, and the brief cancer-related worry inventory (BCWI)<sup>[10]</sup>.

The BCWI has been validated in breast and lung cancer patients, in which it exhibited excellent internal consistency and reliability<sup>[10]</sup>. The BCWI scale is composed of three subscales: (1) prospects; (2) physical and symptomatic problems; and (3) social and interpersonal problems<sup>[10,11]</sup>. Although the BCWI could be used to help patients to create problem lists in a very structured and effective way, no perioperative mental evaluations of gynecological patients have been carried out using the BCWI. Such a study would help medical staff to deeply understand the mental statuses of their patients and identify problems and solutions for improving patients' QOL after surgery.

Therefore, this study aimed to evaluate the mental status of gynecological patients and identify their worries using the BCWI. Furthermore, we assessed the reliability of the BCWI in gynecological patients in a prospective cohort study.

## MATERIALS AND METHODS

### Patients

Between July 2018 and December 2018, 19 consecutive gynecological cancer patients who were scheduled to undergo hysterectomy or oophorectomy were prospectively recruited for this study after providing informed consent. Procedures to ensure the subjects' anonymity were applied. The study protocol was approved by the internal review board of Sapporo Medical University (approval ID: 302-56; approval date: July 12, 2018).

### Assessment of the BCWI



The BCWI is a 15-item self-reported questionnaire that assesses cancer-related worries on a numeric scale (0–100)<sup>[10]</sup>. The severity of worries is calculated by totaling the scores for each item. The inventory consists of three factors: (1) Future prospects; (2) Physical and symptomatic problems; and (3) Social and interpersonal problems. All of the patients responded to the questionnaire by themselves immediately after admission and just before they were discharged from the surgical ward.

### Data collection

Medical records were used to identify physical data, social data, the operation time, the amount of intraoperative bleeding, and the duration of each patient's hospital stay. The surgical team and data collection team were independent and evaluated each patient.

### Statistical analysis

SPSS (version 22, IBM-SPSS, Inc., Armonk, New York, United States) was used for all statistical analyses. The unpaired t-test was used for comparisons between the preoperative high BCWI group ( $\geq 700$ ;  $n = 7$ ) and the postoperative low BCWI group ( $< 700$ ;  $n = 12$ ). The paired t-test was used for comparisons of the differences between the preoperative BCWI and postoperative BCWI ( $n = 19$ ). Levene's test was used to assess the equality of variances for each variable between the two groups. Histograms with probability curves were obtained simultaneously. We calculated descriptive statistics and used the chi-square test to compare demographic data between the groups, when necessary. The internal consistency of each parameter was calculated based on Cronbach's alpha. All results are expressed as mean  $\pm$  SD values. *P* values of  $< 0.05$  were considered to be significant.

## RESULTS

The patients' clinical background data are shown in [Table 1](#), and we divided the subjects into the high BCWI group (BCWI  $\geq 700$ ,  $n = 7$ ) and low BCWI group (BCWI  $< 700$ ,  $n = 12$ ). Although the physiques of the high and low BCWI groups were similar, the patients in the high BCWI group were significantly younger than those in the low BCWI group ( $45.4 \pm 8.8$  vs  $58.3 \pm 11.7$ ;  $P = 0.023$ ). Regarding social status, the absence of a spouse and children was significantly more common in the high BCWI group than in the low BCWI group ( $P = 0.004$  and  $P = 0.017$ ).

The changes in the BCWI scores seen after surgery are shown in [Table 2](#). Although the total BCWI scores obtained before and after surgery did not differ significantly ( $561.6 \pm 367.8$  vs  $478.4 \pm 339.1$ ;  $P = 0.069$ ), the scores for question 3 (Q3), which examined the effects of the current treatment ( $43.7 \pm 31.8$  vs  $33.2 \pm 34.1$ ;  $P = 0.009$ ), and Q6, which examined the patients' mental status ( $43.2 \pm 31.8$  vs  $29.4 \pm 26.3$ ;  $P = 0.007$ ), were significantly decreased after surgery.

We then divided the patients into the stable BCWI group ( $n = 13$ ) and worsening BCWI group ( $n = 6$ ). The stable BCWI group consisted of the patients whose postoperative BCWI scores were equal to or lower than their preoperative BCWI scores ([Table 3](#)). The worsening BCWI group consisted of the patients whose postoperative BCWI scores were higher than their preoperative BCWI scores ([Table 3](#)). The operation time was longer in the worsening BCWI group than in the stable BCWI group ( $305.3 \pm 140.5$  min vs  $171.1 \pm 97.2$  min;  $P = 0.026$ ). As for social status, the absence of a spouse and children was only observed in the stable BCWI group ( $P = 0.004$ ).

The internal consistency (Cronbach's alpha coefficient) of the BCWI is shown in [Table 4](#). Both the preoperative and postoperative BCWI scores exhibited excellent internal consistency (0.934 and 0.944, respectively).

## DISCUSSION

We evaluated the anxiety levels of gynecological cancer patients who underwent hysterectomy or oophorectomy using the BCWI. As a result, we found that younger patients and those with no spouse and no children tended to have higher preoperative anxiety levels than elderly patients and patients with a spouse and children. Overall anxiety decreased after surgery, especially with regard to the effects of the current treatment and mental status. Furthermore, a longer operation time and the presence of a spouse and child could be risk factors for worsening anxiety after surgery.

A previous study showed that being younger than 50 years old was a risk factor for

**Table 1 Clinical demographics of the patients**

	Total (n = 19)	High BCWI (n = 7)	Low BCWI (n = 12)	P values
Age (yr)	53.5 ± 12.2	45.4 ± 8.8	58.3 ± 11.7	0.023
Height (cm)	158.9 ± 5.2	160.5 ± 5.2	157.9 ± 5.1	0.313
Body weight (kg)	64.4 ± 14.3	65.9 ± 19.2	63.5 ± 11.5	0.742
BMI	25.4 ± 5.4	25.4 ± 6.9	25.4 ± 4.6	0.996
Pre-BCWI	561.6 ± 367.8	945.7 ± 211.1	337.5 ± 219.9	< 0.001
Affected organ (UB:UN:OV)	10:6:3	3:2:2	7:4:1	0.502
History of surgery (Y:N)	8:11	4:3	4:8	0.311
Spouse (Y:N)	13:6	2:5	11:1	0.004
Child (Y:N)	12:7	2:5	10:2	0.017
Living with family (Y:N)	15:4	5:2	10:2	0.539
Friends (S:M)	9:10	3:4	6:6	0.764

BMI: Body mass index; BCWI: Brief cancer-related worry inventory; UB: Uterine body; UN: Uterine neck; OV: Ovary; Y: Yes; N: No; S: Single; M: Married.

increased anxiety<sup>[12]</sup>. The age range of the subjects in the present study was 34 to 75 years old, and the mean age of the high BCWI group was 45 years old. In previous studies, female gender, a young age, being married, and a low educational level have been identified as aggravating factors that lead to increased preoperative anxiety among patients that undergo elective or emergency surgery<sup>[13,14]</sup>. Our study aimed to evaluate the anxiety levels of patients that undergo gynecological procedures; therefore, all of the subjects were female. Thus, among female patients anxiety might be greater in younger patients than in aged patients. Medical staff need to pay specific attention to the anxiety levels of young patients who undergo gynecological surgery.

Marital status affected the patients' anxiety levels in different ways before and after surgery. Preoperatively, being married might relieve patients' anxiety. On the other hand, in the postoperative period being married seemed to increase patients' anxiety. The presence of a spouse and child has beneficial effects on mental health, which is related to decreased anxiety<sup>[15]</sup>. Also, another study pointed out that having no family was a risk factor for higher levels of preoperative anxiety<sup>[13]</sup>. Therefore, family support ameliorates anxiety when patients are in a stable state. On the other hand, patients worry about their families' futures and the curability of their disease, which might increase their postoperative anxiety.

Previous studies have found that overall anxiety decreased after surgery<sup>[16,17]</sup>, which is consistent with our results. We intended to identify the factors related to increased anxiety during the perioperative period. The operation time was longer in the worsening BCWI group than in the stable BCWI group. Doll *et al.* suggested that increased patient-reported baseline anxiety might increase postoperative healthcare resource use<sup>[16]</sup>. Furthermore, correlations have been detected between the operation time and a visual analog scale measuring the difficulty of the procedure<sup>[18]</sup>. It is difficult to determine the reason why a longer operation time would increase postoperative anxiety. However, it is possible that severe surgical stress is associated with greater pain, and that this causes increased anxiety. To clarify this issue, an additional study investigating the relationship between surgical stress and pain control should be performed in the future.

One of the limitations of this study was that the study period was short. It would be interesting to see if patients' anxiety levels change over the long term. Changes in anxiety levels and emotions have been observed in patients that underwent surgery for gynecological tumors<sup>[16]</sup>. It would also be interesting to see whether a different scoring system, such as the functional assessment of cancer therapy, patient-reported outcomes measurement information system, or HADS, would produce different results.

Cronbach's alpha is used to assess the correlations among test items and is known to be an internal consistency estimate of the reliability of test scores<sup>[19]</sup>. In the present study, all of the Cronbach's alpha scores for the BCWI were over 0.7, which is acceptable, although scores of over 0.8 would have been preferable. Therefore, we demonstrated that the BCWI, which includes three subscales, exhibited excellent internal consistency among gynecological cancer patients, as has previously been demonstrated for breast and lung cancer patients<sup>[10]</sup>.

**Table 2 Differences between the brief cancer-related worry inventory scores obtained before and after surgery in gynecological cancer patients**

	Pre-BCWI	Post-BCWI	P values		Pre-BCWI	Post-BCWI	P values
Total	561.6 ± 367.8	478.4 ± 339.1	0.069	Q8	36.8 ± 34.8	36.3 ± 36.5	0.943
Q1	47.4 ± 36.2	47.9 ± 36.5	0.905	Q9	24.2 ± 31.7	27.9 ± 29.9	0.521
Q2	54.7 ± 36.7	48.9 ± 33.6	0.249	Q10	15.8 ± 25.2	13.7 ± 17.1	0.52
Q3	43.7 ± 31.8	33.2 ± 34.1	0.009	Q11	21.6 ± 30.4	17.4 ± 21.8	0.534
Q4	43.7 ± 30.9	36.8 ± 31.3	0.271	Q12	37.9 ± 34.3	28.4 ± 30.9	0.104
Q5	46.3 ± 34.5	37.9 ± 34.1	0.115	Q13	24.7 ± 34.1	11.6 ± 11.7	0.096
Q6	43.2 ± 31.8	29.4 ± 26.3	0.007	Q14	40.0 ± 35.3	30.0 ± 34.1	0.194
Q7	32.6 ± 31.9	31.6 ± 30.8	0.894	Q15	32.1 ± 31.7	29.5 ± 31.4	0.499

BCWI: Brief cancer-related worry inventory; Q: Question.

In conclusion, the anxiety of gynecological cancer patients decreased after surgery. Being young, having no family, and a long operation time were identified as risk factors for increased anxiety. Therefore, specific perioperative mental care should be considered for high-risk gynecological cancer patients, who can be identified using the BCWI.



**Table 3 Clinical comparison between the stable brief cancer-related worry inventory group (*n* = 13) and the worsening brief cancer-related worry inventory group (*n* = 6)**

	Stable BCWI ( <i>n</i> = 13)	Worsening BCWI ( <i>n</i> = 6)	<i>P</i> values
Age (yr)	54.8 ± 13.1	50.8 ± 10.7	0.53
Height (cm)	159.1 ± 6.1	158.7 ± 2.3	0.896
Body weight (kg)	65.5 ± 16.9	61.9 ± 6.6	0.634
BMI	25.8 ± 6.3	24.6 ± 2.7	0.665
Pre-BCWI	623.1 ± 413.8	428.3 ± 211.8	0.296
Affected organ (UB:UN:OV)	8:2:3	2:4:0	0.066
History of surgery (Y:N)	6:7	2:4	0.599
Spouse (Y:N)	7:6	6:0	0.044
Child (Y:N)	6:7	6:0	0.024
Living with family (Y:N)	10:3	5:1	0.75
Friends (S:M)	5:8	4:2	0.252
Operation time (min)	171.1 ± 97.2	305.3 ± 140.5	0.026
Intraoperative Bleeding (mL)	213.5 ± 279.5	649.2 ± 586.5	0.134
Hospital stay (d)	14.1 ± 8.8	19.2 ± 10.3	0.281

BMI: Body mass index; BCWI: Brief cancer-related worry inventory; UB: Uterine body; UN: Uterine neck; OV: Ovary; Y: Yes; N: No; S: Single; M: Married.

**Table 4 Reliability of the brief cancer-related worry inventory**

	Pre-Cronbach alpha coefficients	Post-Cronbach alpha coefficients
Future prospects (Q1-Q6)	0.95	0.953
Physical and symptomatic problems (Q7-Q10)	0.713	0.84
Social and interpersonal problems (Q11-Q15)	0.734	0.767
Brief cancer-related worry (total)	0.934	0.944

## ARTICLE HIGHLIGHTS

### Research background

The mental status of gynecological patients who received surgery has not fully understood. The brief cancer-related worry inventory (BCWI) has been validated in breast and lung cancer patients. However, the clinical values of BCWI for gynecological patients had never been investigated.

### Research motivation

To identify the risk factors for perioperative anxiety could prepare for us supporting the patient's mental status. It might improve a quality service of the medical management itself.

### Research objectives

The main objectives, the objectives that were realized, and the significance of realizing these objectives for future research in this field should be described in detail.

### Research methods

Between July 2018 and December 2018, 19 consecutive gynecological cancer patients who were scheduled to undergo hysterectomy or oophorectomy were prospectively recruited for this study after providing informed consent. The BCWI is a 15-item self-reported questionnaire that assesses cancer-related worries on a numeric scale (0–100).

### Research results

The high BCWI group was significantly younger than the low BCWI group. The absence of a spouse and children was significantly more common in the high BCWI group than in the low BCWI group. The operation time was longer in the worsening BCWI group than in the stable BCWI group.

### Research conclusions

We found that being young, having no family, and a long operation time were found to be risk

factors for increased anxiety. Therefore, specific perioperative mental care should be considered for high-risk gynecological cancer patients, who can be identified using the BCWI, in the future.

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