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Review

Sexual Dysfunction in Female Rectal and Anal Cancer Survivors: Pathophysiology, Clinical Management, and Integration into Survivorship Care

Denise Drittone [1,*], Monia Specchia [1], Eva Mazzotti [1] and Federica Mazzuca [2].

[1] Medical Oncology Unit, Sant'Andrea Hospital in Rome, Rome, Italy

[2] Oncology Unit, Department of Clinical and Molecular Medicine, Sant'Andrea University Hospital, Sapienza University of Rome, Rome, Italy

* Correspondence: denise.drittone@uniroma1.it

Abstract

Background: Sexual dysfunction (SD) is a frequent but under-recognized consequence of treatment for rectal and anal cancers in women. While advances in oncologic therapy have improved survival rates, quality-of-life outcomes—particularly those related to sexual health—remain poorly integrated into survivorship care. A multidisciplinary understanding of the pathophysiological, psychological, and social factors contributing to SD is essential for holistic patient management. **Methods**: A narrative review was conducted to examine the impact of cancer treatments on female sexual function. Articles published in English between January 2000 and June 2025 were identified via PubMed. The search strategy used the following keywords combined with the Boolean operator "AND": female sexual dysfunction AND rectal cancer AND anal cancer AND pelvic surgery AND radiotherapy AND survivorship AND quality of life AND FSFI AND psychosexual care AND immunotherapy. Two independent reviewers (DD and MS) screened the titles and abstracts of the retrieved articles. Of the 100 articles initially identified, 70 met the inclusion criteria and were selected for full-text review and thematic analysis.To synthesize current evidence on female sexual dysfunction following rectal and anal cancer treatments, critically analyze the pathophysiological mechanisms and psychosocial implications, and propose evidence-based strategies for clinical assessment and multidisciplinary care. **Results**: Sexual dysfunction affects more than 60% of female survivor post-treatment, with symptoms including decreased libido, vaginal dryness, dyspareunia, and arousal difficulties. Pathophysiological drivers include estrogen/testosterone deficiency, autonomic nerve injury during pelvic surgery, and radiation-induced fibrosis. Psychological distress, body image changes, stoma-related stigma, and poor partner communication exacerbate the dysfunction. Validated instruments like FSFI are frequently used but lack specificity for pelvic cancer populations. Data show significant geographic variability, with greater stigma and reduced access to care in low- and middle-income countries. Immunotherapy-based regimens (e.g., dostarlimab in dMMR rectal cancer) may preserve pelvic anatomy and reduce SD, though sexual outcomes remain underexplored. **Conclusions**: Female sexual dysfunction after rectal and anal cancer is a multifactorial, highly prevalent condition that significantly impairs quality of life. Despite the recognized burden, sexual health remains insufficiently assessed and managed in oncologic follow-up. Multidisciplinary, culturally sensitive models integrating validated screening, psychosexual support, and individualized rehabilitation are urgently needed. Future research should include longitudinal designs, underrepresented populations, and dedicated endpoints on sexual health—especially in emerging treatment settings such as immunotherapy.

Keywords: female sexual dysfunction; rectal cancer; anal cancer; pelvic surgery; radiotherapy; survivorship; quality of life; FSFI; psychosexual care; immunotherapy

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1. Introduction

Colorectal cancer represents about 10% of global cancer cases, ranking second among women, who experience approximately 25% lower incidence and mortality than men [1]. Meanwhile, the incidence of anal cancer, largely driven by HPV-related squamous cell carcinoma, is steadily rising worldwide, with the sharpest increases seen in women over 50 years [2].

Advancements in the treatment of rectal and anal cancers have significantly improved survival, shifting clinical attention toward long-term quality of life in female patients. Among the critical dimensions of survivorship, sexual function remains a key aspect of biopsychosocial well-being and is often under-recognized in clinical oncology.

Despite its potential impact on quality of life, female sexuality post-treatment remains under-investigated, with a scarcity of gender-specific data and validated tools for assessment. Furthermore, the area of sexual dysfunction is not a priority for the clinician's assessments in the pre- and post-treatment phase.

Most literature focuses on male patients or includes mixed populations, thereby limiting its applicability to women specifically. Therefore, this review aims to synthesize and critically analyze available evidence on sexual dysfunction in women treated for rectal and anal cancers with surgery and/or chemoradiotherapy and it will explore pathophysiological mechanisms, clinical manifestations, assessment tools, and prevention or treatment strategies, emphasizing existing gaps and future research directions.

Sexual dysfunction after treatment for rectal and anal cancers can manifest as decreased libido, vaginal dryness, dyspareunia, difficulties with arousal or orgasm, and sexual avoidance [3]. Contributing factors include anatomical and neurological damage from surgery, side effects of pelvic radiotherapy, hormone alterations induced by chemotherapy, and psychological factors such as anxiety, depression, and altered body image.

This review aims to integrate clinical and practical perspectives by critically examining the limitations of current assessment tools and proposing potential pathways for the incorporation of sexual health into the comprehensive care of female patients who have completed treatment for rectal and anal cancer. Furthermore, this review seeks to outline strategies to bridge the gap between evidence synthesis and practical implementation in real-world oncology settings, thereby supporting a multidisciplinary approach to enhance sexual health and quality of life among female survivors of pelvic malignancies.

2. Physiology of Female Sexuality and Oncologic Impact

Female sexual function is a complex, multifactorial phenomenon influenced by biological, psychological, and relational factors. It relies on an intricate interplay between hormonal, vascular, neurologic, and psychological components. Under erotic stimulation, pelvic parasympathetic and sympathetic pathways mediate rapid genital vasocongestion, vaginal lubrication via transudation through the epithelium, and clitoral engorgement, while coordinated somatic and autonomic input facilitates arousal and orgasm. Estrogen and testosterone are essential for maintaining genital tissue integrity, vascular responsiveness, and libido, and psychological factors, including body image, mood, anxiety, and relationship dynamics, critically influence desire and satisfaction [4].

Oncologic treatments for colorectal or anal cancer often disrupt this system at multiple levels. Bilateral oophorectomy or chemoradiation-induced ovarian failure precipitates rapid hormonal withdrawal—especially estrogen and androgen deficiency, leading to vaginal atrophy, lubrication impairment, diminished libido, and dyspareunia [5,6]. Pelvic surgery (total mesorectal excision, abdominoperineal resection) may injure autonomic nerves involved in genital arousal, while pelvic radiation induces mucosal atrophy, fibrosis, and vascular injury, frequently resulting in vaginal shortening, stenosis, and pain during intercourse [7–9].

The impact of these dysfunctions is significant: a systematic review and meta-analysis encompassing 35 studies reported that over 60% of female cancer patients experience sexual

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dysfunction, with average FSFI scores below 20 across various tumor types, including colorectal and gynecological cancers [10]. FSFI is a validated multidimensional questionnaire widely used to assess female sexual function across six domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. Scores range from 2 to 36, with a total score below 26.55 generally indicating risk of sexual dysfunction. This instrument is frequently employed in oncologic research to objectively quantify sexual health outcomes [11].

In a prospective study of colorectal cancer survivors undergoing preoperative radiotherapy, FSFI total scores dropped significantly from 18.5 to 10.8 post-treatment ($p < 0.001$), reflecting widespread sexual function impairment [12]. Similarly, women treated with pelvic radiotherapy showed markedly lower FSFI scores compared to healthy controls (mean 8.5 vs. 13.5; $p = 0.049$) [13]. In anal cancer patients, significant reductions in sexual desire and increases in dyspareunia have been documented, with FSFI scores indicating severe deterioration in most quality-of-life domains except relational satisfaction [14].

Empirical data from a prospective cohort of colorectal/anal cancer survivors ($n = 97$) revealed that only approximately 50% remained sexually active post-treatment, among whom over 70% scored below the FSFI threshold for sexual dysfunction (total FSFI < 26.55). Median FSFI total scores were 21.8 within one year of treatment and remained low (median 22.6) beyond two years; desire subscale medians were around 3.0, significantly below clinical cutoffs [15]. Other studies report postoperative dysfunction prevalence ranging from 19% to 62%, with 30–40% of previously sexually active patients ceasing sexual activity altogether [16,17].

Pelvic radiation exacerbates these dysfunctions: registry data from Norway show that women receiving surgery plus (chemo)radiation have significantly higher rates of vaginal dryness (50% vs. 24%), dyspareunia (35% vs. 11%), and vaginal shortening (35% vs. 6%) compared to surgery alone, despite no differences in sexual interest [18].

Psychosocial factors such as altered body image, fecal incontinence, or stoma presence add to the burden, though physiological impairment appears to be the predominant driver of sexual dysfunction [15].

According to the NCCN Survivorship Guidelines (Version 2.2024), sexual dysfunction in female cancer survivors is inherently multifactorial, arising from physiological (e.g., menopause, mucosal injury), psychological, interpersonal, and treatment-induced causes. The guidelines recommend comprehensive, multidisciplinary evaluation and intervention including vaginal estrogen or lubricants, pelvic floor physical therapy, psychosocial or couples counseling, and lifestyle modifications. However, regenerative therapies like vaginal dilators or off-label medications currently lack strong supporting evidence [19].

Additionally, the psychological burden of infertility and body image changes following oncologic surgeries significantly affect sexual well-being and overall quality of life [20].

3. Rectal and Anal Cancer Surgery and Sexual Dysfunction

Surgical interventions, including low anterior resection (LAR), abdominoperineal resection (APR), and total mesorectal excision (TME), represent fundamental components in the management of locally advanced rectal cancer [21]. Pelvic surgeries risk injuring the autonomic nerves (hypogastric plexuses, pelvic splanchnic nerves), often leading to bladder, bowel, and sexual dysfunction. Precise anatomical knowledge is crucial for nerve-sparing techniques to reduce these complications [22]. Sexual dysfunction is highly prevalent among women after rectal cancer surgery, with studies reporting vaginal dryness in 72%, dyspareunia in 53%, perceived reduced vaginal dimensions in 29%, and low or absent sexual desire in 69% of patient post-treatment [23].

Damage to pelvic autonomic nerves can impair genital vasocongestion, lubrication, and clitoral sensitivity, leading to dyspareunia and reduced sexual satisfaction in women postoperatively. These dysfunctions reflect the complex interplay of hormonal, neurological, and vascular factors critical for female sexual function. The extent of dysfunction depends on tumor location, surgical resection, nerve-sparing techniques, and postoperative complications [24].

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During colorectal surgery, nerve injury risk is highest during ligation of the inferior mesenteric artery, posterior and lateral rectal mobilization, and deep anterior dissection near the prostate, potentially leading to autonomic dysfunction. Careful technique in these four key danger zones is essential to balance oncologic outcomes with nerve preservation [25]. Although APR remains the standard for low rectal tumors, it is associated with higher recurrence, poorer survival, and greater impacts on physical function, body image, and sexual health than LAR, underscoring the need for preoperative counseling and shared decision-making [26]. Also, with regard to TME, while it improves local control in rectal cancer, it often results in sexual and urinary dysfunction due to intraoperative nerve injury [27].

Advanced age, low tumor location, preoperative radiotherapy, and undergoing APR, ISR, or Hartmann procedures are independent risk factors for postoperative sexual dysfunction after rectal cancer surgery, likely due to higher risks of pelvic autonomic nerve injury [28].

These aspects highlight the need for structured preoperative counseling, nerve-sparing surgical strategies, and post-treatment sexual health support to optimize survivorship care in women undergoing rectal and anal cancer surgery.

4. Radiotherapy/Chemoradiotherapy: Late Effects on Sexual Function

Pelvic radiotherapy and chemoradiotherapy, key treatments for rectal and anal cancers, can lead to long-term female sexual dysfunction due to progressive tissue damage occurring months to years after treatment. Radiation-induced fibrosis, with excessive collagen deposition and scarring in the vaginal wall, pelvic floor muscles, and surrounding tissues, reduces tissue elasticity and compliance, contributing to pain and sexual difficulties [29,30].

Vaginal stenosis is a frequent late complication after pelvic radiotherapy, with incidence rates up to 88%, the underlying mechanisms include radiation-induced fibrosis, reduced vascularization, and epithelial atrophy. Preventive measures such as vaginal dilator use and maintaining sexual activity are recommended to reduce risk [31]. Radiation-induced peripheral neuropathy is a rare but increasing late effect in long-term cancer survivors, typically appearing years after treatment. It results from nerve compression due to fibrosis, direct nerve damage, and vascular ischemia. Incidence has decreased with modern radiotherapy, but when it occurs, it is often progressive and impacts quality of life [32]. This can be another critical mechanism of sexual dysfunction.

Modern radiotherapy techniques have evolved to minimize these adverse effects while maintaining oncologic efficacy. The use of intensity-modulated radiotherapy (IMRT), well-established in gynecologic cancers, is equally crucial in rectal and anal cancers to limit radiation exposure to the bladder, rectum, and pelvic floor. By reducing dose to these structures, IMRT may help preserve pelvic function and mitigate sexual dysfunction, improving survivors' long-term quality of life [33].

Overall, recognizing and managing these late effects is essential to optimize survivorship care and sexual health in women undergoing pelvic RT or CRT.

Chemotherapeutic agents, particularly alkylating agents such as cisplatin and 5-fluorouracil, can damage reproductive tissues and alter hormonal levels, leading to premature menopause, vaginal dryness, reduced sexual desire, and pain during intercourse [34]. Additionally, paclitaxel, a commonly used taxane, has been shown to contribute to ovarian dysfunction, increasing the risk of infertility and affecting the hormonal balance crucial for sexual function. Studies indicate that paclitaxel, like cisplatin, can lead to early ovarian failure and a decline in estrogen production, which in turn impacts vaginal lubrication and sexual satisfaction [35]. Furthermore, recent research suggests that chemotherapy can lead to changes in the central nervous system, reducing arousal and orgasmic response [36]. The combination of chemotherapy and radiotherapy has been shown to exacerbate these effects, resulting in a higher incidence of sexual dysfunction compared to patients receiving only surgical or radiotherapy treatments [35]. These long-term effects significantly compromise the sexual health and quality of life of cancer survivors.

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5. Psychological and Relational Aspects

Female sexual dysfunction following colorectal and anal cancer treatment is a multifaceted challenge, with psychological and relational factors playing a pivotal role in survivors' quality of life. While the physical sequelae of oncologic treatments, such as surgical nerve damage, hormonal changes, and radiation-induced tissue injury, are well documented, emerging evidence increasingly highlights that psychological distress is a critical and often under-addressed contributor to sexual dysfunction in this population [37,38].

Recent studies in colorectal and anal cancer survivors report high prevalence rates of anxiety, depression, and post-traumatic stress symptoms, which are strongly correlated with sexual dysfunction and reduced sexual satisfaction [39,40]. For example, a 2022 prospective cohort of female colorectal cancer survivors (n = 120) found that 58% experienced clinically significant depressive symptoms one-year post-treatment, with depression independently predicting poor sexual desire and arousal even after adjusting for physical impairments [39]. Johnson et al. reported that women treated for anal cancer frequently experience body image disturbances, particularly perineal scarring and stoma formation, which were significantly associated with sexual avoidance and relational strain [40].

Fecal incontinence, a common downstream consequence of sphincter-preserving surgery and pelvic radiation, is another major psychological burden. In a multicenter cohort of 85 women, those with incontinence reported markedly higher sexual distress and social withdrawal compared to continent survivors, highlighting the interplay between physiological symptoms and mental health [41].

Pain is highly prevalent among cancer patients and closely associated with symptoms of PTSD, depression, and psychological distress, highlighting a bidirectional interplay that worsens quality of life [42].

Relational dynamics further compound these challenges. Cancer and its treatments can deeply affect couple relationships, causing anxiety and intimacy challenges. Involving partners in sexual health discussions and providing couple-centered care can strengthen emotional support and improve quality of life. Healthcare professionals should be trained to address these issues to facilitate holistic cancer care [43]. Couple-based interventions in cancer care provide modest benefits for patients' physical health and partners' sexual relationship quality, while effects on sexual function and mental health remain uncertain. Integrating psychoeducation, skills training, and counselling supports communication and joint coping [44]. A mixed-methods study from 2021 showed that couples' emotional intimacy substantially decreased post-treatment, mediated by mutual avoidance of sexual discussions and fear of upsetting partners [45]. Chronic stress from cancer surveillance and fear of recurrence also contribute to persistent hypoactive sexual desire and reduced sexual activity [46].

Encouraging intervention data exists: cognitive-behavioral therapy, mindfulness, and couple-based counseling have shown significant improvements in sexual function and relational satisfaction when tailored to colorectal and anal cancer survivors [47,48]. Yet, despite growing evidence, psychological assessment and intervention remain inconsistently implemented in clinical practice [49].

The NCCN Survivorship Guidelines (2024) explicitly recommend multidisciplinary approaches that integrate psychological and relational care alongside physical symptom management, emphasizing early mood-disorder screening and sexual health counseling [50]. The ESMO Guidelines recommend systematic screening with validated tools throughout the cancer trajectory to enable early detection and intervention. An integrated approach combining psychotherapeutic strategies, such as cognitive behavioural and mindfulness-based therapies, with pharmacological treatments including SSRIs and SNRIs, is advised to enhance symptom management and patient outcomes [51]. Regarding epidemiological data, such as we show in the Table 1, in population-based Danish data (n = 2,402), women with a permanent stoma exhibited almost threefold increased risk of overall sexual dysfunction (OR 2.95, 95% CI 1.05–6.38) and significantly higher dyspareunia and vaginal narrowing,

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even after controlling for radiotherapy [52]. In broader European cohorts, colorectal cancer survivors report significantly higher rates of vaginal dryness (28–35% vs 5%) and dyspareunia (9–30% vs 0%) compared to normative controls [53]. Global data from low- and middle-income countries reveal sexual dysfunction prevalence among female survivors ranging from 24% to 80%, mostly linked to cultural taboos, lack of sexual health dialogue, and absence of integrated survivorship care [54]. In low, and middle-income countries [52], cultural taboos and stigma strongly limit sexual health dialogue, exacerbated by the absence of integrated survivorship care. Women often face shame and silence around sexual issues, which negatively impact their quality of life.

Italian qualitative studies [51] highlight similar challenges, including stigma related to stoma and communication barriers with healthcare providers, resulting in social withdrawal and sexual activity suspension in approximately 40% of female survivors. Other data [47,48] further emphasize the high burden of sexual dysfunction, especially in younger women, where more than 80% report dysfunction and psychological distress is strongly linked to diminished quality of life and reduced social support. Unfortunately, sexual health remains under-discussed in clinical settings, perpetuating relational strain and emotional distress.

Collectively, these data highlight that psychological suffering related to body image alteration, stoma-related stigma, incontinence, and inadequate support profoundly impacts sexual desire, activity, and satisfaction, often independent of physical symptoms. Cultural norms surrounding modesty and shame further inhibit help-seeking, reinforcing relational strain and intimacy disruption. Recognizing and addressing this psychological and social dimension is therefore critical in improving sexual and overall quality of life among survivors.

Future research should priorities the inclusion of underrepresented populations, including same-sex couples, and employ flexible delivery formats to enhance accessibility and participation. Moreover, the systematic involvement of partners within cancer care pathways may substantially improve quality of life and relational outcomes, supporting a more holistic and patient-centered model of oncology care [55].

Table 1. Regional Differences in Female Sexual Dysfunction Following Colorectal and Anal Cancer Treatment.

Region / Country	Prevalence of Sexual Dysfunction (%)	Key Social / Psychological Impacts	References
Italy	~40% of female survivors report sexual activity suspension post-treatment	Stigma related to stoma, communication barriers with healthcare providers, social withdrawal	[50]
Europe (general)	Vaginal dryness: 28–35%; Dyspareunia: 9–30% vs controls 5% and 0%	Psychological distress, anxiety, depression; limited sexual health education and cultural reticence	[53]
Denmark	~3-fold increased risk of sexual dysfunction in women with permanent stoma	Increased dyspareunia, vaginal narrowing; social stigma, isolation, reduced sexual communication	[54]
USA	>80% report sexual dysfunction among younger female survivors	High psychological distress, relational strain; sexual health often under-discussed in clinical practice	[48,49]
Low- and Middle-Income Countries (LMICs)	24–80% (wide range)	Cultural taboos, stigma, lack of sexual health dialogue, absence of integrated survivorship care	[29]

6. Assessment Tools and Limitations in Oncologic Female Populations

Accurate evaluation of sexual function in women with cancer is essential for understanding treatment impacts and guiding supportive interventions. Several patient-reported outcome measures

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have been developed to assess sexual health, quality of life, and related domains in female populations.

The Female Sexual Function Index (FSFI) is a 19-item self-report questionnaire designed to assess female sexual function across six domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. Initially developed for the general population, the FSFI has demonstrated strong psychometric properties among female cancer survivors, correlating with measures of depression, menopausal symptoms, and quality of life. It serves as a valuable tool for monitoring sexual function and identifying cancer-related sexual dysfunction, facilitating early and targeted interventions within oncologic care pathways [56]. The Patient-Reported Outcomes Measurement Information System (PROMIS) is a validated NIH system to measure patient-reported outcomes (physical function, fatigue, pain, anxiety, depression) in cancer patients using short forms and computer-adaptive tests. It ensures precise, low-burden assessments, supports symptom monitoring, and enables comparisons with reference populations for patient-centered oncology care [57].

Corrigan et al. conducted a meta-analysis using validated PROs showing that patients with SCCA treated with CRT experience significant long-term sexual dysfunction. Although over half remained sexually active, women had a median FSFI score of 20.2, indicating moderate dysfunction, and men had a median IIEF-5 score of 14, reflecting mild to moderate erectile dysfunction. Younger patients were more likely to remain sexually active. These results highlight the persistent sexual health burden after CRT and the importance of developing interventions to mitigate these toxicities in long-term survivors [58].

Despite the availability of patient-reported outcome (PRO) tools to assess sexual function, their use in post-treatment evaluations for rectal and anal cancer survivors remains challenging. These challenges include variability in administration, interpretation, and integration into survivorship care. Additionally, there is a lack of PRO tools specifically validated for women treated for pelvic cancers, limiting accurate assessment and tailored interventions for sexual dysfunction in this population. Addressing these gaps is essential to advance patient-centered care and improve long-term quality of life outcomes for survivors.

7. Therapeutic and Rehabilitative Strategies

Female sexual dysfunction (FSD) following rectal and anal cancer therapy is driven by combined effects of surgical trauma, pelvic radiotherapy-induced fibrosis, and systemic oncologic treatments, including chemotherapy and immunotherapy. Traditional chemotherapies like oxaliplatin and 5-fluorouracil are associated with neurotoxicity and pelvic nerve injury, leading to diminished genital sensation, dyspareunia, and reduced arousal and orgasmic response [59,60]. Systemic side effects such as fatigue, hormonal imbalance, and mucosal inflammation further impair sexual health [61].

Recent oncology breakthroughs have introduced immunotherapies with potentially lower sexual toxicity. In mismatch repair–deficient (dMMR) locally advanced rectal cancer, dostarlimab (PD-1 inhibitor) has demonstrated striking efficacy, with 100% of evaluable patients achieving clinical complete response after 6 months of treatment without needing chemotherapy, radiotherapy, or surgery [62,63], thus sparing patients the morphological and neurovascular damage linked to these modalities. The treatment was associated with only mild to moderate adverse events (rash, pruritus, fatigue, nausea), with no grade 3 or higher toxicities reported [63,64]. These outcomes suggest a markedly reduced risk of sexual dysfunction due to preservation of pelvic anatomy and avoidance of cytotoxic exposure.

In squamous cell carcinoma of the anal canal (SCAC), retifanlimab—another PD-1 inhibitor—evaluated in platinum-refractory disease (POD1UM-202) showed an objective response rate of ~13.8%, disease control rate of ~48.9%, and median duration of response ~9.5 months, with an acceptable safety profile and only ~11.7% grade 3 or higher treatment-related adverse events [65]. Subsequent phase 3 POD1UM-303/InterAACT-2 trial combining retifanlimab with carboplatin-paclitaxel in advanced SCAC improved progression-free survival (~9.3 vs 7.4 months) and overall survival (~29.2 vs 23.0 months) compared to chemotherapy alone [65,66], while

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maintaining a manageable toxicity profile. Although direct data on sexual function are still lacking, the absence of cumulative neuropathy and reduced mucosal damage compared to cytotoxic regimens suggests lower risk for FSD.

Supportive pharmacologic interventions, such as topical estrogens and lubricants, remain critical for symptom control, especially in patients with mucosal changes [67,68]. Emerging non-hormonal options, including vaginal moisturizers and selective estrogen receptor modulators (SERMs), are important for immunotherapy-treated patients who may have contraindications to hormone therapy [69].

Non-pharmacological rehabilitation, vaginal dilators and pelvic floor physical therapy, continue to play a vital role in preventing vaginal stenosis and enhancing pelvic muscle function post-treatment [70,71]. These strategies yield optimal results when tailored to the individual surgical and radiotherapy context [72].

Psychosexual counseling and multidisciplinary survivorship programs help address emotional, body-image, and relational dimensions of FSD, improving adherence to rehabilitation and overall quality of life [73]. Proactive patient education about the different sexual side effect profiles of chemotherapy versus immunotherapy supports early referrals and personalized management.

8. Discussion

The evidence synthesized in this review confirms that female sexual dysfunction is a common and multifactorial consequence of treatment for rectal and anal cancers. The pathophysiological basis of these dysfunctions includes hormonal withdrawal, pelvic autonomic nerve injury, and radiation-induced fibrosis, which alter genital sensation, lubrication, and vaginal architecture. FSFI data consistently show reduced scores in colorectal and anal cancer survivors, especially in domains of desire, lubrication, and dyspareunia.

Surgical techniques such as TME, APR, and LAR are associated with significant risk of postoperative sexual dysfunction, particularly when nerve-sparing is not achieved. Radiotherapy and chemoradiotherapy contribute to late toxicities including vaginal stenosis, fibrosis, and peripheral neuropathy. These physiological changes are compounded by psychological factors, including depression, body image dissatisfaction, and relational strain, as shown in multiple studies involving survivors with stomas or fecal incontinence.

Validated assessment tools like the FSFI and PROMIS have shown utility in quantifying sexual dysfunction in this population, but lack specificity for female pelvic cancer survivors. The heterogeneity of instruments and inconsistent use in clinical practice further limits accurate evaluation.

Therapeutic strategies remain largely supportive. Topical estrogens, lubricants, dilators, and pelvic floor physical therapy are the most widely used interventions. Psychosexual counseling and couple-based therapies show benefit in select populations. Immunotherapy-based regimens such as dostarlimab for dMMR rectal cancer and retifanlimab for SCAC appear to reduce long-term toxicity, potentially sparing sexual function by avoiding pelvic surgery and radiotherapy; however, dedicated studies on sexual outcomes are currently lacking.

Overall, data from different countries, including Denmark, Italy, the USA, and LMICs, highlight substantial geographic and cultural variability in sexual health outcomes and support services. Psychological distress, stigma, and under-addressed partner dynamics are frequently reported. Despite the recognized impact on quality of life, sexual dysfunction remains under-assessed and under-treated in this oncologic context.

9. Conclusions and Future Perspective

Female sexual dysfunction is a frequent and multifaceted consequence of treatment for rectal and anal cancers, arising from the combined effects of surgical trauma, pelvic radiotherapy, systemic therapies, and psychological distress. The literature consistently highlights the high prevalence of

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symptoms such as decreased libido, vaginal dryness, dyspareunia, and reduced sexual satisfaction among survivors, with significant impacts on quality of life. Despite this, sexual health remains insufficiently addressed in routine clinical practice, with limited availability of validated, female-specific assessment tools and standardized management pathways.

While instruments like the FSFI are commonly employed, they may not fully capture the complexity of sexual dysfunction in women treated for pelvic malignancies. Similarly, most available data are derived from retrospective or cross-sectional studies, with a notable scarcity of longitudinal research specifically focused on female populations. Psychological and relational dimensions—especially those linked to stoma, body image, and partner dynamics—further compound the burden and are often under-evaluated.

The emergence of immunotherapy-based approaches, particularly in mismatch repair–deficient rectal cancer and advanced squamous cell anal carcinoma, opens new perspectives for organ preservation and potentially reduced sexual toxicity. However, dedicated studies exploring sexual health outcomes in these treatment settings are still lacking.

In light of these findings, it is essential to incorporate sexual health assessment and support as integral components of survivorship care in pelvic oncology. Future directions should include the development of standardized protocols, the validation of gender-specific assessment tools, and the implementation of prospective observational studies aimed at monitoring sexual function over time. Promoting awareness and multidisciplinary collaboration will be crucial to improve quality of life and address the unmet needs of female survivors of rectal and anal cancer.

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