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ORIGINAL ARTICLE

Sexual function, depression, and quality of life in patients with cervical cancer

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Abstract
Purpose The purpose of this study was to examine the level of sexual function, depression, and quality of life in cervical cancer patients.
Methods This descriptive, correlational, cross-sectional study was conducted at E Hospital, Seoul. A total of 137 women diagnosed with cervical cancer completed a structured questionnaire. Sexual function was measured with the Female Sexual Function Index (FSFI), depression with the Hospital Anxiety and Depression Scale (HADS), and quality of life with the Functional Assessment of Cancer Therapy–General version 4 (FACT-G). Descriptive statistics, ANOVA, Scheffé's tests, and Pearson correlations were computed with SPSS Win 21.0.
Results The participants experienced sexual dysfunction (4.83±4.16) and moderate to severe depression (11.08±5.06). The mean score of quality of life was 57.33±8.47. Sexual function had a negative relationship with depression, while having a positive one with quality of life ($p<.001$). Also, in relation with subcategories of quality of life, sexual function was positively correlated with physical well-being, social well-being, and functional well-being ($p=.001$), but not with psychological well-being ($p=.223$).
Conclusion This study showed that cervical cancer patients with lower sexual function tended to have lower quality of life and higher levels of depression. Thus, clinical nurses should develop and implement interventions to enhance sexual function for patients diagnosed with cervical cancer.

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Introduction

Cervical cancer, especially invasive cervical cancer, is one of the top 7 cancers for women in Korea, occurring in 3728 cases in 2011 [1]. Once a person is diagnosed with invasive cervical cancer, treatment depends on the patient's age, health status, and degree of metastasis; according to the stage of disease and tumor size, chemotherapy, radiotherapy, or concurrent chemoradiotherapy are considered for treatment. For patients experiencing the primary and early secondary stages of cervical cancer, a radical hysterectomy is performed to remove the uterus, ovary, Fallopian tubes, parametrium tissue, upper vagina, and pelvic lymph nodes. For cases diagnosed in an early stage, patients can be effectively treated with this regimen; however, they experience early menopause due to oophorectomy or chemoradiotherapy that degrades ovarian function. Consequently, patients experience reduced lubrication during intercourse, lower sexual desire, and insensitive arousal after initiating intercourse. This may result in various sexual disorders in the middle or end of treatment and negatively affects quality of life for these women [2–4].

Sexual function is an important element of quality of life [5]. Patients with gynecologic cancer have negative perceptions of sexual self-concept, sexual relationships, and sexual function; their problems must be approached within a multilayered structure of biological, sociological, and psychological care [6].

Most studies focus on physical rather than psychological changes and social effects of disease and its treatment. Greater psychosocial difficulties compared to other cancers, including the loss of the ability to bear children and the potential effect

on female identity, mean that the health care professionals must consider possible psychological, social, and sexual issues when treating women with gynecologic cancer [7].

The diagnosis and treatment of cancer is a major stressor that is known to cause or worsen anxiety and depression; patients with cancer experience a level of depression that is three times higher than that of normal adults [8]. In case of the patients with cervical cancer, human papilloma virus, a sexually transmitted infection, is known to be the major cause of the disease; thus, the illness is negatively perceived from the moment of diagnosis. This psychological distress may increase the level of depression among patients [9, 10]. Recently, depression in patients with gynecologic cancer was reported in research done in Korea; however, few studies analyzed physical and psychological symptoms such as depression and sexual dysfunction among women with cervical cancer.

In recent years, early diagnosis of cancer has improved, survival rates of cancer patients have increased, and survivors wish to live their lives normally after cancer treatment. For survivors of gynecologic cancer, the occurrence of problems related to sexuality is high, and this affects their quality of life and spousal relationship [11]. Although many studies have investigated depression and loss of female identity after surgery among patients with gynecologic cancer, little research has been conducted on sexual function and quality of life. To provide effective interventions for these patients, research is needed on sexual function and level of depression among cervical cancer patients who have a high risk of sexual issues caused by treatment of their disease. Thus, the purpose of this study was to examine sexual function, levels of depression, and quality of life in patients with cervical cancer and determine the relationships among these variables.

Methods

Study design

This study used a descriptive, correlational, and cross-sectional design, conducted with women with a history of cervical cancer treated at E University Hospital, Seoul. This study obtained the approval of the Institutional Review Board (ETC 14-01A-02) of E University Hospital, and written consent was received from each study participant.

Participants

A total of 137 women were selected. Inclusion criteria were as follows: (1) women who were diagnosed with cervical cancer, (2) age between 21 and 59 years, (3) had been treated with surgery more than 2 months before the survey, and (4) for patients who received radiotherapy, treatment terminated at least 1 month before the survey [12].

Measures

Demographic characteristics, disease-related characteristics, sexual function, depression, and quality of life data were collected.

Sexual function

To measure sexual function, a Korean translation of the Female Sexual Function Index (FSFI) was used [13, 14]. This 19-item questionnaire contains two items on sexual desire, four items on arousal, four items on lubrication, three items on orgasm, three items on satisfaction, and three items on pain. The total score of sexual function ranges from a minimum of 1.2 points to a maximum of 36 points; higher scores imply higher sexual function. Cronbach's α was .97 [14] and it was .98 in this study.

Depression

A Korean translation of the Hospital Anxiety and Depression Scale (HADS) was used to measure levels of depression [14, 15]. This is composed of seven items from the Hospital Anxiety and Depression Scale–Anxiety (HADS-A) and seven items from Hospital Anxiety and Depression Scale–Depression (HADS-D). It is a four-point Likert scale ranging from 0 (no symptom) to 3 (severe symptom) for each item. A total of 21 points are respectively available for anxiety and depression. Scores between 0 and 7 points indicate an absence of anxiety and depression. Mild anxiety and depression are present with scores between 8 and 10 points and moderate anxiety and depression are present with scores between 11 and 21 points. Cronbach's α was .89 in prior testing [15]. Cronbach's alpha was calculated to be .91 in this study.

Quality of life

Quality of Life (QoL) was measured with use of the Korean Functional Assessment of Cancer Therapy–General Version 4 (FACT-G) [16]. This instrument is composed of a total of 26 items with four subcategories: physical well-being (PWB), social well-being (SWB), emotional well-being (EWB), and functional well-being (FWB). It is a five-point Likert scale ranging from 0 (never) to 4 points (always) for each item. Higher scores indicate higher quality of life. Cronbach's α was .92 [16] and it was calculated to be .71 in this study.

Statistical analysis

The data were analyzed using SPSS WIN version 21.0 (SPSS, IBM Inc., Chicago, IL), and the significance level was set to be $p<.05$. The demographic and disease-related characteristics of the subjects were analyzed through percentages, means,

and standard deviations. Sexual function, depression, and quality of life were analyzed using means and standard deviations. The difference in sexual function, depression, and quality of life depending on the subjects' demographic and disease-related characteristics was analyzed with *t* test and ANOVA while conducting a Scheffé test for the post hoc analysis. Finally, the correlation between sexual function, depression, and quality of life was analyzed through use of the Pearson correlation coefficient, *r*.

Results

Demographic and disease-related characteristics are shown in Table 1. The mean age of the 137 participants was 47.82± 7.89 years, ranging from 28 to 59; 46.7 % of the participants were in their 50s. Regarding marital status, 108 participants (78.8 %) reported that they were married; divorced, widowed, or unmarried was the status of 29 participants (21.2 %). As for employment status, 104 were unemployed (75.9 %) whereas 35 (24.1 %) reported being employed. Regarding the primary caregiver after diagnosis, 66 participants (48.2 %) said their spouses, followed by a child for 30 (21.9 %), parents for 26 (19.0 %), and other caregivers (health caretaker or friend) for 15 (10.9 %).

As for the disease-related characteristics among participants, 114 (83.2 %) were in FIGO stage I, 20 (14.6 %) in stage II, one (0.7 %) in stage III, and two (1.5 %) in stage IV. Regarding treatment, 82 (62.0 %) received surgery only, 22 (16.1 %) received concurrent chemoradiotherapy after surgery, 13 (9.5 %) received concurrent chemotherapy and radiotherapy without surgery, 12 (8.8 %) received radiotherapy after surgery, and 5 (3.6 %) received chemotherapy after surgery.

Among the 124 participants who underwent surgery, there were 101 cases (73.7 %) of radical hysterectomy and 23 cases (16.8 %) of general hysterectomy. Types of anticancer drug prescribed to the 43 participants who received chemotherapy included fluorouracil and cisplatin (n=6; 19.0 %), cisplatin-based drug (weekly cisplatin and tri-weekly cisplatin; n=11; 8.0 %), and paclitaxel and carboplatin (n=6; 4.4 %). Treatment methods for the 47 subjects who received radiotherapy included both external beam radiotherapy and brachytherapy (internal radiation; n=39; 28.5 %).

The subjects' scores of FSFI, HADS, and FACT-G are shown in Table 2. The mean score on sexual function was 4.83±4.16 points; all the subjects fell into the group with a high risk of sexual dysfunction. The mean scores of sexual function in the subcategories were 1.53±0.67 points for sexual desire, 1.32±0.64 points for satisfaction, 0.52±0.88 points for sexual arousal, 0.49±0.86 points for pain during intercourse, 0.50±0.82 points for orgasm, and 0.46±0.75 points for lubrication.

Table 1 Demographic and clinical characteristics (N=137)

Characteristics	Number	Percent	M±SD
Age (years)			47.87±7.89
20–39	24	17.5	
40–49	49	35.8	
50–59	64	46.7	
Education			
<High school	98	71.5	
>College	39	28.5	
Marital status			
Married	108	78.8	
Divorce, single, bereavement	29	21.2	
Job			
Yes	33	24.1	
No	104	75.9	
Religion			
Yes	74	54.0	
No	63	46.0	
Economic status (won)			
≤3,000,000	32	23.3	
3,000,000–4,000,000	76	55.5	
≥4,000,000	29	21.2	
Main caregiver			
Spouse	66	48.2	
Parents	26	19.0	
Children	30	21.9	
Others	15	10.9	
Stage (FIGO)			
Stage I	114	83.2	
Stage II	2	14.6	
Stage III	1	0.7	
Stage IV	2	1.5	
Type of carcinoma			
Squamous cell carcinoma	100	73.0	
Adenocarcinoma	37	28.0	
Type of treatment			
Operation only	85	62.0	
Operation+radiotherapy	12	8.8	
Operation+chemotherapy	5	3.6	
CCRT	13	9.5	
Operation+CCRT	22	16.1	
Type of surgery			
Simple hysterectomy	23	16.8	
Radical hysterectomy	101	73.7	
No surgery	13	9.5	
Chemotherapy drug			
FP	26	19.0	
WP, Tri WP	11	8.0	
TC	6	4.4	
No chemotherapy	94	68.6	
Type of radiotherapy			

Table 1 (continued)

Characteristics	Number	Percent	M±SD
ERT	7	5.1	
ICR	1	0.7	
ERT+ICR	39	28.5	
No radiotherapy	90	65.7	

CCRT concurrent chemoradiotherapy, *ERT* external radiotherapy, *FP* fluorouracil+cisplain, *ICR* intracavitary radiation, *TC* paclitaxel+carboplatin, *Tri WP* tri-weekly cisplatin, *WP* weekly cisplatin

The mean depression score was 11.08±5.06 points; 31 participants (22 %) were not depressed, whereas 46 (32.6 %) had a slight level of depression. However, 64 participants (45.4 %) had more than a moderate level of depression.

The mean QoL score was 57.33±8.47 points. QoL was composed of four subcategories, and upon inspection of each mean score, physical well-being (PWB) was highest with 16.91±3.21 points, followed by functional well-being (FWB; 14.47±4.51), emotional well-being (EWB; 14.00±2.41), and social well-being (SWB; 11.95±2.25).

Discussion

Sexual function, depression, and quality of life and their relationships to demographic characteristics are shown in Table 3; younger age is correlated with higher sexual function. This result supports the findings of the study conducted by Chun and Park (2006) [17] which reported greater sexual dysfunction for patients with gynecologic cancer with increasing age. Scores for sexual function had statistically significant differences according to marital status, educational background, and employment status; those who were married, with a high level of education, and were employed had higher sexual function scores. This outcome is congruent with the results of studies by Chun (2010) and Park (2012) who reported higher sexual function among women with gynecologic cancer who were employed. For these women, it may be that they can relatively easily obtain information in their social lives which fosters their recovery of sexual function after treatment [18, 19].

Table 2 Sexual function, depression, and quality of life (*N*=137)

Variables	Possible range	Min	Max	M±SD
Sexual function	1.2-36.0	2.0	23.6	4.83±4.16
Desire	1.2-6.0	1.2	3.6	1.53±0.67
Arousal	0-6.0	0.0	3.6	0.52±0.88
Lubrication	0-6.0	0.0	3.6	0.46±0.75
Orgasm	0-6.0	0.0	4.0	0.50±0.82
Satisfaction	0-6.0	0.8	4.4	1.32±1.64
Pain	0-6.0	0.0	4.4	0.49±0.86
Depression	0-21	1.0	19.0	10.39±3.89
Quality of life total	0-130	34	95	57.33±8.47
Physical well-being	0-35	9	24	16.91±3.21
Social well-being	0-30	6	19	11.95±2.25
Emotional well-being	0-30	8	19	14.00±2.41
Functional well-being	0-35	6	21	14.47±4.51

The scores on the sexual function scale had statistically significant differences depending on the primary caregiver. According to the post hoc analysis, the group whose primary caregivers were parents had a higher sexual function than the group whose primary caregiver was a child. Those who had a child as the primary caregiver were older than the group with parents as primary caregivers which corresponds with the study finding that increased age is related to sexual dysfunction.

Depression scores had statistically significant differences when compared to employment status. Those who were working were less depressed than those who were unemployed. Previous research has shown that chemoradiotherapy is related to anxiety and depression; in this study, depression scores were higher for those receiving concurrent chemoradiotherapy compared to depression scores for those receiving surgery or radiotherapy. In addition, patients with advanced cervical cancer experienced higher depression levels than those in the early stage of the disease [20]. Disease stage and complexity of treatment have been reported to increase the degree of depression. However in this study, there was no significant difference in depression scores depending on disease stage and or level of treatment of cervical cancer. Rather, the degree of depression in this study was shown to be higher compared to the results derived in previous studies and seems to be due to the difference in stage and method of treatment for cervical cancer.

QoL among younger participants was higher compared that among older participants. This contradicts the results of two previous studies, which found no difference in QoL depending on age in a study that was conducted for hospitalized cancer patients who received chemotherapy, and patients with gynecologic cancer [21, 22]. Another study compared the QoL among patients with cervical cancer receiving chemotherapy who received the independent administration of cisplatin-based anticancer drugs or a combination of a cisplatin- and a paclitaxel-based anticancer drug. The result showed that there was no significant difference between the two groups and overall QoL was higher than that of this study [23].

The results of the analysis of the correlation of sexual function, depression, and quality of life among participants are shown in Table 4. Sexual function showed a statistically

Table 3 Differences in sexual function, depression, and quality of life by participants' characteristics

Characteristics	Categories	Sexual function				Depression				Quality of life			
		M±SD	*t/F*	*p*	Scheffe	M±SD	*t/F*	*p*	Scheffe	M±SD	*t/F*	*p*	Scheffe
Age (years)	20–39[a]	10.75±4.62	62.249	<.001**	a>b>c	8.79±3.54	2.585	.079		62.08±10.02	5.440	.005**	a>c
	40–49[b]	4.70±3.45				10.59±4.19				57.24±8.21			
	50–59[c]	2.70±1.57				10.84±3.67				55.64±7.42			
Education	<High school	4.31±3.49	–2.322	.022*		10.33±3.68	–.321	.748		57.32±7.91			
	>College	3.11±5.33				10.56±4.43				57.36±9.84			
Marital status	Married	5.22±4.22	2.714	.031*		10.46±3.85	.398	.691		57.49±8.82			
	Divorce, single, bereavement	3.36±3.63				10.14±3.70				56.72±7.11			
Work	Yes	7.99±5.37	5.546	<.001**		8.58±3.97	–3.183	.002**		55.48±7.71	0.900	.370	
	No	3.82±3.10				10.97±3.70				56.96±8.70			
Main caregiver	Spouse[a]	5.22±4.02	3.564	.016*	b>c	10.44±3.69	.0043	.988		58.50±9.08	1.404	.245	
	Parents[b]	6.12±5.52				10.15±4.11				57.04±7.52			
	Children[c]	2.82±1.71				10.43±4.13				54.73±7.22			
	Others[d]	4.84±4.46				10.39±3.89				57.87±9.12			
Chemotherapy drug	FP	4.35±3.42	3.847	.030*		10.69±4.06	2.369	.107		57.81±9.00	2.502	.095	
	Cisplatin (WP, Tri WP)	2.32±0.54				11.00±3.44				52.27±9.00			
	TC	7.28±6.39				7.17±3.06				59.17±8.52			

FP flurouracil+cisplatin, *TC* placlitaxel+carboplatin, *Tri WP* tri-weekly cisplatin, *WP* weekly cisplatin

Table 4 Correlations among sexual function, depression, and quality of life (N=137)

Variables	Sexual function	Depression	Quality of life				
			PWB	SWB	EWB	FWB	Total
Sexual function		−.408** (<.001)	.304** (<.001)	.243** (0.004)	−.105 (0.223)	.287** (0.001)	.303** (<0.001)
Depression	−.408** (<0.001)		.029 (0.739)	.018 (0.832)	−.003 (0.971)	.036 (0.673)	.034 (0.691)

PWB physical well-being, *SWB* social well-being, *EWB* emotional well-being, *FWB* functional well-being

significant correlation with depression and quality of life, while there was no statistically significant correlation of depression with quality of life. This finding contradicts the result of a US study that reported a correlation between depression and quality of life, in which 63 % of the patients with cervical cancer were depressed [22].

The issue regarding sexual function is one of the critical matters to cervical cancer patients who are more than 60 years old. Since this study assessed cervical cancer patients who were between 21 and 59 years of age, the results may be limited and not generalizable. Although there have been many changes in the surgical techniques used for cervical cancer treatment, such surgical methods were not considered in this study. Therefore, it is recommended that future studies should consider the inclusive age frame of cervical cancer patients, specifically those who are more than 60 years old. Other variables such as new surgical methods should also be included as variables.

Conclusion

The purpose of the study was to examine sexual function, depression, and quality of life among cervical cancer patients. The correlation among these factors was also examined. In conclusion, sexual function of the subjects was low and about 45.4 % of them experienced more than a moderate level of depression. On the other hand, cervical cancer patients with high sexual function tended to have low levels of depression and exhibited a higher quality of life. This finding signals an urgent need for treatment interventions. Once sexual function is improved through an effective nursing intervention that provides proper and accurate information, levels of depression can be decreased while increasing QoL in these patients. In the clinical setting, specialized education that considers the relationships among these characteristics is currently not provided. In addition, it is difficult to ascertain in advance which problems with sexual function may emerge during or after treatment. Nurse practitioners should be the ones to provide active counseling and conduct education programs for these women.

Conflict of interest The authors declare that they have no conflict of interest.

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