

Stage-Affected Quality of Life in Endometrial Cancer Patients

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ABSTRACT

OBJECTIVE This study aims to compare the aspects of quality of life between early and advanced-stage endometrial cancer patients.

METHODS From January to February 2021, women diagnosed with endometrial cancer and treated at Maharaj Nakorn Chiang Mai Hospital were invited to participate. Two qualities of life questionnaires, the European Organization for Research and Treatment of Cancer Quality of Life QLQ-C30 questionnaire (EORTC QLQ-C30) and the CMU Endometrial Cancer Quality of Life (gastrointestinal, urinary, lymphatic, sexual, and hormonal domains) were used. The chi-squared test, the Mann-Whitney U test, and multivariable linear regression were used for statistical analysis.

RESULTS A total of 103 participants were divided into two groups: 65 individuals with early-stage disease and 38 with advanced-stage disease. All participants completed the quality-of-life questionnaires. The two groups were comparable in terms of global health status/QoL for EORTC QLQ-C30. However, the early-stage group had significantly higher functional scales and quality-of-life summary scores than the advanced-stage group. As for the CMU endometrial cancer QoL, the advanced-stage group had more negative issues related to the gynecologic and hormonal system compared to the early-stage group.

CONCLUSIONS Women with endometrial cancer generally have a good quality of life. Survivors of advanced stages may have a quality of life similar to those in the early stage but with a higher incidence of gastrointestinal, sexual, and hormonal complications.

KEYWORDS chemotherapy, endometrial cancer, oncology, quality of life

INTRODUCTION

The American Cancer Society in 2020 estimated that of the 893,660 women who would be diagnosed with cancer that year 7 percent would be diagnosed with endometrial cancer, of whom 4 percent would die of the disease. The report also stated that endometrial cancer has the highest incidence of gynecologic cancer in developed countries because of their aging population and changing lifestyles (1). The World Health Organi-

zation (WHO) reported that of 170,495 women newly diagnosed with cancer in Thailand, 2,671 (1.56%) had endometrial cancer, the third most common gynecologic malignancy following cervical and ovarian cancer. Additionally, the Age-Standardized Incidence Rate (ASR) of endometrial cancer was 16.4 (2). Due to advancements in medical technology, the 5-year survival rate for all stages globally is around 80 percent, but 65 percent have recurrence at the vaginal area and

18 percent have distance metastases (3).

Endometrial carcinoma is common in menopausal women age 45–65 years old, and is commonly diagnosed at the early stage (4). Approximately 95 percent of uterine cancers can be classified by histopathology into two groups: type 1 (grades 1 and 2 endometrioid adenocarcinomas) and type 2 (grade 3 endometrioid tumors and tumors of non-endometrioid histology).

The standard treatments of endometrial cancer are surgery, radiation, and chemotherapy. Surgery is the main treatment because it can define the stage of the disease and thus aid in the selection of postoperative treatments such as radiation and chemotherapy. Adjuvant therapy is considered for high-risk patients, e.g., patients age > 60 years, and those with deep myometrial invasion, endometrioid cell histology grade 3, serous or clear cell histology, or LVSI (5). These factors are prognostic of survival rate as well. However, patients who receive only surgical treatment have a better quality of life in terms of physical function, e.g., less constipation and less loss of appetite, than the patients receiving postoperative treatment, as well as in terms of social function (6). Moreover, menopausal patients who receive a total hysterectomy with bilateral salpingo-oophorectomy have lower libido and orgasm scores than the patients who receive only a total hysterectomy due to pain during intercourse (7). Obesity is another factor that determines quality of life. Studies have found that patients with BMI > 40 kg/m² have worse sleep quality than the patients who have BMI 25–29.99 kg/m² due to fatigue during daytime, increased stress and a lower quality of life. Patients who have BMI > 50 kg/m² in particular have greater problems with stress, physical and mental health (8). Fear of recurrence is also associated with a lower quality of life. Factors that can affect fear of recurrence include aging, physical illness, stress, and low quality of life (9).

The above information suggests that important factors for cancer patients include not only the treatment of the cancer but also the side effects after treatment, including being worried about recurrence. Researchers have noticed the importance of studying the quality of life of endometrial cancer patients treated at Maharaj Nakorn Chiang Mai Hospital and of efficiently using that quality-of-life information to benefit patients.

The first objective of this research is to analyze factors affecting the quality of life of endometrial cancer patients treated at Maharaj Nakorn Chiang Mai Hospital using two quality of life questionnaires, the European Organization for Research and Treatment of Cancer Quality of Life QLQ-C30 questionnaire (EORTC QLQ-C30) and the CMU Endometrial Cancer Quality of Life questionnaire. The second objective is to compare the quality of life in early-stage (FIGO Stage I–II) and advanced stage (FIGO Stage III–IV) endometrial cancer patients.

METHODS

Study population

The study population was patients diagnosed with endometrial cancer who were treated by surgery, chemotherapy, or radiation and followed up at Maharaj Nakorn Chiang Mai Hospital during January and February 2021. All participants were given information about the research including the quality-of-life questionnaires which they would complete themselves. All participants provided written informed consent. For participants who were unable to complete the questionnaires, researchers conducted oral interviews and some patients were interviewed via telephone. Demographic data was obtained from hospital records or from interviews with the patient. Surgical and histopathological data was retrieved from medical records. The participants were divided into 2 groups: an early-stage group and an advanced stage group for quality-of-life comparisons.

Questionnaires

A Thai version of the European Organization for Research and Treatment of Cancer quality of life questionnaire (EORTC QLQ-C30) version 3.0 which has demonstrated high validity and reliability was used with the cancer patients (10). The questionnaire includes 30 items consisting of multi-item scale, single item, and a global health status scales encompassing five functional scales (Physical, Role, Cognitive, Emotional, and Social), three symptom scales (Fatigue, Pain, and Nausea and Vomiting), six symptom items (Dyspnea, Loss of Appetite, Sleep Disturbance, Constipation, and Diarrhea), plus a self-assessment of overall health status and the financial impact of the disease itself and of the treatment. A Likert scale, ranging

from 1-4 (1 = “Not at all” and 4 = “Very much”, was used to score each item and to determine an average score or “raw score”. The raw score was then converted to a scale of 0-100 using the Linear transformation equation. A high score on the functional scale and the global health status scale represents a healthy level of functioning and a good QoL. A high score on the symptom scale and the multi-item scale indicates a high level of problems (11).

The Chiang Mai University Endometrial Cancer Quality of Life Questionnaire (CMU Endometrial Cancer QoL), which was developed by our institute, includes 35 items in the quality-of-life questionnaire (12) which are divided into 4 functional systems: (1) gastrointestinal system (9 items), (2) urinary system (7 items), (3) lymphatic system (4 items), and (4) Reproductive and hormonal system (14 items). Each item is assessed on a scale of 1 to 5, with 1 indicating no symptoms and 5 indicating the most severe symptoms. The scores for each item in each system were analyzed and are shown as means and percentages. If a participant had a high percentage in a system, they were likely to have poor symptoms in that system.

Data analysis

Statistical analysis was conducted using the SPSS program with statistical significance set at a 95% confidence level. Data analyzes were divided into two parts: general patient data and patient quality of life data. General information about the patient included quantitative data such as age, weight, height, monthly income as well as important details of the endometrial cancer in each patient which are shown as mean, standard deviation, median, and interquartile range. Qualitative information such as occupation, marital status, comorbidities, current illnesses, history of treatment for endometrial cancer and concerns that the disease will come back are show as frequencies and percentages.

For correlations between factors affecting the quality of life of the endometrial cancer patients, the quality-of-life score was divided into 2 parts: quality-of-life scores and symptom scores for cancer patients. The formula is based on the EORTC QLQ-C30 version 3.0 analysis. The range of quality-of-life scores and symptom scores was from 0 to 100. Having a high functional score indicates

good quality-of-life, but a high symptom score reflects a poor quality of life. The quality-of-life scoring system for endometrial cancer patients, which was developed by the Faculty of Medicine, Chiang Mai University, computes symptom scores then analyzes the distribution of the quality-of-life scores using the One-Sample Kolmogorov-Smirnov test. If the data is normally distributed, parametric statistics were used; however, for not normally distributed data, the statistical pattern was non-parametric. For data analysis, the patients were divided into two groups according to the stage of endometrial cancer (early stage and advanced stage). The quality-of-life scores were compared between the two groups using the Mann-Whitney U test for skewed distributions. In the comparison of categorical outcome variables, odds ratios were used.

For analysis of the relationship between the factors used to study the quality of life of the study groups, a sample of patients with low quality of life scores was used with linear regression to analyze each factor.

RESULTS

A total of 103 women participated in the study, with 65 in the early-stage group and 38 in the advanced stage group. Table 1 summarizes the demographic, surgical, histological characteristics, and treatment data of the participants with comparisons between the two groups. Age, BMI and parity were equal between the 2 groups. The level of income in the advanced stage group was slightly higher than in the other group. The advanced stage group also had a higher rate of chemotherapy and radiotherapy. The two groups were equally concerned about the recurrence of the disease. In terms of treatment status, the majority of patients in advanced group were currently in treatment and completed treatment in less than 2 years while the early-stage group was in completed treatment, especially in less than 2 years.

Comparison between the two groups by EORTC QLQ-C30 scores, shown in Table 2, found no statistically significant difference in global health status/QoL scale, while participants in the early-stage group showed statistically significantly higher scores only in cognitive functioning on the functional scales. There was no significant difference

Table 1. Basic characteristics of participants (n=103)

Characteristics	Overall	Stage		p-value
		Early (n=65)	Advanced (n=38)	
Age (years)	59.7±9.1	59.4±9.3	60.1±8.9	0.701
Age at diagnosis (years)	56.7±9.4	56.2±10.0	57.5±8.3	0.494
BMI	24.6 (21.9-28.5)	24.5 (21.9-28.3)	24.6 (21.9-28.5)	0.896
Parity				0.836
0	33 (32.3)	20 (31.7)	13 (33.3)	
1	13 (12.1)	10 (14.3)	3 (8.3)	
2	38 (38.4)	23 (36.5)	15 (41.7)	
≥3	19 (17.2)	12 (17.5)	7 (16.7)	
Median (IQR)	2 (0-2)	2 (0-2)	2 (0-2)	0.942
Occupation				0.274
None	33 (32.0)	18 (27.7)	15 (39.5)	
Government officer/retired	27 (26.2)	20 (30.8)	7 (18.4)	
Company employee	2 (1.9)	2 (3.1)	0 (0.0)	
Self-employed	19 (18.4)	14 (21.5)	5 (13.2)	
General employee	9 (8.7)	4 (6.2)	5 (13.2)	
Others	13 (12.6)	7 (10.8)	6 (15.8)	
Income group (Baht)				0.182
None	9 (12.3)	3 (6.8)	6 (20.7)	
< 10,000	27 (37.0)	15 (34.1)	12 (41.4)	
10,001-20,000	14 (19.2)	9 (20.5)	5 (17.2)	
>20,000	23 (31.5)	17 (38.6)	6 (20.7)	
Median (IQR)	12,000 (2,000-30,000)	15,000 (3,250-32,500)	8,000 (500-20,000)	0.120
Marital status				0.078
Married	62 (60.2)	43 (66.2)	19 (50.0)	
Single	21 (20.4)	13 (20.0)	8 (21.1)	
Divorced	6 (5.8)	1 (1.5)	5 (13.2)	
Widowed	14 (13.6)	8 (12.3)	6 (15.8)	
Prior hormonal Replacement therapy				0.0006*
No	96 (93.2)	64 (98.5)	32 (84.2)	
Yes	7 (6.8)	1 (1.5)	6 (15.8)	
Surgery				0.786
TAH	1 (1.0)	1 (1.6)	0 (0.0)	
TAH & BSO	91 (88.0)	56 (87.5)	35 (92.1)	
TAH c Lt. SO	1 (1.0)	1 (1.6)	0 (0.0)	
TLH & BSO	8 (8.7)	5 (6.3)	3 (8.3)	
TVH c BSO	1 (1.0)	1 (1.6)	0 (0.0)	
TVH c laparoscopic BSO	1 (1.0)	1 (1.6)	0 (0.0)	
LN dissection				0.903
No	39 (38.6)	25 (39.1)	14 (37.8)	
Yes	64 (61.4)	40 (60.9)	24 (62.2)	
Histopathology				<0.009*
Type 1	53 (51.0)	39 (60.0)	14 (35.1)	
Type 2	31 (30.4)	13 (20.0)	18 (48.6)	
Others	19 (18.6)	13 (20.0)	6 (16.2)	
Metastases				<0.001*
No	59 (58.1)	53 (82.0)	6 (15.7)	
Yes	44 (41.9)	12 (18.0)	32 (84.2)	

Table 1. Basic characteristics of participants (n=103) (continued)

Characteristics	Overall	Stage		p-value
		Early (n=65)	Advanced (n=38)	
Chemotherapy				<0.001*
No	48 (46.6)	45 (69.2)	3 (7.9)	
Yes	55 (53.4)	20 (30.8)	35 (92.1)	
Number of chemotherapies	2 (0-6)	0 (0-2)	6 (5.5-6)	<0.001*
Radiotherapy				0.009*
No	47 (45.6)	36 (55.4)	11 (28.9)	
Yes	56 (54.4)	29 (44.6)	27 (71.1)	
Concerned about recurrence				0.751
No	65 (63.6)	41 (62.5)	24 (63.1)	
Yes	38 (36.4)	24 (37.5)	14 (36.8)	
Treatment status				0.071
Current treatment	16 (15.5)	7 (10.7)	9 (23.6)	
Complete treatment <2 year	51 (49.5)	30 (46.1)	21 (55.2)	
Complete treatment ≥2 year	36 (35.0)	28 (43.1)	8 (21.2)	

Data is expressed as frequency (percentage); SD, standard deviation; IQR, interquartile range; p-value was computed using the Chi-square test for categorical variables, T-test and Mann-Whitney U test for continuous variables with and without normal distribution respectively;

*Statistically significant $p < 0.05$.

Table 2. Characteristics of EORTC QLQ-C30 scores in women with early versus advanced endometrial cancer (n=103)

Questionnaire scores	Overall	Stage		p-value
		Early (n=65)	Advanced (n=38)	
Global health status/QoL	83.3 (75-91.7)	83.3 (75-91.7)	83.3 (66.7-91.7)	0.052
Functional scales				
Physical functioning	93.3 (80.0-100.0)	93.3 (80.0-100.0)	93.3 (80.0-100.0)	0.477
Role functioning	100.0 (83.3-100.0)	100.0 (100.0-100.0)	100.0 (83.3-100.0)	0.181
Emotional functioning	100.0 (83.3-100.0)	100.0 (83.3-100.0)	100.0 (83.3-100.0)	0.808
Cognitive functioning	100.0 (83.3-100.0)	100.0 (83.3-100.0)	83.3 (83.3-100.0)	0.007*
Social functioning	100.0 (100.0-100.0)	100.0 (100.0-100.0)	100.0 (83.3-100.0)	0.194
Symptom scales/items				
Fatigue	0.0 (0.0-22.2)	0.0 (0.0-22.2)	0.0 (0.0-22.2)	0.868
Nausea and vomiting	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.364
Pain	0.0 (0.0-16.7)	0.0 (0-16.7)	16.7 (0-16.7)	0.094
Dyspnea	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.649
Insomnia	0.0 (0.0-33.3)	0.0 (0.0-33.3)	0.0 (0.0-33.3)	0.661
Appetite loss	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.640
Constipation	0.0 (0.0-33.3)	0.0 (0-33.3)	0.0 (0.0-0.0)	0.728
Diarrhea	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.963
Financial difficulties	0.0 (0.0-33.3)	0.0 (0.0-0.0)	0.0 (0.0-33.3)	0.051
QLQ-C30 summary score	93.7 (86.3-98.5)	95.5 (88.5-99.5)	91 (81.6-97.4)	0.036*

Data was expressed by median (interquartile range); p-value was performed using Mann-Whitney U test;

*Statistically significant $p < 0.05$.

between the two groups in any of the nine symptom scales/items. The QLQ-C30 summary score was significantly higher in the early-stage group than in the advanced stage group.

CMU endometrial cancer QoL scores were also compared between the early and the advanced stage groups. Participants with advanced disease had significantly higher (worse) scores in

the sexual/hormonal domain (total domain score and two of fourteen item scores) than those with early disease. The scores for the other domains were similar, with no statistically significant differences between the two groups (Table 3).

Multivariable analysis (Table 4) showed that recurrence had a negative impact on the QLQ-C30

summary score (adjusted β , 95% confidence interval (CI): -10.04, -14.49 to -5.59) and on domain I (adjusted β , 95% CI: 5.00, 1.40 to 8.60) of the CMU Endometrial Cancer QoL scores. Current treatment was associated with lower CMU Endometrial Cancer QoL scores in domain I (adjusted β , 95% CI 6.37, 1.63 to 11.12) and domain IV (adjusted β ,

Table 3. Comparison of CMU Endometrial Cancer QoL scores between Early stage and Advanced stage group (n=103)

Questionnaire scores	Overall	Stage		p-value
		Early (n=65)	Advanced (n=38)	
Domain I (gastrointestinal) score	27.8 (25-33.3)	27.8 (25-33.3)	27.8 (25-36.1)	0.652
I1 I have felt a loss of appetite	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	0.256
I2 I have felt nauseous/vomited	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.543
I3 I have had abdominal cramping while resting	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.970
I4 I have had anal cramping while resting	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.331
I5 I have been constipated	1.0 (1.0-1.0)	1.0 (1.0-2.0)	1.0 (1.0-2.0)	0.566
I6 I have had diarrhea	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.446
I7 I have had anal pain while passing stool	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.375
I8 I have had blood in stool	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.897
I9 I have had difficulty in holding stool	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.402
Domain II (urinary) score	28.6 (25-35.7)	28.6 (25-32.1)	28.6 (25-35.7)	0.857
II1 I have had difficulty in passing urine	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.213
II2 I have had difficulty in completely emptying bladder	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.983
II3 I have had to urinate more frequently	1.0 (1.0-2.0)	1.0 (1.0-2.0)	1.0 (1.0-2.0)	0.813
II4 I have had a burning sensation while passing urine	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.459
II5 I have had blood in urine	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.878
II6 I have had leaking of urine while coughing, sneezing, laughing, or lifting heavy objects	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	0.387
II7 I have had a sudden urge to urinate and was unable to hold it	1.0 (1.0-2.0)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	0.100
Domain III (lymphatic) score				
III1 I have felt heavy or weighed down leg	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	0.173
III2 I have had leg swelling	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.269
III3 I have had genital swelling	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.611
III4 I have had abdominal wall swelling	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.133
Domain IV (sexual/hormonal) score				
IV1 I have had bleeding from vagina	34.5 (30.0-40.0)	30.2 (28.4-36.3)	37.5 (30.0-45.0)	0.020*
IV2 I have had abnormal discharge or foul smell from vagina	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.600
IV3 I have had soreness at vagina while resting.	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.728
IV4 I have had hot flushes or sweating.	1.0 (1.0-2.0)	1.0 (1.0-2.0)	1.0 (1.0-2.0)	0.126
IV5 I have had numbness at my fingers or toes.	2.0 (1.0-3.0)	1.0 (1.0-2.0)	3.0 (1.0-4.0)	0.621
IV6 Frequency of sexual intercourse.	1.0 (1.0-2.0)	1.0 (1.0-2.0)	1.5 (1.0-2.0)	0.002*
IV7 I have been afraid of having sexual intercourse	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.854
IV8 I have felt that I am physically not attractive	3.0 (2.0-4.0)	3.0 (1.0-4.0)	2.5 (2.0-3.0)	0.482
IV9 I have had a loss of desire for sexual activity	2.0 (1.0-4.0)	2.0 (1.0-4.0)	2.5 (1.0-4.0)	0.879
IV10 I have felt dry vagina while having sexual intercourse	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.874
IV11 I have felt disappointed concerning orgasm	1.0 (1.0-2.0)	1.0 (1.0-2.0)	4.0 (4.0-4.0)	0.706
IV16 I have felt short/tight vagina	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.010*
IV17 I have felt inflexible vagina	1.0 (1.0-2.0)	1.0 (1.0-2.0)	2.0 (1.0-3.0)	0.580
IV14 I have had pain in vagina during sexual intercourse	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	0.614
				0.715

Data was expressed by median (interquartile range); p-value was performed using Mann-Whitney U test;

*Statistically significant $p < 0.05$.

Table 4. Factors associated with EORTC QLQ-C30 scores, and CMU Endometrial Cancer QoL scores

Outcome	Multivariable analysis		
	predictors	adjusted β (95% CI)	p-value
QLQ-C30 summary score	Number of chemotherapy	-0.79 (-1.47 to -0.10)	0.03
	Concerning of recurrence	-10.04 (-14.49 to -5.59)	<0.01
Domain I	Concerning of recurrence	5.00 (1.40 to 8.60)	<0.01
	Current treatment	6.37 (1.63 to 11.12)	<0.01
Domain II	Histopathology		0.03
	Type 1	Ref	
	Type 2	0.90 (-3.24 to 5.05)	
	Others	-5.93 (-10.83 to -1.03)	
Domain III	Metastasis	7.95 (2.13 to 13.77)	<0.01
	Concerning of recurrence	7.26 (1.35 to 13.18)	0.02
Domain IV	Histopathology		0.01
	Type 1	Ref	
	Type 2	0.88 (-3.94 to 5.69)	
	Others	-7.92 (-13.70 to -2.15)	
	Current treatment	9.99 (4.48 to 15.50)	<0.01

The factors associated with outcome were analyzed using univariable linear regression. Factors with $p \leq 0.10$ were used in the multivariable logistic regression model. Backward elimination was used for considering associated factors with $p \leq 0.05$

95% CI 9.99 (4.48 to 15.50). Metastasis was associated with lower Domain III scores on the CMU Endometrial Cancer QoL (adjusted β , 95% CI 7.95 (1.35 to 13.18)). However, histopathology and the number of chemotherapy regimens were independent predictive factors for quality of life outcomes.

DISCUSSION

According to the study, endometrial cancer patients had a good quality of life, as assessed by the EORTC QLQ-C30 questionnaires. The survivors of endometrial cancer had a median score of 83.3 out of 100 on the EORTC global health status/QoL scale. There was no difference in functional scale scores between the early and advanced stage groups. For the symptom scales, the patients in the advanced-stage group had more pain problems (16.7 from 100) but the difference was not statistically significant. The advanced stage group had a statistically significantly worse quality of life compared to the early-stage group, as shown by the QLQ-C30 summary score. The CMU Endometrial Cancer QoL scores found that the advanced stage group had more problems related to domain 4 (sexual/hormonal), which included numbness of hands and feet and disappointment in orgasm, than the early-stage group. The quality of life prediction factors from

the EORTC QLQ-C30 scores were the number of chemotherapy sessions and the patient's level of concern about recurrence. In the domains of the CMU Endometrial Cancer QoL scores, factors which could predict scores in each of the domains were concern about recurrence (domains 1 and 3), current treatment (domains 1 and 4), metastasis (domain 3), and histology (domains 2 and 4).

The most frequent adjuvant therapies in the advanced stage group following comprehensive surgery were radiotherapy, chemotherapy, or both. Patients receiving chemotherapy may experience neuropathy which can include numbness and tingling in the fingers and toes. However, late complications are rare with radiotherapy (13, 14). This study found significantly lower EORTC QLQ-C30 cognitive functioning scale scores in the advanced stage group which could have been a result of chemotherapy-induced cognitive impairment. Jeffrey et al. reported on potential mechanisms of neurologic injury caused by chemotherapy, including direct injury to both cerebral gray and white matter, as well as microvascular injury, which can lead to cognitive impairment (15).

Current treatment, i.e., chemotherapy or radiation therapy, significantly worsens the quality of life of endometrial cancer patients in the gastrointestinal and sexual/hormonal domains. Their side effects, e.g., nausea/vomiting, constipation,

loss of hair, and mucositis, might cause patients to be uncomfortable and impair their self-image (16).

Most of the patients in the study had had a lymphadenectomy during comprehensive surgical staging, especially those with advanced stage and type 2 histology which caused lymphedema with different levels of severity of swelling. In cases of metastasis of cancer, lymph nodes are one of the most frequent locations of recurrence where lymphedema would worsen. The patient might suffer from leg swelling, have to wear compression stockings, worry about their symptoms, and have a greater number of medical appointments, all of which can affect the patients' quality of life (17).

The histopathology of endometrial cancer is also associated with the quality of life of the patients. Patients with high grade or type 2 endometrial cancer had a worse quality of life in terms of socio-economic, psychological, and physical factors (18). Type 2 endometrial cancer has an aggressive manner which is associated with higher stages and the need for more adjuvant chemotherapy and radiotherapy, resulting in some adverse consequences.

CONCLUSIONS

Women with endometrial cancer generally have a good quality of life. Survivors in advanced stages may have a quality of life similar to those in the early stage, but with more frequent gastrointestinal, sexual, and hormonal complications.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

ADDITIONAL INFORMATION

Author contributions

Conceptualization, C.M., N.S., N.P., W.T., C.S., C.T., and D.J.; proposal development, C.M., N.S., N.P., W.T., and C.S.; study design, C.M., N.S., N.P., W.T., C.T., and D.J.; data collection, C.M., N.S., N.P., and W.T.; data validation, C.S., C.T., and D.J.; formal analysis, C.T., and D.J.; manuscript writing, C.M., N.S., N.P., and W.T.; manuscript editing, C.S., C.T., and D.J.; supervision, C.S., C.T., and D.J. All authors have read and agreed to the published version of the manuscript.

Data availability statement

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

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