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Sexual Morbidity Associated With Poorer Psychological Adjustment Among Gynecological Cancer Survivors

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Abstract

Objectives—Sexual morbidity is a distressing and undertreated problem in gynecological cancer survivorship known to occur early and persist well beyond the period of physical recovery. Although often studied as a separate domain, sexuality represents an integral component of psychological adjustment and quality of life (QoL) that is adversely affected by cancer treatments. The present study tests the association between sexual morbidity, and adverse psychological adjustment and QoL outcomes.

Methods—A cross-sectional design was used. The participants were gynecological (cervical, endometrial, ovarian, and vulvar) cancer survivors who were partnered (N = 186), whose cancer was diagnosed 2 to 10 years previously, and who were at least 6 months post any cancer therapy. Most had been found to have early-stage disease (70%) and were treated with hysterectomy (77%), chemotherapy (43%), and/or radiotherapy (23%). Sexual morbidity was operationalized as a multidimensional construct including sexual behavior, sexual functioning, and subjective sexual satisfaction, assessed by patient self-report. Outcomes included self-reported depressive symptoms, traumatic stress symptoms, cancer-specific stress, stress about body changes, and QoL. Nurse-rated of performance status and disruptive signs/symptoms of treatment toxicity, as well as relevant sociodemographic and disease variables were collected as potential controls.

Results—Hierarchical multiple regression analyses tested sexual morbidity as a predictor of poor outcomes. All statistical models were significant, accounting for 12% to 53% of the variance in psychological adjustment/QoL. Sexual morbidity covaried with worsened depressive symptoms, body change stress, and psychological QoL beyond the negative contributions of (older) age, (poorer) performance status, and (greater) fatigue. Notably, disease and treatment variables were not statistically significant correlates of psychological adjustment or QoL.

Conclusions—These findings suggest that prevention or treatment of sexual morbidity might foster improved psychological adjustment/QoL. Given the high rates of sexual morbidity in this population and the connection between sexuality and broader psychological adjustment/QoL, there is a clear need for better integration of sexuality rehabilitation into routine clinical care.

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Keywords

Sexual morbidity; Gynecological cancers; Survivorship; Quality of life; Psychological adjustment

Sexual morbidity is a distressing, persistent, and undertreated problem among gynecological cancer survivors.[1,2] Described decades ago as an “island of disruption” in an otherwise positive psychological and quality of life (QoL) trajectory, sexual morbidity occurs early and improves little as patients recover.[3] Despite ample data demonstrating the prevalence of sexual dysfunction among gynecological cancer survivors, progress toward developing and implementing intervention has lagged. It may be that few are aware of the broader importance of sexuality because few studies have explored the potential implications of sexual morbidity for psychological outcomes and QoL in a survivor population. If sexual morbidity in gynecological cancer is indeed related to psychological adjustment and QoL, then prevention and treatment of sexuality morbidity may have important secondary benefits for survivors.

In the current study, we explore the possibility that sexual morbidity is associated with poorer psychological adjustment and QoL. Once immediate concerns after diagnosis and treatment, for example, prognosis, have diminished, sexual problems emerge as a persistent QoL issue for a significant subset of survivors.[4–6] In fact, one study found that women ranked problems with sexual arousal as among the most distressing of their treatment-related symptoms.[7] Although often studied as a separate domain, sexual changes after gynecological cancer can play an important role in a woman’s sexual identity and her personal relationships and, as such, represents an integral component of psychological adjustment and QoL.[8] Certainly, strategies for improved psychological adjustment are needed for gynecological cancer patients and survivors; a significant portion of patients, ranging from 20% to 40%, across studies evidence persistent psychological adjustment and QoL difficulties, lasting long after diagnosis and treatment.[6,9–11]

To date, only 1 study has explicitly examined the relationship between sexual morbidity and QoL in gynecological cancer survivors. In a study of long-term (>5 years) ovarian cancer survivors (N = 49), increased sexual discomfort was associated with lowered physical and social well-being.[11] Although no studies have examined the relationship between sexual morbidity and psychological adjustment in gynecological cancer samples, the relationship has been studied in breast cancer. In 2 studies of survivors (N = 863 and 1094), 1 to 5 years after diagnosis, Ganz and colleagues[12,13] found that poorer mental health was associated with diminished sexual interest, poorer sexual satisfaction, and higher rates of sexual dysfunction. Others have examined traumatic stress. Frierson and colleagues[14] found that increased body change stress in a sample of newly diagnosed, early-stage breast cancer patients was related to more sexual problems and increased posttraumatic stress symptoms. In a study of longer-term breast cancer survivors (>20 years after treatment), Kornblith et al[15] found that the number of sexual problems was significantly correlated with posttraumatic stress symptoms.

The current study examines the association between sexual morbidity and psychological adjustment/QoL in gynecological cancer survivors. Here, we conceptualize sexual morbidity as a predictor and psychological adjustment (depressive symptoms, traumatic stress symptoms, cancer-specific stress, and body change stress) and QoL (psychological and physical) as outcomes. Of course, directionality cannot be established using cross-sectional data, but from a clinical perspective, the relationship is an important one, regardless of directionality. Its very existence would suggest that treatment of sexual morbidity could have important secondary benefits for psychological adjustment and QoL. To capture the

full range of sexual disruptions that occur after gynecological cancer treatment, we developed a sexual morbidity composite score using self-report measures of sexual behavior, functioning, and satisfaction. Inclusion of the satisfaction measure is particularly important because we recognize that not all survivors with sexual functioning changes or infrequent sexual behavior will be dissatisfied. We hypothesized that sexual morbidity would contribute significantly to patients' psychological adjustment and QoL. To perform an appropriately stringent test of these relationships, we considered relevant sociodemographic (eg, age) and disease/treatment characteristics (eg, receipt of chemotherapy) as controls.

MATERIALS AND METHODS

Procedures

Patients receiving follow-up care at a university-affiliated, National Cancer Institute–designated Comprehensive Cancer Center were accrued. Participation was limited to patients whose cancer was diagnosed 2 to 10 years previously and at least 6 months post any cancer therapy. By 2 years, the acute stress of diagnosis has ended and sexual changes have stabilized.[3] Other exclusion criteria were age younger than 20 or older than 85 years, other cancer diagnoses, prior refusal of cancer treatment, health conditions impairing comprehension, significant sensory deficits, major or untreated mental illness (eg, schizophrenia), deficiency in speaking/reading English, and/or current pregnancy.

Clinic rosters were screened and, 2 weeks before the scheduled routine follow-up appointments with their gynecologic oncologist, all potentially eligible patients received a letter from their physician describing the study. Over 12 months (January to December 2005), 294 eligible patients were approached and invited to participate; of these, 260 (88%) were accrued. Informed consent was completed in person at the clinic appointment. Data from the 186 partnered women in the sample (72%) are reported here. Data were obtained through structured, in-person interviews with trained female assessors, brief evaluations with a research nurse (both of which took place in the clinic on the same day, before the patient's scheduled appointment), and a subsequent medical chart review. Participants were offered $25 for their time and effort.

Participants

The sample (n = 186) was primarily white, middle aged, and college educated. Most were married, with a mean relationship duration of 26 years (range, 1–63 years). Women were at mean of 4 years after diagnosis and survivors of endometrial (n = 84; 45%), ovarian (n = 49; 26%), cervical (n = 42; 23%), or vulvar cancer (n = 11; 6%). Table 1 provides complete sociodemographic and disease information.

Measures

Throughout this section, the mean, SD, and internal consistency reliability (Cronbach α) are for the present sample unless otherwise indicated.

Sexual Morbidity

Sexual morbidity represents a wide range of responses and problems, which are difficult to capture using any one measure. To derive a single sexual morbidity score that captured all subcontracts of interest, a factor analysis was conducted using items from several measures of sexual behavior, functioning, and satisfaction. This strategy allowed for inclusion of the full range of sexual morbidities while maintaining parsimony (ie, reducing the number of statistical tests conducted). Three validated measures were administered, comprising 31

sexuality items that can be found in Table 2: (*a*) 8 items from the disease-specific subscales of the Functional Assessment of Cancer Therapy[16]; (*b*) 4 items from the Derogatis Sexual Functioning Index,[17] assessing global sexual satisfaction and frequency of intercourse, kissing, and avoidance of sexual activity; and (*c*) the 19-item Female Sexual Function Index,[18] assessing sexual desire, arousal, lubrication, orgasm, satisfaction, and pain.

In the present study, factor analysis was used to obtain a single sexual morbidity score by identifying and combining groups (or factors) of interrelated sexual morbidity items. The Comprehensive Exploratory Factor Analysis program was used; the specified parameters were maximum likelihood discrepancy function and oblique Crawford-Ferguson varimax rotation. A 5-factor solution was selected, based on interpretability, parsimony, and model fit (root mean square error of approximation, 0.093). To be retained as part of the composite score, individual items should exhibit high factor loadings on 1 factor and low loadings on others.[19] A criterion of factor loadings less than 0.30 was used to identify weak items (those that are not strongly statistically related to other items). Three items were excluded from the total sexual morbidity score based on this criterion (Table 2); thus, the total sexual morbidity score was the sum of 5 factor scores comprising 28 of the 31 items administered: (1) appearance/desire (7 items), (2) sexual satisfaction/activity (6 items), (3) arousal (7 items), (4) lubrication (4 items), and (5) pain with intercourse (4 items). The fit of the final factor structure was adequate (root mean square error of approximation, 0.087). Factor intercorrelations were high (Table 3), providing support for combining the factors for a total sexual morbidity score. Items were standardized and summed, with higher scores indicating greater sexual morbidity. The sample mean (SD) was 24.0 (12.2); the coefficient α was 0.97 for the total morbidity score in the present sample.

Psychological Adjustment and QoL

Depressive symptoms—The Iowa short form of the Center for Epidemiological Studies Depression Scale (CES-D)[20,21] consists of 11 items (eg, “I felt like everything I did was an effort”) rated on a 3-point scale from 0 (hardly ever or never) to 2 (much or most of the time). Unlike other measures of depressive symptoms, the CES-D is relatively unaffected by physical symptoms and is therefore commonly used in research with cancer and other medical patients.[22] Total scores range from 0 to 22, with higher scores indicating more depressive symptoms. The sample mean (SD) was 4.2 (3.9); the coefficient α was 0.81.

Traumatic stress symptoms—The Posttraumatic Stress Disorder (PTSD) Checklist—Civilian Version (PCL-C) measured general PTSD symptoms. Women identified the most distressing event they had ever experienced and then reported the extent to which they had experienced PTSD symptoms related to that event in the past month. The PCL-C consists of 17 items, each corresponding to a specific PTSD diagnostic criterion (eg, “I had repeated, disturbing memories, thoughts, or images”). Intended for noncombatant populations,[23] the PCL-C has been used to assess traumatic stress symptoms in cancer survivors.[24] A 5-point Likert scale, ranging from 1 (not at all) to 5 (extremely), was used. The total scores range from 17 to 85, with higher scores indicating more symptoms. The sample mean (SD) was 26.3 (12.4); the coefficient α was 0.94.

Cancer-specific stress—The Impact of Events Scale—Revised (IES-R)[25,26] measured cancer-specific stress or symptoms of intrusion and avoidance related only to their cancer experience (eg, “I stayed away from reminders about my cancer diagnosis and treatment”). In this 21-item questionnaire, women rated the frequency of feelings or events during the previous week using a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). The total scores range from 0 to 64, with higher scores reflecting greater distress. The sample mean (SD) was 10.3 (11.3); the coefficient α was 0.91.

Body change stress—The 13-item Impact of Treatment Scale (ITS) is an adaptation of a measure developed by the author.[14] It assesses traumatic stress symptoms specifically related to posttreatment body changes. Such symptoms include intrusive thoughts ("How my body has changed pops into my mind"), avoidant thoughts ("I don't want to deal with how my body looks"), and avoidant behaviors ("I avoid looking at or touching my body") specifically related to bodily changes that follow gynecological cancer treatments. A 6-point scale ranging from 0 (not at all) to 5 (often) was used. Total scores range from 0 to 65, with higher scores indicating greater body change stress. The sample mean (SD) was 17.5 (16.2); the coefficient α was 0.93.

Quality of life—The Medical Outcomes Study—Short Form 12 (SF-12)[27] assesses health-related QoL. The SF-12 includes 8 aspects of QoL including physical functioning, role functioning (physical), bodily pain, general health perceptions, vitality, social functioning, role functioning (emotional), and mental health. The 8 primary subscales are summarized into 2 component scores: the Mental Component Summary (MCS) and the Physical Component Summary (PCS).[27] Higher scores reflect better QoL. Seminal studies of this measure assessed its psychometric properties in chronic health conditions,[28] and it has been recommended for use with cancer samples.[29] For the PCS, the sample mean (SD) was 45.7 (12.3); the coefficient α was 0.85. The MCS sample mean (SD) was 52.7 (10.3); the coefficient α was 0.73.

Control Variables

Sociodemographic, disease, and treatment characteristics—Age, race, education level, family income, and marital status were obtained through an interview. Disease site, stage, and time since diagnosis, recurrence status, and treatment modalities were extracted from patient medical records.

Performance status—The Karnofsky Performance Status (KPS)[30] ratings were used. The scale ranges from 100 (normal, no complaints, and no evidence of disease) to 0 (dead) with 10-point intervals each containing different criteria (eg, 90, able to carry on normal activity, with minor signs/symptoms of disease; 80, normal activity with effort, with some signs/symptoms of disease). The KPS and the symptom measure (discussed later) were nurse-rated after the patient interview and chart review. The sample mean (SD) was 79.8 (11.4).

Signs/symptoms of treatment toxicity—Items for symptoms, signs, illnesses, laboratory values, examination findings, and so on came from the toxicity and status listing used by the Southwest Oncology Collaborative Group (1994 version) for clinical trials. The items are grouped by the 4 body categories most relevant to gynecological disease: renal/bladder, gastrointestinal, endocrine, and mucosal. A 5-point item-specific rating scale is used. The mean of the items within the categories were calculated, and that of the category scores were calculated for an overall score ranging from 0 to 4. The sample mean (SD) was 0.5 (0.2).

Fatigue—The 7-item Total Disruption Index of the Fatigue Symptom Inventory—Revised (FSI TDI)[31] assessed the impact of fatigue during the previous week. For each item, the patients rated the degree to which fatigue interfered with activities during the past week using a 10-point Likert scale ranging from 0 (no interference) to 10 (extreme interference). The items were summed for a total score ranging from 0 to 70, with higher scores indicating greater interference. The sample mean (SD) was 14.4 (15.7); the coefficient α was 0.98.

Analytic Strategy

Descriptive statistics and correlations among the control, the predictor, and the outcome variables were calculated (Table 4). To test sexual morbidity as a predictor of psychological adjustment and QoL, hierarchical multiple linear regression (HMLR) analyses were performed. Sociodemographic, disease, treatment, and health status variables (performance status, symptoms/signs, and fatigue) that are known to be related to psychological adjustment and QoL were identified a priori for consideration as potential control variables. Bivariate correlations between these potential control variables and the outcomes of interest were obtained, and those control variables that were significantly correlated with an outcome were included in the respective HMLR model. This empirical method of control selection was used to ensure that all relevant control variables were considered while also maintaining statistical power and avoiding overfitting of models. The variables were entered in the following order: (1) sociodemographics, (2) disease and treatment variables, (3) current health status, and (4) sexual morbidity. The final step tests the association of sexual morbidity with the outcome, beyond the contribution of relevant controls.

RESULTS

Intercorrelations among the predictor, outcome, and control variables were inspected, and appropriate controls were selected for each outcome (Table 4). Table 5 provides a complete summary of the results of the HMLR models predicting psychological adjustment and QoL. (A Bonferroni correction is used to account for multiple comparisons involving similar outcomes. As the 3 traumatic stress outcomes used here exhibit some conceptual overlap, we have applied such a correction, which suggests a significance level of 0.017 for these 3 tests.) Briefly, all statistical models were significant ($P < 0.05$), with 48% of the variance accounted for in depressive symptoms; 23%, for traumatic stress symptoms; 10%, for cancer-specific stress; 26%, for body change stress; 31%, for psychological QoL; and 53%, for physical QoL.

Sexual morbidity was a significant unique predictor of the CES-D score (depressive symptoms, $P = 0.044$), the ITS (body change stress, $P = 0.008$), and the SF-12 MCS (psychological QoL, $P = 0.011$) but was not a significant unique predictor of the PCL-C score (traumatic stress symptoms, $P = 0.167$), the IES-R (cancer-specific stress, $P = 0.135$), or the SF-12 PCS (physical QoL, $P = 0.056$). The findings suggest that, beyond the important contribution of a patient's (younger) age, (fewer) years of education, and (greater) fatigue, sexual morbidity covaried with greater depressive and body change stress symptoms, as well as poorer psychological QoL. Of note, none of the disease (disease site and stage) or treatment (receipt of hysterectomy, chemotherapy, radiation, or hormone therapy) variables considered as controls emerged as significant unique predictors of psychological adjustment in the current regression models.

DISCUSSION

This analysis is 1 of the first to examine the relationship between sexual morbidity and psychological adjustment/QoL for gynecological cancer survivors. In doing so, it presents a more complete picture of sexuality in this clinical context than has been provided previously. These results support the view that sexual morbidity poses an added psychological burden for some patients and suggest that management of sexual morbidity could conceivably impact psychological adjustment or vice versa. The current study is framed to emphasize sexual morbidity because (1) it is known to be undertreated and underaddressed in gynecological cancer care[32]; (2) research has demonstrated that gynecological cancer patients have higher rates of sexual morbidity compared with rates of poor psychological adjustment or impaired QoL[3]; (3) sexual morbidity in gynecological

cancer has a sudden and specific onset (eg, at the time of hysterectomy or adjuvant treatment); (4) treatment-related sexual morbidity can be anticipated and can thus be addressed in a timely fashion; and (5) sexual morbidity is a lasting and distressing concern for a subset of survivors.[4,6]

Whereas there are few data from female cancer patients, data from women with other medical conditions, as well as physically healthy women, attest to the strong link between sexual morbidity and psychological adjustment/QoL. In studies of women with chronic medical conditions, those with comorbid depression tend to have higher prevalence rates of sexual dysfunction compared with controls. For instance, middle-aged women with a history of major depressive illness (N = 914) reported less arousal, physical pleasure, and emotional satisfaction in their present relationship, even when current mood and medications were considered.[33] These results underscore larger epidemiological studies suggesting that poor mental health is a risk factor for sexual dysfunction.[34]

Given the high rates of sexual problems for gynecological patients, and the connection between sexuality and broader psychological adjustment and QoL, there is a clear need for integration of sexuality into routine clinical care. This does not seem to be the case in clinical practice. An interview study[32] of 43 physicians and nurses regularly treating women with ovarian cancer found that although 98% of providers felt that sexual issues should be discussed with patients, only 21% reported actually doing so. Reasons listed by these clinicians for not discussing sexual sequelae of treatment included lack of knowledge and experience with such information, embarrassment, and lack of resources to provide further support if needed. Certainly, treatment and referral for sexual problems in gynecological cancer is uniquely challenging. Medicinal approaches often involve hormonal agents, which are contraindicated for many gynecological cancer patients, and compliance with rehabilitative measures such as vaginal dilation is low[35] Referral for psychotherapy is an option. Although randomized controlled trials have shown that psychological interventions can be efficacious for improving outcomes for cancer patients,[36] there have been few clinical or empirical reports of therapies specifically addressing sexual problems. The few available intervention studies in gynecological cancer specifically addressing sexuality have applied strategies from well-established, time-limited (eg, 3–12 sessions) psychotherapy protocols,[37–39] including Cognitive Behavioral Therapy, mindfulness training, and couple therapy. These studies suggest that cognitive and behavioral techniques (eg, directed masturbation and sensate focus), which represent the state-of-the-art in sex therapy research and practice,[40] can ameliorate sexual functioning difficulties after gynecological cancer.

A few study limitations merit discussion. The cross-sectional design used here provided for efficient recruitment of a large cohort of patients, but this design also limits the interpretation of the results. Directionality cannot be established without a longitudinal design. The sample included diversity of age, income, education, and disease and treatment characteristics, but there are several issues regarding the generalizability of the findings. Obviously, those who died (from any cause) were not included, which limits our ability to generalize results to women with aggressive, rapidly progressing cancers or significant medical morbidity. In addition, only those participants who presented for follow-up with their physician were accrued. Also, there were few minority participants. Studies of the US health care have found that patients of certain ethnic groups and of lower socioeconomic status tend to have decreased access to care and that the care they do receive may be less intensive and of poorer quality. Part of the reason for this disparity is based on geographic proximity; these groups often have to travel to receive the highest quality care in their region[41,42]; thus, recruiting from community clinics might yield a higher proportion of minority participants. Strategies for increasing ethnic minority participation in future studies could involve recruiting from such clinics or oversampling ethnic minority participants in

our existing clinic. Additional research with ethnic minority patients will be important, as study findings suggest higher rates of distress, more comorbid medical conditions, and more unmet medical and emotional needs.[43]

Despite these limitations, the current research provides insight into an important clinical problem in gynecological cancer treatment and/or referral for the sexual problems that are prevalent throughout the course of diagnosis and treatment, and into longer-term survivorship. Although integrating such care presents a myriad of challenges, doing so may foster not only less sexual morbidity but also improved psychological adjustment and QoL.

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TABLE 1

Description of sample and correlations between the predictor and outcome measures

Variable	Mean (SD)/Percentage (n = 186)
Age, yr	54.7 (11.9)
Race, % white	96%
Education, yr	14.0 (2.6)
Employment status, % yes	
Household income, median ($000/yr)	60.0
Married, % yes	92%
Relationship duration	26.2 (15.7)
Disease site	
Cervix	23%
Endometrium	45%
Ovary/peritoneum	26%
Vulva/vagina	6%
Stage at diagnosis	
I	58%
II	10%
III	23%
IV	3%
Not surgically staged	6%
Time since diagnosis, yr	4.2 (2.1)
Hysterectomy, % yes	77%
Chemotherapy, % yes	44%
Radiation, % yes	23%
Recurrence, % yes	8%

TABLE 2

Item loadings and assignment to factors for the 5-factor solution for sexual morbidity

Item	Appearance/ Desire	Satisfaction/ Activity	Arousal	Lubrication	Pain With Sexual Activity
I feel sexually attractive	**0.65**	0.21	−0.01	0.12	−0.02
I like the appearance of my body	**0.54**	0.07	−0.09	0.23	−0.06
How would you rate your level of sexual desire or interest	**0.48**	0.18	0.48	0.06	−0.27
I am interested in sex	**0.47**	0.26	0.44	−0.02	−0.18
How often did you feel sexual desire or interest	**0.45**	0.23	0.38	0.08	−0.12
I am afraid to have sex	**0.40**	0.00	0.10	0.04	0.19
I am unhappy about a change in my appearance	**0.42**	0.04	−0.10	0.01	0.13
How satisfied have you been with your sexual relationship with your partner	−0.04	**0.92**	−0.05	0.04	0.13
How satisfied have you been with the amount of emotional closeness during sexual activity with your partner	−0.11	**0.80**	0.00	−0.05	0.18
How satisfied have you been with your overall sexual life	0.07	**0.76**	0.16	0.00	0.02
How would you rate your current sex life	0.05	**0.65**	0.17	0.10	−0.04
How often have you kissed your partner (past 4 wk)	0.10	**0.57**	−0.04	−0.09	0.05
How often have you had sexual intercourse (past 4 wk)	0.04	**0.43**	0.10	0.11	0.08
How would you rate your level of sexual arousal	−0.05	0.20	**0.74**	0.17	0.04
How often have you been satisfied with your arousal	−0.09	0.15	**0.69**	0.25	0.16
When you had sexual stimulation or intercourse, how often did you reach orgasm	−0.23	0.05	**0.67**	0.30	0.12
How often did you feel sexually aroused	0.07	0.09	**0.66**	0.18	0.15
How confident were you about becoming sexually aroused	0.04	0.10	**0.61**	0.28	0.11
How satisfied were you with your ability to reach orgasm	−0.12	0.18	**0.56**	0.28	0.15
When you had sexual stimulation or intercourse, how difficult was it to reach orgasm	−0.04	0.05	**0.40**	0.49	0.05
How difficult was it to maintain lubrication until completion of the sexual activity	0.01	−0.03	−0.07	**0.92**	0.12
How difficult was it to become lubricated during sexual activity	0.10	−0.03	0.04	**0.88**	0.08
How often did you maintain your lubrication until completion of the sexual activity	0.09	−0.06	0.08	**0.79**	0.12
How often did you become lubricated during sexual activity	0.09	0.00	0.22	**0.74**	0.05
How would you rate your level of pain during or after vaginal penetration	−0.03	0.16	0.01	0.17	**0.86**
How often did you experience pain during vaginal penetration	0.04	0.17	−0.03	0.19	**0.80**
How often did you experience pain after vaginal penetration	−0.03	0.20	0.00	0.07	**0.79**

Item	Appearance/ Desire	Satisfaction/ Activity	Arousal	Lubrication	Pain With Sexual Activity
I have pain or discomfort with intercourse	0.48	−0.08	0.08	0.06	**0.39**
How often have you avoided or declined sexual intercourse*	−0.27	−0.10	−0.21	0.09	−0.12
I have vaginal bleeding or spotting*	0.29	−0.08	0.03	−0.01	0.12
I have discomfort or pain in my pelvic area*	0.24	−0.11	0.27	−0.15	0.25

The boldface type indicates the factor assignment.

*Items not included in the final factor structure because of lower-than-acceptable factor loadings.

TABLE 3

Intercorrelations among the sexual morbidity factors and the total score

Factor/Measure	Appearance/Desire	Satisfaction/Activity	Arousal	Lubrication	Pain With Sexual Activity	Total Score
Sexual morbidity						
Desire/appearance	—					
Activity/satisfaction	0.52*	—				
Arousal	0.56*	0.75*	—			
Lubrication	0.51*	0.65*	0.90*	—		
Pain with intercourse	0.54*	0.66*	0.87*	0.83*	—	
Total morbidity score	0.66*	0.82*	0.96*	0.93*	0.93*	—

*$P < 0.01$.

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TABLE 4

Intercorrelations among the predictors, outcome, and control variables

Variable	Sexual Morbidity	CES-D	PCL-C	IES	ITS	SF-12 MCS	SF-12 PCS
Psychological adjustment							
CES-D	0.34*						
PCL-C	0.30*						
IES-R	0.10						
ITS	0.25*						
QoL							
SF-12 MCS	−0.24*						
SF-12 PCS	−0.34*						
Sociodemographics							
Age	0.31*	−0.22*	0.30*	−0.18†	−0.26*	−0.08	−0.28*
Race	0.11	0.00	−0.04	0.09	0.08	0.21*	0.10
Education	−0.11	0.30*	0.07	−0.24*	0.00	−0.11	0.07
Family income	−0.08	0.13	−0.05	0.05	−0.02	−0.03	−0.08
Employment status	−0.32*	0.33*	0.05	−0.17†	−0.04	−0.08	0.03
Health status							
Performance status (KPS)	−0.36*	0.65*	0.22*	−0.46*	−0.16†	−0.27*	−0.33*
Symptoms/signs (SWOG)	0.20*	−0.28*	−0.13	0.24*	0.08	0.20*	0.16†
Fatigue (FSI TDI)	0.44*	−0.55*	−0.47*	0.67*	0.21*	0.46*	0.43*
Disease and treatment characteristics							
Stage	0.09	−0.13	0.08	−0.03	0.09	−0.04	0.01
Time since diagnosis	−0.01	0.03	0.13	−0.14	−0.11	−0.02	−0.08
Hysterectomy (yes, 1)	0.07	0.07	0.08	0.03	0.01	0.05	0.02
Chemotherapy (yes, 1)	−0.02	−0.02	0.10	−0.09	0.06	0.01	−0.07
Radiation (yes, 1)	0.07	−0.11†	−0.02	−0.02	0.01	−0.01	0.00
Recurred (yes, 1)	0.20*	−0.18†	0.00	0.03	−0.04	−0.02	0.02

*$P < 0.01$.

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$^{\dagger}P < 0.05$.

SWOG, Southwest Oncology Collaborative Group.

TABLE 5

Hierarchical multiple linear regression results

	Statistics by Step		Statistics by Predictor		
Step and Predictors	**Total Adjusted R^2**	**ΔR^2**	**β (Standardized)**	***t***	***P***
Depressive symptoms (CES-D; $F_{6,176} = 29.01$, $P < 0.001$)					
1. Age	0.09	0.10*	−0.19	−3.23	0.001*
Education, yr			−0.13	−2.25	0.025†
2. KPS	0.47	0.38*	−0.04	−0.57	0.568
Symptoms/signs			0.03	0.60	0.549
FSI TDI			0.54	7.25	0.000‡
3. Sexual morbidity	0.48	0.01†	0.13	2.03	0.044†
Traumatic stress (PCL-C; $F_{5,177} = 12.12$, $P < 0.001$)					
1. Race	0.04	0.04*	0.15	2.25	0.025†
2. KPS	0.23	0.20*	0.06	0.68	0.498
Symptoms/signs			0.09	1.24	0.216
FSI TDI			0.41	4.68	0.000‡
3. Sexual morbidity	0.23	0.01	0.10	1.39	0.167
Cancer-specific stress (IES-R; $F_{4,178} = 6.14$, $P < 0.001$)					
1. Age	0.07	0.07*	−0.30	−3.95	0.000‡
2. KPS	0.10	0.04†	−0.04	−0.49	0.626
FSI TDI			0.10	1.04	0.300
3. Sexual morbidity	0.10	0.01	0.13	1.50	0.135
Body change stress (ITS; $F_{5,175} = 13.77$, $P < 0.001$)					
1. Age	0.07	0.08*	−0.32	−4.66	0.000‡
2. KPS	0.24	0.17*	−0.08	−0.91	0.365
Symptoms/signs			0.03	0.46	0.649
FSI TDI			0.26	2.89	0.004*

Step and Predictors	Statistics by Step: Total Adjusted R^2	Statistics by Step: ΔR^2	Statistics by Predictor: β (Standardized)	Statistics by Predictor: *t*	Statistics by Predictor: *P*
3. Sexual morbidity	0.26	0.03*	0.21	2.67	0.008*
Psychological QoL (MCS; $F_{4,177} = 21.27$, $P < 0.001$)					
1. Age	0.09	0.09*	0.32	4.74	0.000‡
2. KPS	0.29	0.21*	−0.13	−1.59	0.114
FSI TDI	0.31	0.03†	−0.44	−5.24	0.000‡
3. Sexual morbidity	0.31	0.03†	−0.19	−2.56	0.011†
Physical QoL (PCS; $F_{8,170} = 25.93$, $P < 0.001$)					
1. Age	0.11	0.12*	−0.24	−4.17	0.129
Education			0.08	1.52	0.000‡
2. Recurrence (yes, 1)	0.13	0.03	−0.08	−1.49	0.138
Radiation (yes, 1)			−0.09	−1.64	0.103
3. KPS	0.53	0.40*	0.46	6.81	0.463
Symptoms/signs			−0.01	−0.26	0.797
FSI TDI			−0.28	−3.76	0.000‡
4. Sexual morbidity	0.53	0.00	0.05	0.73	0.464

Statistics by predictor are reported for the final HMLR model.

*$P < 0.01$.

†$P < 0.05$.

‡$P < 0.001$.