Quality of Life and Self-Esteem of Long-Term Survivors of Invasive and Noninvasive Cervical Cancer

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Abstract

Objective: We compared long-term survivors of invasive and noninvasive cervical cancer (1) to determine if there are differences in the quality of life (QOL) and (2) to assess the association between self-esteem and QOL.

Methods: A sample of cervical cancer survivors diagnosed with invasive and noninvasive cervical cancer during 1995–1996 was drawn from the metropolitan Detroit Surveillance, Epidemiology, and End Results (SEER) cancer registry. There were 145 participating survivors, 42 with invasive and 103 with noninvasive cervical cancer. Data were collected using a structured interview, conducted primarily over the telephone. The outcome measures were the QOL (measured by the Medical Outcomes Study Short Form-36 [SF-36]) summary scales, the Physical Component Summary (PCS) score and the Mental Component Summary (MCS) score. Differences in MCS and PCS between women with invasive and noninvasive cancer were determined using analysis of covariance (ANCOVA). Multivariate analysis was performed to determine the association between self-esteem and MCS and PCS.

Results: There were no differences in either PCS or MCS scores between long-term survivors of invasive and noninvasive cervical cancer. Self-esteem was associated with MCS but not with PCS in women with invasive cancer as well as in women with noninvasive cancer.

Conclusions: The distinctive association of self-esteem with MCS but not PCS indicates that interventions for supporting and improving self-esteem may be more effective by promoting psychological well-being rather than physical well-being. Moreover, women with noninvasive cervical cancer, a group often neglected in cervical cancer studies, should also be targeted for these interventions.

Introduction

THE AMERICAN CANCER SOCIETY (ACS) estimated that in 2008 over 11,070 cases of invasive cervical cancer and about four times as many noninvasive cervical cancer cases (carcinoma *in situ*) [CIS]) would be diagnosed in the United States.¹ When diagnosed at its earliest stage, the 5-year survival rate for invasive cervical cancer approaches 100%. Survival drops to 92% for locally advanced disease and is approximately 73% when all invasive stages are combined. As survival rates of cervical cancer patients increase, studies on long-term quality of life (QOL) of cervical cancer survivors are of growing interest.²

In a review of QOL studies of long-term survivors of cervical cancer, Vistad et al.² indicated a need to investigate the risk factors associated with QOL in cervical cancer patients, and Schover³ underscored the importance of studying these

factors in order to design appropriate intervention programs. Only a few studies have examined the role of demographic and disease characteristics^{4,5} and the effects of psychosocial factors, such as distress, social support, spiritual well-being and maladaptive coping,⁵ and sexual self schema⁶ on QOL.

Clinical care for cervical cancer patients should address psychological needs from treatment to follow-up.⁷ Self-esteem is often considered an indicator of psychological adjustment.⁸ According to Taylor's Theory of Cognitive Adaptation, self-esteem is one of the cognitive factors that directly affects psychosocial adjustment.⁹ In a review of the relationship between self-esteem and cancer, Katz et al.¹⁰ noted that cancer may cause lowered self-esteem because of changes in bodily experience, self-concept, and personal relationships. Pedro¹¹ investigated the role of psychosocial factors (self-esteem, learned resourcefulness, social support) on health-related QOL among cancer survivors,

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predominantly breast cancer patients, 5 years postdiagnosis, and found self-esteem was the strongest predictor.

Although a number of studies have examined QOL in invasive cancer survivors, little has been reported on the QOL in those with noninvasive cancer and dysplasia. Dysplasia is defined as cervical intraepithelial neoplasia (CIN) I (mild dysplasia), CIN II (moderate to marked dysplasia), and CIN III (severe dysplasia to CIS).¹² Low self-esteem was observed at postsurgery visits in patients with CIN I, CIN II, and CIN III after colposcopic biopsy.¹³ In a study that evaluated women diagnosed with CIN I, 8% of the women reported a negative influence of disease management on self-esteem 5 years after undergoing colposcopy and biopsy.¹⁴ Even a diagnosis of mild dysplasia can affect a woman's psychological state.⁷

In their review of long-term cervical cancer survivors, Vistad et al.² found that the length of follow-up for most studies was no more than 36 months. However, studies with longer follow-up (>60 months) with comprehensive QOL assessments are needed to better understand the impact of this prevalent cancer. Moreover, considering that the incidence of noninvasive cancer is four times greater than that of invasive cancer,¹⁵ there also is a need to study QOL among this group of women. Knowledge about QOL following a cervical cancer diagnosis may be useful for improving clinical care. The current study, therefore, aims to compare survivors of invasive cervical cancer with survivors of noninvasive cervical cancer (1) to determine differences in their long-term QOL and (2) to investigate associations between self-esteem and long-term QOL.

Materials and Methods

Study design and sample

The study sample includes women diagnosed with invasive and noninvasive cervical cancer during the period 1995–1996, providing at least 5 years follow-up. The survey was conducted during 2002–2003.

Invasive cases were identified using the Metropolitan Detroit Cancer Surveillance System (MDCSS), a participant of the Surveillance, Epidemiology, and End Results (SEER) Program, which has registered and tracked survival of all newly diagnosed cancer cases in the tricity (Macomb, Oakland, Wayne) metropolitan Detroit area since 1973. The SEER database includes information on demographics, age at diagnosis, date of pathological diagnosis, anatomical site, histological diagnosis, and first course of treatment.

All living women with a histological diagnosis of invasive or noninvasive cervical cancer in the years 1995 and 1996 were eligible for the study, regardless of SEER follow-up status (i.e., lost to follow-up or actively being followed). Using year of diagnosis and disease status, women in the invasive and noninvasive groups were further matched based on age at diagnosis. Using the number of women diagnosed with invasive cervical cancer at any given age range as a limiting factor, invasive and noninvasive cases were then randomly selected. The treating or diagnosing physician was first contacted before attempting contact with the selected woman to determine if there was any reason to avoid contacting her. If there was no objection from the physician, we sent a letter to the eligible women, describing the study purpose and requesting their participation. A majority of women were interviewed over the telephone. A few women preferred to

complete a written survey; in these cases, a hard copy of the same instrument was sent out with a stamped return envelope.

There were 660 women randomly selected from the SEER database who were potentially eligible for the study, 199 women with invasive cancer and 461 women with noninvasive cancer. Of these, we were unable to locate 236 (36%), leaving a potential sample of 424. Of these, 180 were found to be either deceased, too ill to participate, or non-English speaking, leaving an eligible sample of 244. Of the 244 women, 89 (36.5%) refused to participate in the study, 4 (1.6%) did not respond, and 151 (61.9%) completed the interview.

In order to create a study group with a homogeneous treatment experience, we included in the data analysis reported here only patients treated with surgery ($n = 145$). We excluded patients treated with only radiation therapy ($n = 2$) and those who had missing treatment data ($n = 4$), leaving a final sample of 42 women with invasive and 103 women with noninvasive cervical cancer.

This study was approved by the Wayne State University Human Investigation Committee.

Study instruments

The structured interview was developed from standardized and validated questionnaire instruments. Participants were asked about possible factors that might be associated with QOL, including sociodemographics, behavioral factors, psychosocial factors, and comorbidities.

Quality of life is a multidimensional construct. The Medical Outcomes Study Short Form-36 (SF-36), with established reliability and validity, was used to assess functional health status.¹⁶ The questionnaire consisted of eight scales: limitations in physical activity because of health (physical functioning), limitations in social activities due to physical or emotional problems (social functioning), limitations in role activities due to physical health problems (role-physical), bodily pain, general mental health, limitations in role activities due to emotional problems (role-emotional), vitality, and general health perceptions. There are two summary scales: Physical Component Summary (PCS) score and Mental Component Summary (MCS) score. All eight subscales contribute to MCS and PCS; however, four subscales are dominant in MCS and four in PCS. PCS integrates the physical functioning, role-physical, bodily pain, and general health subscales; MCS integrates the mental, role-emotional, social functioning, and vitality subscales. Scoring was performed following recommended guidelines, with lower scores indicating poorer health.¹⁶

The Rosenberg Self-Esteem (RSE) scale¹⁷ was used to measure general feelings of self-respect and self-acceptance. The scale generally has high reliability; test-retest correlations are typically in the range of 0.82–0.88, and reports of Cronbach's alpha for various samples are in the range of 0.77–0.88. The scale consists of 10 items rated on a 4-point scale (1, strongly agree; 2, agree; 3, disagree; 4, strongly disagree). To score the items, we recoded the five positively worded items (e.g., I feel that I have a number of good qualities) as 1, strongly disagree; 2, disagree; 3, agree; 4, strongly agree. For the negatively worded items (e.g., I wish I could have more respect for myself), we retained the original coding. A summary score was computed; higher scores represent higher self-esteem.

The Charlson Comorbidity Index was computed using a modified comorbidity questionnaire¹⁸ based on the original medical record-based Charlson Comorbidity Index.¹⁹ The index was estimated using the algorithm proposed by Charlson et al.¹⁹ Test-retest reliability measured by the intraclass correlation coefficient was reported at 0.91.¹⁸

Considering our use of a multi-item questionnaire, missing items in a scale were handled as follows. For the SF-36 instrument, we followed the missing data guidelines in the manual.¹⁶ For scales without published procedures for missing items, we considered a scale missing when >25% of the items were unanswered; otherwise, we determined the value of the missing item in a scale by imputing the average of the answered items.²⁰

Analytical methods

The approach to data analysis started with describing the participants and their responses to the interview survey and progressed to examining bivariate associations and, finally, to multivariate modeling. Chi-square, Fisher's exact tests, or *t* tests were performed to assess differences between women with invasive and noninvasive cancer on demographics and psychosocial factors. Cronbach's alpha was used to assess the internal consistency of the SF-36 and self-esteem scales. Differences in QOL between women with invasive and noninvasive cancer were determined using analysis of covariance (ANCOVA) to adjust for demographic and medical factors that might affect these differences. We applied generalized linear models (GLM) using the SAS PROC GLM procedure in the ANCOVA analysis for correction for unequal group sizes.

In the multivariate analyses, the independent variable investigated was self-esteem, and the two dependent variables were PCS and MCS summary scores. The covariates included were age at diagnosis, age at survey, race/ethnicity, education, health insurance status, occupation, current marital status, working status, income, year of diagnosis, comorbidity, radiation therapy included in treatment, hysterectomy after treatment, relapse, and current use of hormone replacement therapy (HRT). Because there was a large proportion of missing values for the income variable (19%), it was not included as a potential confounder in the multivariate analysis.

To assess the association between self-esteem and QOL, controlling for potential confounders, multivariate regression modeling methods were implemented.²¹ The QOL variables were the SF-36 summary measures and the PCS and MCS scores, each modeled separately. Separate models were fitted for patients with invasive and noninvasive cancer.

The association of potential confounders and each of the summary measures was initially evaluated by univariate regression analyses. Variables were added to the regression model in a forward selection procedure, retaining variables that changed the regression coefficient of the independent variable by $\geq 10\%$. A *p* value of <0.05 was used to indicate statistical significance in all analyses.

Results

Participant characteristics by extent of disease

Of the 145 women in this study, 42 had a previous diagnosis of invasive cervical cancer and 103 had noninvasive disease. Among the invasive cancer survivors, 31 (74%) were

diagnosed with localized cancer, 10 (24%) were diagnosed with regional cancer, and 1 (2%) was diagnosed with distant cancer. Women with invasive cancer were more likely to report an income of $< \$10,000$ ($p = 0.01$) and had no hysterectomy after cancer treatment ($p = 0.02$) (Table 1).

The extent of invasive disease was not associated with ethnicity, age at survey, education, health insurance status, current marital status, occupation, working status, self-reported comorbidity, relapse, and current use of HRT. Women with invasive and noninvasive cancer had similar self-esteem.

Long-term QOL by extent of disease

Women with noninvasive cervical cancer reported similar mean scores on PCS and MCS, the QOL indicators, as women with invasive cancer (Table 1). After adjusting for demographic and medical factors, the ANCOVA results also revealed similar adjusted mean scores on PCS between the noninvasive and invasive groups ($p = 0.44$). Likewise, there were no important differences in adjusted MCS mean scores ($p = 0.23$). These ANCOVA results are not shown on the tables.

Self-esteem and long-term QOL

The bivariate associations between self-esteem and PCS and MCS among women with invasive and noninvasive cancer are shown in Table 2. Self-esteem was positively associated with both PCS and MCS among women with noninvasive cancer, whereas self-esteem was associated with MCS but not PCS among invasive cancer patients.

Results of multivariate analyses (Table 2) indicate that self-esteem was positively associated with MCS among women with invasive and noninvasive cancer. However, self-esteem was not significantly associated with PCS in either group.

Discussion

To our knowledge, this is one of the few studies to explore the differences in long-term QOL, measured by the SF-36 PCS and MCS, of patients surviving invasive and noninvasive cancer. Findings from our study indicate no differences in both the PCS and MCS of these patients. This may not be surprising, considering that other studies have reported no differences in QOL between cervical cancer survivors 5–7 years post-diagnosis and healthy populations.^{4,5,22} These findings may be explained by the response shift theory, the concept that when an individual undergoes a change in health status, there may be changes in the meaning of one's evaluation of QOL resulting from an individual's changes in internal standards, values, or conceptualizations.²³ Response shift is a psychological process of adjustment to illness, allowing people to maintain acceptable QOL in spite of deteriorating health.²⁴

Results show that among women surviving invasive and noninvasive cancer, self-esteem is positively related to MCS. Our findings of significant positive associations between self-esteem and MCS in both invasive and noninvasive cancer patients suggest the importance of self-esteem in the long-term clinical management of these women. These results underscore the importance of assessing and developing self-esteem in cancer survivors as a means of enhancing QOL.

The distinctive association between self-esteem and MCS but not with PCS may be explained, first, by what the MCS

TABLE 1. FREQUENCY DISTRIBUTION OR MEAN (SD) OF DEMOGRAPHIC, MEDICAL, AND PSYCHOSOCIAL VARIABLES AMONG WOMEN WITH INVASIVE AND NONINVASIVE CERVICAL CANCER IN METROPOLITAN DETROIT AREA, MICHIGAN, 2002

Variable	Total sample n = 145		Invasive (n = 42)		Noninvasive (n = 103)		p value
	n	%	n	%	n	%	
Race							0.33 ^a
White	124	87.9	34	85.0	90	89.1	
Black	14	9.9	6	15.0	8	7.9	
Other	3	2.1	0	0.0	3	3.0	
Missing	4						
Age at diagnosis (years)							0.06
<34	46	31.7	12	25.6	34	33.0	
35–44	51	35.2	15	35.7	36	35.0	
45–54	23	15.9	3	7.1	20	19.4	
≥ 55	25	17.2	12	28.6	13	12.6	
Age at survey (years)							0.30
<34	14	9.7	5	11.9	9	8.7	
35–44	44	30.3	11	26.2	33	32.0	
45–54	49	33.8	11	26.2	38	36.9	
≥ 55	38	26.2	15	35.7	23	22.3	
Education							0.70
Some high school/high school graduate	45	31.7	12	29.3	33	32.7	
Some college/college graduate	85	59.9	24	58.5	61	60.4	
Graduate school	12	8.5	5	12.2	7	6.9	
Missing	3						
Health insurance status							0.70
No insurance	6	4.2	3	7.3	3	2.9	
Medicare/Medicaid	9	6.3	2	4.9	7	6.9	
Managed care	89	62.2	26	63.4	63	61.8	
Private insurance	36	25.2	10	24.4	26	25.5	
Other	3	2.1	0	0	3	2.9	
Missing	2						
Current marital status							0.06
Never married	12	8.3	6	14.6	6	5.8	
Widowed/divorced/separated	35	24.3	13	31.7	22	21.4	
Married	97	67.4	22	53.7	75	72.8	
Missing	1						
Occupation							0.14
Retired/unemployed	42	29.4	8	19.5	34	33.3	
Self-employed	57	39.9	16	39.0	41	40.2	
Clerical/crafts	7	4.9	4	9.8	3	2.9	
Professional	37	25.9	13	31.7	24	23.5	
Missing	2						
Working status							0.09
Not working/on leave	42	29.6	17	41.5	25	24.8	
Homemaker/caregiver	11	7.8	4	9.8	7	6.9	
Working job, own business	89	62.7	20	48.8	69	68.3	
Missing	3						
Income (U.S. dollars)							0.01
<10,000	5	4.2	5	13.5	0	0	
10,001–30,000	22	18.6	5	13.5	17	21.0	
30,001–70,000	46	39.0	13	35.1	33	40.7	
≥ 70,001	45	38.1	14	37.8	31	38.3	
Missing	27						
Self-reported comorbidities							0.57
None	105	72.9	28	68.3	77	74.8	
1	18	12.5	5	12.2	13	12.6	
2–6	21	14.6	8	19.5	13	12.6	
Missing	1						

(continued)

TABLE 1. (CONTINUED)

Variable	Total sample n = 145		Invasive (n = 42)		Noninvasive (n = 103)		p value
	n	%	n	%	n	%	
Relapse							0.15
Yes	17	12.8	2	5.1	15	16.0	
No	116	87.2	37	94.9	79	84.0	
Missing	12						
Radiation therapy included in treatment							<0.001 ^a
Yes	12	8.3	12	28.6	0	0.0	
No	133	91.7	30	71.4	103	100.0	
Missing							
Hysterectomy after treatment							0.02
Yes	19	13.4	1	2.6	18	17.5	
No	123	87.2	38	97.4	85	82.5	
Missing	3						
Current use of hormone replacement therapy							0.29
Yes	33	22.8	12	28.6	21	20.4	
No	112	77.2	30	71.4	82	79.60	
Missing							
	Mean	SD	Mean	SD	Mean	SD	
Physical component score (PCS) ^b	50.8	10.8	48.5	12.9	51.7	9.7	0.16
Mental component score (MCS) ^c	51.9	9.5	50.6	11.3	52.5	8.7	0.35
Self-esteem ^d	33.3	4.6	32.3	5.1	33.8	4.4	0.08

^aFisher's exact test.^bCronbach's alpha = 0.90.^cCronbach's alpha = 0.85.^dCronbach's alpha = 0.89.

component measures. As the MCS component measures mental, role-emotional (limitations in role activities because of emotional problems), and social functioning domains of QOL¹⁶ and self-esteem is a psychosocial variable,¹⁰ the association between self-esteem and MCS may be considered mainly of psychological or emotional nature. Second, studies of QOL in long-term female cancer survivors suggest psychological, social, and spiritual concerns are more important than physical concerns,²⁵ and psychological dysfunction is a major problem observed in most studies of cancer survivors.²⁶ Another explanation may be that self-esteem of long-term survivors may be more affected by difficulties in reintegrating into valued social roles,⁸ a domain in the computation of the MCS measure.

These findings and plausible explanations have important implications in the clinical care of long-term cervical

cancer survivors. When planning interventions that target patient's self-esteem, interventions with psychological bearing should be considered. Interventions might focus on improving interpersonal and problem-solving skills, seeking social support, and redirecting career goals or leisure activities toward those that promote psychological well-being. Our finding also substantiates other studies that investigated the association between self-esteem and QOL-related psychosocial outcomes in other cancer patients. Self-esteem was associated with psychological adjustments in women after biopsy of suspicious breast lump,²⁷ was associated with positive social experiences in a group of mixed cancer patients,²⁸ and was the strongest predictor of health-related QOL in breast cancer survivors.¹¹ Psychotherapeutic treatments of cancer patients involve enhancement of self-esteem.^{29,30}

TABLE 2. UNIVARIATE AND MULTIVARIATE REGRESSION ANALYSES OF RELATIONSHIP BETWEEN SELF-ESTEEM AND QUALITY OF LIFE (PHYSICAL AND MENTAL COMPONENT SCORE) AMONG WOMEN WITH INVASIVE AND NONINVASIVE CERVICAL CANCER IN METROPOLITAN DETROIT AREA, MICHIGAN, 2002

Variable	Invasive (n = 42)			Noninvasive (n = 103)		
	Beta coefficient	95% CI	p value	Beta coefficient	95% CI	p value
Univariate regression						
Physical Component Score (PCS)	0.54	-0.19, 1.28	0.14	0.62	0.20, 1.04	0.004
Mental Component Score (MCS)	1.27	0.66, 1.87	0.0001	1.05	0.72, 1.38	<0.0001
Multivariate regression						
Physical Component Score (PCS)	0.15	-0.41, 0.73	0.59	0.25	-0.18, 0.68	0.26
Mental Component Score (MCS)	1.12	0.48, 1.76	0.0012	1.05	0.47, 1.21	<0.0001

This study has strengths that are worth noting. Although there are a number of studies related to QOL of cervical cancer survivors that have long-term assessments, beyond 60 months after diagnosis or treatment,^{4-6,22,31-37} some aspects of long-term cervical cancer survivorship need more research. In a 2006 review of patient-rated QOL studies of long-term cervical cancer survivors, Vistad et al.² cited there were no studies that identified risk factors associated with QOL. There have been only a few studies that fill this gap, particularly the need to study psychological factors.^{5,6,37} This study is one of the first to investigate how self-esteem, often considered an indicator of psychological adjustment,⁸ may be associated with the long-term QOL of women with a history of cervical cancer. Moreover, we controlled for possible confounding, which Vistad et al.² noted as lacking in the majority of studies. Also, considering that the incidence of noninvasive cancer is four times greater than that of invasive cancer,¹⁵ there is a need to study QOL among this group of women.

The study has important limitations as well. The RSE scale is the most widely used measure of self-esteem in cancer research; however, one of the complexities in interpreting the RSE instrument is the inconsistency in scoring the responses found in the literature.⁸ This in turn does not allow direct comparisons of results among studies. Moreover, information on scoring is not always provided in published reports.⁸ A related problem is that the literature has not focused on the importance of distinguishing between low, moderate, and high self-esteem. The cross-sectional nature of this study limited our ability to evaluate temporal associations. Thus, longitudinal studies should be conducted to reliably establish such associations.

Selection bias may occur in the initial selection of eligible women, low response rate, and physician's approval pattern. To avoid the first bias, we randomly selected eligible women. As to the low response rate (62%), a comparison between those interviewed and the nonrespondents indicates no differences in age at diagnosis and stage of diagnosis, so subjects in the study were not different from the population with respect to these two important factors affecting QOL. Although evidence of bias may not be reflected with these variables, this limited examination precludes us from declaring the nonexistence of this bias. The potential bias resulting from physician approval patterns is likely to be small, as only two physicians indicated we should not contact their patients. Because we were only interested in the difference of QOL between patients with invasive and noninvasive cancer, we did not include healthy population controls. However, Gotay and Muraoka²⁶ pointed out that the need of a healthy control group depends on the hypothesis being tested.

In summary, our study found no differences in either PCS or MCS scores between long-term survivors of invasive and noninvasive cervical cancer. However, we detected the importance of self-esteem in the QOL (MCS component) among women with invasive cancer as well as among women with noninvasive cancer.

Conclusions

The findings suggest that psychosocial variables, such as self-esteem, need closer examination when investigating the QOL of women with invasive and noninvasive cervical cancer. The distinctive association of self-esteem with the

MCS score but not the PCS score suggests that interventions that promote psychological well-being may be important for supporting self-esteem. Moreover, we stress that women with noninvasive cervical cancer, a group that is neglected in most studies of cervical cancer, should also be included in these interventions.

Disclosure Statement

No competing financial interests exist.

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