A Systematic Review of Interventions for Sexual Well-Being in Women With Gynecologic, Anal, or Rectal Cancer

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About nine million women live with cancer in the United States, most with breast (42%), gynecologic (15%) (National Cancer Institute, 2017), and anal, rectal, and other cancers (Lindau, Abramssohn, & Matthews, 2015) that affect sexual health. Sexual well-being is a significant health and quality-of-life issue in cancer survivorship. Cancer treatments often cause devastating and long-lasting effects on tissue and require psychological and physical adjustment. Short- and long-term effects include fatigue, pain, scars, altered body image, and genital symptoms (Breukink & Donovan, 2013; Carter, Stabile, Gunn, & Sonoda, 2013; Hendren et al., 2005). Persistent symptoms can lead to altered sexual functioning (Aerts et al., 2012; Den Oudsten et al., 2012; Herbenick, Reece, Hollub, Satinsky, & Dodge, 2008) and have a negative impact on partner relationships (Badr, Acitelli, & Carmack Taylor, 2008; Wimberly, Carver, Laurenceau, Harris, & Antoni, 2005).

The need for effective interventions for women’s sexual well-being after cancer treatment is recognized, but the intervention literature is limited by methodologic challenges, delivery format variability, and diverse outcome measures. Literature reviews confirm the limitations of the evidence (Brotto, Yule, & Breckon, 2010; Candy, Jones, Vickerstaff, Tookman, & King, 2016; Scott & Kayser, 2009) as a barrier to validating interventions in larger, multisite clinical trials. Scott and Kayser (2009) reviewed 12 psychoeducational interventions for improving women’s sexual well-being and body image after cancer treatment, most focusing on women with breast cancer. Couple-focused interventions promoted mutual coping processes and diagnosis or treatment education and included specific sex therapy techniques that tended to produce better effects (Scott & Kayser, 2009).
Brotto et al. (2010) performed a systematic review of 27 psychological interventions for sexual difficulties after cancer, targeted to either sex or couples with any type of cancer. Successful intervention elements included thematic counseling, partner inclusion, motivation and self-efficacy, and longer interventions (Brotto et al., 2010).

In a systematic review of interventions for women’s sexual dysfunction following cancer treatments, Candy et al. (2016) identified only 11 trials published from 2007–2015, all of which were randomized, controlled trials (RCTs) with psychoeducational (n = 8), pharmaceutical (n = 2), or exercise interventions (n = 1). The 11 studies included only patients with breast or gynecologic cancer and partnered heterosexual women, and most had small samples (50 or fewer participants). Variability in intervention content and outcome measures restricted combined analysis and limited the ability to draw more general conclusions about the effect of the interventions (Candy et al., 2016).

The current review has more inclusive study design criteria and intervention types, includes more recent interventions, and provides a narrower focus on gynecologic, anal, and rectal cancer. The authors reviewed interventions for sexual well-being in gynecologic, anal, and rectal cancer survivors because of cancer treatment’s interruption of women’s pelvic sexual organs. Adjustment to life after cancer treatment likely involves alternative methods of sexual contact, but culture favors heteronormative penetrative vaginal intercourse. The purpose of this review is to evaluate interventions to improve sexual well-being in female gynecologic, anal, and rectal cancer survivors. Contemporary interventions are described, and successes and challenges of interventions for sexual well-being in female cancer survivors are summarized.

Methods

This review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2009 checklist and guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). A literature search (see Figure 1) was conducted using PubMed, CINAHL®, PsycINFO, and Cochrane Library with the keywords cancer, sexual function, sexual well-being, sexual health, and intervention. The search was limited to studies of women published in English from 2000–2016. Results were further limited by intervention studies of women treated for gynecologic (ovarian, endometrial or uterine, cervical, vaginal, or vulvar), anal, or rectal cancer that had a sexual well-being outcome measure. The list was narrowed by a review of the study titles, then by reading the abstracts of potential articles for inclusion criteria. Additional articles were retrieved after reviewing reference lists of selected articles.

Sixteen studies addressed interventions for sexual well-being in women treated for colorectal or gynecologic cancer. Intervention studies reporting only qualitative outcomes were excluded. Interventions that focused on sexual well-being and on coping with cancer were included. Study interventions that focused on coping with cancer (Brotto et al., 2012; Chow, Chan, Chan, Choi, & Siu, 2014; Maughan & Clarke, 2001; Scott, Halford, & Ward, 2004) included sexual well-being content and sexual well-being outcome measures to meet review inclusion criteria.

Articles were excluded based on type of sample and outcome measure (e.g., men with prostate cancer; women with breast cancer, a mix of cancer types, or women at risk for cancer). Some study interventions targeted sexual well-being but did not measure sexual well-being outcomes, or studies reported intervention adherence instead of effect. Included studies demonstrated heterogeneity in sample sizes.
and characteristics, interventions, outcome measures, and study designs. Studies were not amenable to subgroup analyses because of a lack of adequate power and large confidence intervals of estimates. Therefore, a descriptive synthesis approach was used.

The full-text articles were read by a single reviewer, who extracted and summarized details of the sample, intervention, outcomes, and efficacy (see Table 1). Significance of correlates and intervention outcomes were defined by statistical significance (p < 0.05) and an effect size of at least 0.3. Each coauthor read eight randomly assigned articles that were the basis of the literature review and re-reviewed the abstracted data in the table to reach 100% agreement.

Results
Most of the studies were conducted in North America (n = 9), samples were predominantly Caucasian and well-educated, and the mean participant age ranged from 40–62 years. Two studies focused on women treated for colon or rectal cancer (Barsky Reese et al., 2014; Barsky Reese, Porter, Somers, & Keefe, 2012), and one focused on women treated for rectal or anal cancer (DuHamel et al., 2016). Two studies were of women treated for cervical cancer (Li, Huang, Zhang, & Li, 2016; Schroder et al., 2005), two reported combined results for breast and gynecologic cancers (Schover et al., 2013; Scott et al., 2004), and the remainder involved a mix of gynecologic cancers. Sample sizes ranged from 9 couples (4 of whom were women with male partners) to 226 women. Eight studies were RCTs, and the remaining were one-, two-, or three-group studies. One article was a randomized case control study (Aktaş & Terzioğlu, 2015).

Methodologic Considerations
The reviewed studies are limited in rigor and interpretation by methodologic weaknesses. Only half the studies employed a RCT design, which provides the highest level of evidence. These included either a wait-list or attention control group; however, sample sizes were small. An example of the limitation on conclusions without an attention control group was exemplified in the sexual rehabilitation intervention (Schroder et al., 2005). In the Schroder et al. (2005) study, participants were instructed to use a clitoral vacuum device as a part of partnered sex play twice a week and as self-stimulation at least twice a week. This study could have benefited from a control group instructed to participate in partnered sex play and self-stimulation four times weekly. Without a control group, it is difficult to determine whether the outcomes were related to the clitoral therapy device, the sexual activity regimen, or both.

Samples varied by type and combination of cancers. Although cancer treatment can negatively affect sexual well-being regardless of cancer type, reviews and observational studies of women’s sexual well-being after cancer treatment report differential experiences and challenges based on types of treatment (Breukink & Donovan, 2013; Carter et al., 2013; Den Oudsten et al., 2012; Krychman & Millheiser, 2013; Sadovsky et al., 2010; Traa, De Vries, Roukema, & Den Oudsten, 2012). Little evidence supports combining multiple cancer types, stages, and treatment types in an intervention trial unless the sample is large enough to perform subgroup analysis.

Types of Interventions
Interventions described in the 16 studies can be categorized into genitourinary rehabilitation (n = 1), psychoeducational interventions (n = 12), or a combination of interventions (n = 3).

Genitourinary: The genitourinary rehabilitation intervention involved a single-group study of patients with cervical cancer treated with radiation (Schroder et al., 2005). The intervention consisted of a nurse practitioner teaching participants how to use a therapy device for clitoral engorgement at home (Schroder et al., 2005).

Psychoeducational: Most of the interventions (n = 12) were psychoeducational in nature (Aktaş & Terzioğlu, 2015; Barsky Reese et al., 2012, 2014; Broatto et al., 2008, 2012; Caldwell et al., 2003; Chow et al., 2014; Classen et al., 2013; DuHamel et al., 2016; Maughan & Clarke, 2001; Schover et al., 2013; Scott et al., 2004). Although the level of detail provided about the psychoeducational programs varied greatly, programs generally included a combination of education, communication coaching, coping techniques, and components of sexual therapy. Education topics generally included the disease process, changes in sexuality, symptoms after treatment, arousal-enhancing techniques, and the use of dilators, lubricants, or pelvic floor muscle strengthening. Communication coaching often consisted of talking with a partner or a healthcare provider about changes in sex and intimacy. Counseling for coping with cancer and sexual changes involved challenging maladaptive beliefs, cognitive scripts, active problem-solving, mindfulness, and dealing with common concerns associated with treatment. Interventions were most frequently delivered by nurses, advanced
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<tr>
<td>Aktaş &amp; Terzioglu, 2015 (Turkey)</td>
<td>70 women, 44% with ovarian, 40% with endometrial, and 16% with cervical cancer; mean age of 49.3 years; partner status not reported; randomized case control study; Golombok-Rust Inventory of Sexual Satisfaction</td>
<td>Goal: SW; individual; in person, on site, and at home; intervention group received nursing care in 3 hospital (pre- and postop and discharge teaching) and 2 home visits (week 1 and 12 weeks postop) using specifically developed nursing care plans for sexual problems (length of visits not described); control group received care as usual; duration was 12 weeks; assessments occurred pre- and postintervention.</td>
<td>Treatment was superior to control in improving sexual functioning and satisfaction (p &lt; 0.05).</td>
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<td>Bakker et al., 2017 (Netherlands)</td>
<td>20 women, 90% with cervical, 5% with vaginal, and 5% with endometrial cancer; mean age of 40 years; 70% were partnered; single-group study; Female Sexual Function Index and Female Sexual Distress Scale; frequency of vaginal dilation was a SW measure.</td>
<td>Goal: SW; individual, but partners were invited to join sessions; in person and on site; treatment group received 4 counseling sessions at 1, 2, 3, and 6 months postradiation (additional session offered between 6–12 months, length of sessions not reported); instruction on dilator use but also included education on diagnosis and treatment, effects on sexuality, couples mutual coping, and body image or relationship concerns; duration was 6 months; assessments occurred at baseline and at 1, 6, and 12 months postradiation.</td>
<td>Outcomes at 12 months postradiation were better than at 1 and 6 months postradiation treatment for sexual functioning (p = 0.015); at 6 months, 88% dilated at least twice weekly; at 12 months, 75% dilated twice weekly and 92% dilated once weekly, but often with alternative methods; sexual distress, depression, anxiety, and relationship satisfaction did not change over time.</td>
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<td>Barsky Reese et al., 2012 (United States)</td>
<td>9 couples, 67% with rectal and 33% with colon cancer; mean age of 61.6 years; 44% were women; single-group study; Index of Sexual Satisfaction, Female Sexual Function Index, Dyadic Sexual Communication Scale, and Miller Social Intimacy Scale</td>
<td>Goal: SW; couples; phone-based; intervention group received 4 weekly 50-minute psychoeducational sessions involving behavioral coping skills and sex and couple/marital therapy techniques; duration was 4 weeks; assessment occurred pre- and postintervention.</td>
<td>Sexual function (d = 1.15), sexual distress (d = –1.01), sexual communication (d = 0.82), intimacy (d = 0.29), and relationship adjustment (d = 0.33) were better postintervention.</td>
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<td>Barsky Reese et al., 2014 (United States)</td>
<td>18 couples, 56% with rectal and 54% with colon cancer; mean age of 52.6 years; 33% were female patients (all couples were of opposite sex); RCT; Index of Sexual Satisfaction, Dyadic Sexual Communication Scale, Female Sexual Function Index, Sexual Function Questionnaire Medical Impact Subscale, and Miller Social Intimacy Scale</td>
<td>Goal: SW; couples; phone-based; intervention group received 4 weekly 50-minute psychoeducational sessions teaching behavioral coping skills, integrating sex and couple/marital therapy techniques; wait-list control; duration was 4 weeks; assessments occurred pre- and postintervention.</td>
<td>Correlates: self-efficacy for enjoying intimacy, self-efficacy for communicating effectively, self-efficacy for dealing effectively, depressive symptoms, impact on sexual function, and intimacy; sexual function (d = 0.85), medical impact on sexual function (d = –0.66), and self-efficacy for enjoying intimacy (d = 0.66) were superior in the intervention group; sexual distress (d = 0.05), intimacy (d = –0.06), self-efficacy for communicating sexual issues (d = 0.02), and self-efficacy for dealing effectively with sexual difficulties (d = –0.08) were the same in both groups; sexual communication (d = –0.3) was superior in the control group.</td>
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### TABLE 1. Overview of Study Characteristics, Correlates of SW, and Reported Outcomes (N = 16) (Continued)

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<td>Broto et al., 2008 (Canada)</td>
<td>22 women, 59% with cervical and 41% with endometrial cancer; mean age of 49.4 years; all were heterosexual and partnered; mixed-methods study (single group and interviews); Detailed Assessment of Sexual Arousal, Female Sexual Function Index, Female Sexual Distress Scale, Sexual Function Questionnaire, Sexual Beliefs and Information Questionnaire, Film Scale, and vaginal pulse amplitude</td>
<td>Goal: SW; individual; in person and on site; intervention group received 3 monthly 60-minute psychoeducational sessions using education, challenging maladaptive beliefs, and sex therapy techniques; wait-list control; duration was 3 months; assessment occurred pre- and postintervention.</td>
<td>Correlates: depressive symptoms, cancer type, surgery type, radiation therapy, and hormone replacement status; sexual function (p &lt; 0.01), sexual distress (p &lt; 0.001), depressive symptoms (p &lt; 0.01), mental health quality of life (p &lt; 0.001), mental sexual excitement (p &lt; 0.01), and genital tingling/throbbing (p &lt; 0.05) were superior postintervention; relationship adjustment, physical quality of life, physiologically measured genital arousal, perceived genital arousal, and pleasurable sexual genital sensations were the same pre- and postintervention.</td>
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<td>Broto et al., 2012 (Canada)</td>
<td>31 women, 26% with cervical, 65% with endometrial, and 10% with both cancers; mean age of 54 years; 84% were partnered; RCT (unless women had a scheduling conflict); Female Sexual Function Index, Female Sexual Distress Scale, Sexual Function Questionnaire, and vaginal pulse amplitude</td>
<td>Goal: SW; individual; in person and on site; intervention group received 3 monthly 90-minute psychoeducational sessions using education, mindfulness, pelvic floor health, and sex therapy techniques; wait-list control; duration was 3 months; assessment occurred preintervention and at 1 and 6 months postintervention.</td>
<td>Sexual function (p &lt; 0.001) and perception of genital arousal (p = 0.014) were superior in the intervention group; sexual distress, treatment impact on sexual function, relationship functioning, depressive symptoms, and physiologically measured genital arousal were the same in both groups.</td>
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<td>Caldwell et al., 2003 (United States)</td>
<td>18 women, 21% with cervical, 68% with endometrial, 5% with uterine, and 5% with other cancers; mean age of 47.1 years; 63% were married; single-group study; Changes in Sexual Functioning Questionnaire</td>
<td>Goal: SW; group, in person, and on site; intervention group received weekly 90-minute facilitated group sessions focusing on communicating with partners, coping with treatment effects, providing support, and allowing expression of emotions; duration was 12 weeks; assessment occurred pre-, post-, and 3 months postintervention.</td>
<td>Changes in sexual function (p &lt; 0.01) and mood (p = 0.01) were superior postintervention.</td>
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<td>Chow et al., 2014 (China)</td>
<td>26 women, 23% with cervical, 50% with uterine, and 27% with ovarian cancer; mean age of 54.5 years; 85% were partnered; mixed-methods study (RCT and interviews); Sexual Function and Vaginal Changes Questionnaire</td>
<td>Goal: SW and coping with cancer; individual and group; on site and via telephone; intervention group received 4 sessions (45–60 minutes in person preop, 30–45 minutes in person immediate postop, 30 minutes via telephone 4 weeks postop, 60 minutes in person and in a small group 8 weeks postop) with education on treatment, coping with treatment effects, communication, social role, social support, sexuality, and body image; attention control (in person and on site via telephone and self-help group); duration was about 8–12 weeks; assessment occurred pre-, post-, and 8 weeks postop.</td>
<td>A statistically significant difference was found between control and intervention groups after 2 education sessions (p = 0.026); intervention group received less inconsistent information about the illness after the operation in the hospital compared to baseline; quality of life, uncertainty in illness (ambiguity, complexity, unpredictability), anxiety and depressive symptoms, and social support were the same in both groups; sexual function measured only at 8 weeks postintervention (no baseline)</td>
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<td>Classen et al., 2013 (Canada)</td>
<td>27 women, 52% with cervical, 15% with ovarian, and 33% with uterine cancer; mean age of 42.3 years; 60% were married or living common law; RCT; Female Sexual Distress Scale-Revised</td>
<td>Goal: SW; group; online; intervention group received 12 weeks of access to a moderated asynchronous discussion forum/support group with weekly topical educational materials and one synchronous 90-minute session with physician moderators; wait-list control; duration was 12 weeks; assessment occurred preintervention and at 1 and 5 months postintervention.</td>
<td>All outcome variables (no significant p values) were the same in both groups; however, the intervention group experienced less sexual distress (d = 0.31) and greater intimacy (d = 0.28).</td>
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<td>DuHamel et al., 2016 (United States)</td>
<td>70 women, 70% with rectal and 30% with anal cancer; mean age of 55.4 years; 57% were married or partnered; RCT (stratified block randomized on stoma, chemotherapy, and menopausal status); Female Sexual Function Index</td>
<td>Goal: SW; individual; in person and via telephone; intervention group received four 60-minute manualized psychoeducational sessions (timing not documented) with 3 follow-up calls after the first 3 sessions; sessions covered sexual health, strategies for sex and overall health, effective partner communication, and educational resources; control was assessment only, and group was offered the intervention after assessment; duration was 3 months; assessment occurred at baseline and at 4 and 8 months.</td>
<td>All outcome variables were the same in both groups; sexual functioning, emotional functioning, and impact of events (d = 0.51–0.72) were greater 4 months postintervention; sexual functioning, quality of life, and impact of events (d = 0.52–1.13) were greater 4 months postintervention for sexually active women.</td>
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<td>Li et al., 2016 (China)</td>
<td>226 women, all with cervical cancer; mean age of 46 years; partner status not reported; RCT; Female Sexual Function Index</td>
<td>Goal: SW and coping with cancer; individual; in person (hospital), at home, via telephone, and online; intervention group received a health program with physiologic rehabilitation (pelvic floor muscle training), emotion-release management (yoga, timing not reported), and an informal social support system and follow-up monitoring via online, a telephone call every 2 weeks, and a home visit every 2–3 months if permitted; control group received usual care; duration was 6 months; assessment occurred pre- and postintervention.</td>
<td>Quality of life (p = 0.000), sexual function (p = 0.000), family cohesion (p = 0.001), and family adaptability (p = 0.000) were superior in the intervention group.</td>
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<td>Maughan &amp; Clarke, 2001 (United Kingdom)</td>
<td>62 women with varied gynecologic cancers; mean age of 50 years; partner status not reported, but 64% of those in the quantitative portion were sexually active; mixed-methods study (RCT and interviews); Lasry Sexual Functioning Scale used for patients with breast cancer</td>
<td>Goal: SW and coping with cancer; individual, but partners were encouraged to participate; in person and at home; intervention group received a specialist nurse visit preop and 3 other times on average (no maximum, no set frequency or length reported); nurse provided emotional support, education on treatment and effects, coping strategies, social role exploration, and advice on resumption of sexual activity and partner communication; control received usual care; duration was about 4–6 weeks; assessment occurred preop and at 6, 12, and 24 weeks postop.</td>
<td>Correlates: quality-of-life subscales of social functioning, sleep disturbance, fatigue, and emotional functioning; global health status (p = 0.04) and sleep disturbance (p = 0.02) were superior in the intervention group; emotional functioning, cognitive functioning, social functioning, and sexual functioning were the same in both groups.</td>
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<td>Schover et al., 2013 (United States)</td>
<td>58 women, 81% with breast and 19% with gynecologic cancer; mean age of 53 years; all were partnered; two-group study with repeated measures; Female Sexual Function Index and Menopausal Sexual Interest Questionnaire</td>
<td>Goal: SW; individual; online, in person, and on site; intervention group received 12-week access to educational website versus access to educational website plus 3 in-person counseling sessions guiding women through the website content and discussing behavioral homework; duration was 12 weeks; assessment occurred pre-, post-, and 3 and 6 months postintervention.</td>
<td>Counseled group: sexual function (p &lt; 0.001) and sexual interest (p &lt; 0.001) were superior postintervention; depressive symptoms and quality of life were the same pre- and postintervention; self-help group: depressive symptoms (p = 0.011) and quality of life (p = 0.0008) were better postintervention; sexual function and sexual interest were the same pre- and postintervention; groups combined: sexual function (p &lt; 0.001) and sexual interest (p &lt; 0.001) were superior postintervention; sexual function (p = 0.024) and sexual interest (p = 0.011) were better in the counseled group versus the self-help group postintervention.</td>
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<td>Schroder et al., 2005 (United States)</td>
<td>13 women, all with cervical cancer; median age of 43 years; all were partnered and heterosexual; single-group study; Female Sexual Function Index and Derogatis Interview for Sexual Functioning</td>
<td>Goal: SW; individual; in person and on site instruction for home use with telephone follow-up calls (no dose reported); a provider taught the intervention group how to use a handheld vacuum device for clitoral engorgement; participants were instructed to use the device 4 times weekly either in partnered sex play or self-stimulation; duration was 3 months; assessment occurred pre- and postintervention.</td>
<td>Sexual function by two measures (p &lt; 0.001) and affectional expression (p = 0.003) were superior postintervention; dyadic consensus, dyadic satisfaction, and dyadic cohesion were the same pre- and postintervention.</td>
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<td>Scott et al., 2004 (Australia)</td>
<td>94 couples, 61% with breast, 22% with cervical, 10% with uterine, 6% with endometrial, and 1% with ovarian cancer; mean age of 51 years; all were women with partners; mixed-methods study (RCT and interviews); Psychosocial Adjustment to Illness Scale–Self Report Sexual Difficulties subscale, Sexual Self-Schema Scale, Brief Index of Sexual Functioning for Women</td>
<td>Goal: SW and coping with cancer; couple; in-person, at home, and telephone follow up; PC intervention group received an educational booklet, four 2-hour in-home coping training and supportive counseling sessions (education, coping strategies), and three 30-minute telephone calls; CanCOPE intervention group received an educational booklet, five 2-hour in-home coping training and supportive counseling sessions with the patient and partner (education, couple-coping strategies, supportive communication, sexual counseling), and two 30-minute telephone calls; control group received an educational booklet and five 15-minute telephone calls; duration was about 6 months; assessment occurred preintervention, postintervention, and at 6 and 12 months.</td>
<td>Correlates: partner’s sexual problems; observed supportive communication (p &lt; 0.05), sexual sex schema (d = 0.8, p &lt; 0.05), psychological distress (d = 0.22, p &lt; 0.05), coping effort (d = 0.64, p &lt; 0.05), avoidance of negative thoughts and behaviors (p &lt; 0.05), and sexual intimacy (d = 0.91, p &lt; 0.05) were superior in the CanCOPE group versus the PC and control groups; body image, sexual function (desire, arousal, orgasm, communication), and intrusive negative thoughts were the same in all groups.</td>
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practice nurses, or clinical psychologists; many had training specifically in sex therapy.

**Combination:** Three studies combined genitourinary rehabilitation with psychoeducation (Bakker et al., 2017; Li et al., 2016; Yang, Lim, Rah, & Kim, 2012). In the Yang et al. (2012) study, women treated for cervical or endometrial cancer participated in a pelvic floor rehabilitation program. Participants received weekly abdominopelvic exercise sessions with biofeedback and lifestyle counseling sessions to prepare them for home-based exercise. In the Li et al. (2016) study, postoperative patients with cervical cancer received a multifaceted home-based health program that included a tailored interprofessional care team who provided advice, pelvic floor muscle training, yoga, education, support for the creation of an informal social support system, and follow-up monitoring with online and telephone communications. In the Bakker et al. (2017) study, women undergoing radiation therapy for gynecologic cancer received a nurse-led sexual rehabilitation intervention targeting sexual recovery and vaginal dilatation. Women received in-person counseling sessions primarily with instruction on dilator use but also education on diagnosis and treatment, effects on sexuality, couples’ mutual coping, and body image or relationship concerns.

**Intervention Delivery Format**

Intervention formats varied across studies and included phone-based (Barsky Reese et al., 2012, 2014), Internet-based (Classen et al., 2013; Schover et al., 2013), home-based (Li et al., 2016; Maughan & Clarke, 2001), or clinic-based interventions for practice at home (Schröder et al., 2005; Yang et al., 2012). Other interventions combined some of these formats (Aktaş & Terzioglu, 2015; Bakker et al., 2017; Brotno et al., 2008; Caldwell et al., 2003; Chow et al., 2014; DuHamel et al., 2016; Li et al., 2016; Scott et al., 2004).

The interventions were delivered to individuals, couples, or groups in therapy sessions. Three studies assessed interventions focused on the couple (Barsky Reese et al., 2012, 2014; Scott et al., 2004). Two studies evaluated interventions delivered through group format, one in-person group (Caldwell et al., 2003) and one online group (Classen et al., 2013). The remainder of the interventions were delivered to women individually, although two articles stated that sexual partners were encouraged to participate in the intervention sessions (Bakker et al., 2017; Maughan & Clarke, 2001), but no data were reported on partner participation rates or partner variables. The dose of the interventions varied, ranging from 2–12 sessions (Aktaş & Terzioglu, 2015; Bakker et al., 2017; Barsky Reese et al., 2012, 2014; Brotno et al., 2008, 2012; Caldwell et al., 2003; Chow et al., 2014; Classen et al., 2013; DuHamel et al., 2016; Maughan & Clarke, 2001; Schover et al., 2013; Scott et al., 2004; Yang et al., 2012), with session duration ranging from 45–90 minutes (Barsky Reese et al., 2012, 2014; Brotno et al., 2008, 2012; Caldwell et al., 2003; Chow et al., 2014; DuHamel et al., 2016; Yang et al., 2012).

**Intervention Format Considerations**

Interventions were included if they targeted at least one physiologic, psychological, or relational aspect.
of sexual well-being. No intervention components targeted all three aspects of sex and intimacy (physiologic, psychological, and couple-based relational).

Inconsistency of the psychoeducational intervention content limits recommendations for best practice. Four studies described a specific session-by-session syllabus (Barsky Reese et al., 2012; Brotto et al., 2008, 2012; Chow et al., 2014), whereas other descriptions were more general. Nine studies instructed participants for home practice (Bakker et al., 2017; Barsky Reese et al., 2012, 2014; Brotto et al., 2012; Caldwell et al., 2003; DuHamel et al., 2016; Li et al., 2016; Schroder et al., 2005; Yang et al., 2012), although few measured adherence at home. Yang et al. (2012) mentioned that participants received a diary as part of their educational packet but did not describe instructions for how to complete it or whether the authors collected adherence data from the diaries. Both online interventions recorded participant use (Classen et al., 2013; Schover et al., 2013), and one reported outcomes based on intent-to-treat and adequate dose criteria (minimum of 12 posts) (Classen et al., 2013).

Questions remain about the ideal delivery format of sexual well-being interventions. Studies reviewed targeted women or couples and were delivered to individuals or groups. Location of intervention delivery occurred in the hospital or clinic, at the patient’s home, via telephone, or online. None of the studies with interventions primarily targeting sexual wellbeing were designed and/or powered to identify a superior delivery format. Studies with interventions provided in group format (all women) suggested the importance of social support (Caldwell et al., 2003; Chow et al., 2014), whereas interventions provided via telephone suggested convenience and the possibility that individuals and couples may have been more open and honest about sensitive subjects on the telephone versus in person with a counselor or interventionist (Barsky Reese et al., 2014; Cox et al., 2008). Intervention studies were usually proof-of-concept pilot studies and, therefore, were not powered or designed to evaluate dosing and duration considerations.

**Effectiveness of the Interventions**

Ten of the 16 intervention studies were proof-of-concept pilot studies to determine feasibility, acceptability, and effect size for future sample size determination (Bakker et al., 2017; Barsky Reese et al., 2012, 2014; Brotto et al., 2008; Caldwell et al., 2003; Chow et al., 2014; Classen et al., 2013; DuHamel et al., 2016; Schroder et al., 2005; Yang et al., 2012), and preliminary efficacy was reported as a secondary aim. Efficacy was reported for sexual well-being outcomes and as outcomes hypothesized to relate to sexual well-being, such as depressive symptoms, quality of life, and relationship adjustment. Efficacy varied, with the authors reporting significant differences, effect sizes, or both. Most studies (n = 14) revealed a positive intervention effect on some measure of sexual well-being, with two exceptions (Chow et al., 2014; Maughan & Clarke, 2001).

Outcomes measures to assess sexual well-being concepts varied significantly. Eighteen distinct measures of sexual well-being concepts were reported, not including sexual health subscales of the quality-of-life scales many authors used as outcome measures. This variability in outcome measures is consistent with the findings of a systematic review of self-reported sexual function measures administered to women with cancer from 2008–2014 (Jeffery et al., 2015).

**Impact of Interventions on Outcomes**

All studies, aside from the two exceptions (Chow et al., 2014; Maughan & Clarke, 2001), reported a positive effect of the intervention on some measure of sexual well-being. However, small sample size, variability of intervention content, and lack of dose comparison limit recommendations for clinical application without additional research. Limitations to outcome evaluation in some studies also stem from a lack of assessment of whether women were bothered or distressed by changes in their sexual functioning after cancer treatment. Basing sexual well-being outcomes on measures primarily focused on genital function, sexual response cycle, and heteronormative penetrative intercourse may miss important aspects of women’s intimate relationships with their partners.

Half the studies assessed sexual distress or sexual (dys)function and used the results as a screening tool (inclusion or exclusion criteria) to target the intervention toward women at higher risk for poor sexual well-being outcomes (Barsky Reese et al., 2012, 2014; Brotto et al., 2008, 2012; Classen et al., 2013; DuHamel et al., 2016; Schover et al., 2013; Schroder et al., 2005). Increased reporting of correlates of sexual well-being outcomes and variables that interact with the intervention is important for assessing the complexities of women’s multifaceted sexual well-being in survivorship and who may be more likely to benefit from the intervention.

Evaluating women’s baseline sexual well-being prior to a cancer diagnosis is a challenge. Knowing whether sexual well-being at baseline in these studies
In a study evaluating a psychoeducational intervention in women treated for cancer (Den Oudsten et al., 2012; Levin et al., 2010; Perz, Ussher, & Gilbert, 2014), depressive symptoms and quality-of-life components were related to sexual well-being. Depressive symptoms were found to be correlated with sexual function pain scores ($r = -0.55$), relationship adjustment ($r = -0.46$), and sexual distress ($r = 0.58$) in a psychoeducational intervention study of women treated for gynecologic cancer (Brotto et al., 2008). In another psychoeducational intervention study, scores on the Lasry Sexual Functioning Scale were significantly correlated with scores on the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire subscales for social functioning, sleep disturbance, fatigue, and emotional functioning (correlation values not reported) (Maughan & Clarke, 2001).

**Interactions of variables with interventions for sexual well-being:** In a study evaluating a psychoeducational intervention in women with gynecologic cancer, Brotto et al. (2008) identified significant interactions of the intervention with depressive status, cancer type, surgery type, and hormone status. Specifically, Brotto et al. (2008) found that women who were initially more depressed showed more improvement in arousal after the intervention ($F[1,13] = 7.16, p = 0.019$). In addition, women with cervical cancer had higher scores on perceived genital arousal postintervention than women with endometrial cancer ($F[1,16] = 5.6, p = 0.031$). Women receiving radical hysterectomy showed greater improvements in perceived arousal than women receiving simple hysterectomy ($F[1,16] = 10.94, p = 0.004$). Hormonally replete women had higher perceived genital arousal following the intervention than women who did not receive hormones ($F[1,16] = 9.73, p = 0.007$) (Brotto et al., 2008).

**Discussion**

Optimizing women’s sexual well-being after cancer through effective interventions is important to quality of life in survivorship. Interventions to improve sexual well-being may be particularly relevant when the lower pelvis, pelvic floor, or perineum are adversely affected by treatment, particularly considering that culture considers penetrative vaginal coitus to be the norm. However, interventions to improve the sexual well-being of women and couples have not

**Correlates of Sexual Well-Being**

Observational literature on colorectal cancer (Breukink & Donovan, 2013; Den Oudsten et al., 2012; Milbary, Cohen, Jenkins, Skibber, & Schover, 2013; Panjari et al., 2012; Traa et al., 2012) and gynecologic cancer (Carter et al., 2013; Krychman & Millheiser, 2013; Levin et al., 2010; Rowlands, Lee, Beesley, & Webb, 2014) have reported correlates of sexual well-being. Four intervention studies in this review reported sexual well-being correlates (Barsky Reese et al., 2014; Brotto et al., 2008; Maughan & Clarke, 2001; Scott et al., 2004). The current authors divided sexual well-being correlates into three categories: sexual well-being variables, related concepts, and interactions of these variables with an intervention for sexual well-being.

**Sexual well-being variables:** For this review, the authors defined sexual well-being as a multifaceted concept, incorporating physical, psychological, and relational variables of sex and intimacy. Two interventions revealed associations among sexual well-being variables. In one study, reports of sexual problems were moderately correlated ($r = 0.62$) for sexually active couples (women with male partners) participating in a couples intervention for coping with breast and gynecologic cancer (Scott et al., 2004). In a telephone-based couples intervention for sexual well-being in colorectal cancer (Barsky Reese et al., 2014), sexual distress was correlated with sexual communication ($r = -0.59$), intimacy ($r = -0.72$), and medical effect on sexual function ($r = 0.54$). Intimacy was associated with sexual communication ($r = 0.64$). Sexual distress, sexual communication, and intimacy were significantly associated with all three self-efficacy items: self-efficacy to communicate effectively about issues related to physical intimacy or sex, self-efficacy to deal effectively with sexual difficulties, and self-efficacy to enjoy intimacy despite physical limitations ($r = 0.58-0.79$). Medical effect on sexual function was correlated with self-efficacy to enjoy intimacy ($r = 0.47$).

**Related concepts:** In larger observational studies of sexual well-being in women treated for cancer (Den Oudsten et al., 2012; Levin et al., 2010; Perz, Ussher, & Gilbert, 2014), depressive symptoms and quality-of-life components were related to sexual well-being. Depressive symptoms were found to be correlated with sexual function pain scores ($r = -0.55$), relationship adjustment ($r = -0.46$), and sexual distress ($r = 0.58$) in a psychoeducational intervention study of women treated for gynecologic cancer (Brotto et al., 2008).
been tested rigorously and on a large scale to make conclusions about factors related to efficacy, such as content, dose, or delivery format of interventions.

This review had four results related to conclusions about methods, formats of interventions, selection of outcomes measures, and the effect of existing interventions. First, methodologic inconsistencies reviewed previously, including lack of randomization, lack of a control group, or combination of cancer types into one sample, weaken the authors’ ability to make recommendations for practice based on intervention efficacy. Second, the variety of intervention content and delivery formats limits specific recommendations for practice. Aside from the CanCOPE study (Scott et al., 2004), intervention studies on sexual well-being in women with gynecologic or rectal cancer were not designed or powered to evaluate the superiority of intervention content (genitourinary rehabilitation, psychoeducation, or both), dose, or delivery format (individual, couple, or group; in person, via the telephone, or online). Third, the number of sexual well-being outcomes used in the studies (18 dedicated measures of sex or intimacy) illustrates inconsistency in the understanding of which sexual well-being outcomes are most relevant to women after cancer treatment and how to best measure them. It also prevents comparison of outcomes across studies or the combination of data for meta-analysis. Last, small sample size, which is common to pilot studies, limited the extrapolation of intervention outcomes for use in clinical practice.

Limitations

Intervention study design was not an exclusion criterion for this review and, therefore, contributed to heterogeneity of design and limited strength of evidence. The intervention literature remains in an early proof-of-concept stage, so the heterogeneity of intervention types and content is valuable for determining what treatment and delivery format is feasible, acceptable, preliminarily effective, and clinically relevant. Cancer types were limited to gynecologic, anal, and rectal cancer. Treatment for many cancer types is associated with poor sexual well-being outcomes, but disruption of the perineum and lower pelvis from treatment most likely will limit women’s ability to perform penetrative vaginal coitus, which remains the predominant cultural standard. The authors propose that multifaceted interventions involving education, improved self-efficacy, relationship and sex therapy, and genital-directed therapy (lubricants, dilators, stimulators, pelvic floor muscle exercises) would be efficacious for women treated for any type of cancer. Results of this review may also be affected by publication bias or by the exclusion of non-English language publications. Despite the rigorous literature search procedure, the authors may not have identified all intervention studies to improve women’s sexual well-being after gynecologic, anal, or rectal cancer treatment.

Implications for Research and Practice

Study design and reporting are important for strength of evidence and ability to perform a combined analysis. RCTs of interventions are preferred, and reporting should follow a standardized format, such as the Consolidated Standards of Reporting Trials guideline (Schulz, Altman, & Moher, 2010). Studies with larger sample sizes, treatment fidelity strategies, and participant adherence would add great value to the literature. Additional research is needed to confirm the specific components of successful interventions, as well as the dose (frequency and duration) of treatment. The next step after conducting proof-of-concept intervention pilots is to validate efficacy in large-scale studies. Studies targeting specific populations, such as people with a specific cancer type (e.g., head and neck, brain, blood), racial or ethnic minorities, and sexual minorities, are important to evaluate how the interventions perform in subgroups of survivors. Intervention studies should target one cancer or treatment type or be powered to perform subgroup analysis.

Future studies should also be powered to identify superior content and delivery formats (individual woman-, group-, or couples-based interventions; delivered in person, via the telephone, online, or in a combination of formats). Future studies targeting couples should have a clear and systematic strategy for including women’s partners. Reporting partner adherence rates is also important and would have added value.
Future research may benefit from screening for levels of sexual distress prior to enrollment or risk stratifying based on distress. Incorporating measures of self-efficacy and methods to increase self-efficacy will be important for future health behavior change interventions. There is also an opportunity to assess sexual well-being and related variables (depression, relationship satisfaction, quality of life) at high-risk clinics prior to a cancer diagnosis, such as the sexual well-being of women with abnormal mammograms who come for evaluation and potential treatment. This would add valuable information about changes in women’s sexual well-being after treatment and who may be at higher risk for poor sexual well-being and, therefore, more likely to benefit from an intervention.

None of the studies included in this review referenced models or theoretical frameworks that guided the research. Models have been suggested for general female sexual function (Basson, 2001; Masters & Johnson, 1966) and relationship intimacy after cancer (Manne & Badr, 2008), which define intimacy as a process whereby an individual expresses important self-relevant feelings and information to another and, as a result of the other’s response, believes that he or she is understood, validated, and cared for. A model proposed for female sexual health after breast cancer includes several categories of predictor variables to approach sexual well-being in a more comprehensive, biopsychosocial way (Ganz, Desmond, Belin, Meyerowitz, & Rowland, 1999). In this model, demographic and personal characteristics, cancer- and medical-related variables, body image, partner relationship, and health-related quality of life each affect the sexual health outcomes of sexual interest, sexual dysfunction, and sexual satisfaction in a unidirectional manner. The current authors would argue that this model could be enhanced by consideration of more complex and interactive relationships; the addition of cultural influences and larger, system-level influences like media portrayals of beauty and sex; cultural, political, or gendered expectations for what constitutes real sex; and the healthcare industry impact (e.g., reimbursement or prioritizing sexual health in research, patient-reported outcomes, standards of practice), among others.

Because of the variety of intervention types and delivery formats, as well as outcome measures used for sexual well-being, this field needs analysis related to multifactorial sexual well-being in cancer survivors and a testable conceptual framework related to mechanisms of sexual well-being interventions for women treated for cancer. Researchers should include intervention outcome variables that reflect the multidimensional nature of sexual well-being. Correlates of sexual well-being and hypothesized relationships among variables should be incorporated into a comprehensive theoretical framework for predictors of sexual well-being after cancer treatment. Following development of a comprehensive framework, researchers in the field should use the framework to develop research questions and report results in ways that may support or critique constructs and relationships to refine the framework.

**Conclusion**

This review illustrated a variety of intervention approaches in the proof-of-concept phase for women’s sexual well-being after treatment for gynecologic, anal, and rectal cancer. Preliminary efficacy, feasibility, and acceptability by participants are promising, but larger studies following standardized methodology and reporting techniques, as well as consistent operations of sexual well-being, are imperative. Additional studies should include intervention components that have had a positive impact on sexual well-being, such as elements of sex therapy. Interventions should bolster self-efficacy, address physical limitations to participants’ preferred sexual contact (vaginal lubrication, clitoral stimulation, pelvic floor muscle strengthening), educate about cancer treatment effects, and include partners for mutual coping and support. Studies should also be designed to discern optimal delivery format, dose, and timing of the intervention in relation to completion of cancer therapy.

Incorporation of cancer community members, healthcare providers, and insurers to the design, implementation, and evaluation of interventions for women’s sexual well-being would increase the likelihood of adherence, clinical relevance, and financial feasibility. Interprofessional collaboration strengthens researchers’ comprehensive approach and broadens perspective. Development of a testable theoretical framework for women’s sexual well-being after cancer treatment will advance science by allowing researchers to identify targets for intervention and address how study outcomes fit into the bigger picture of women’s sexual well-being after cancer treatment. Last, activating women’s sexual health and cancer survivorship organizations to advocate for the priority of interventions may promote grant funding for larger studies. Together, these recommendations can improve sexual well-being and quality of life for female survivors of cancer.
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