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Survivorship Sexual Health and Racial/Ethnic Disparities After Pelvic Radiation for Cervical Cancer

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Abstract

Purpose

Sexual dysfunction after pelvic radiation for cervical cancer is an under-recognized aspect of survivorship. This study characterized radiation-related complications and patient-reported sexual health outcomes among cervical cancer survivors and examined whether outcomes and counseling experiences differ by race/ethnicity.

Methods

Cervical cancer patients treated with pelvic radiotherapy were identified by Honest Broker and interviewed by telephone using a validated sexual health needs assessment survey. Complications were characterized among patients with chart-confirmed radiotherapy. Hispanic and Caucasian patients were compared using chi-square or Fisher's exact tests, and multivariable logistic regression identified predictors of high sexual health distress.

Results

Of 500 patients contacted, 66 completed the interview (59.1% Hispanic, 30.3% Caucasian). Among 51 patients with confirmed radiotherapy, atrophic vaginitis (62.7%) and urinary/bowel dysfunction (56.9%) were most common. Overall, 59.1% reported substantial sexual health change and 30.3% substantial distress. Hispanic patients were significantly less comfortable discussing sexual health with their oncologist (61.5% vs. 95.0%, p = 0.015) or nurse/nurse practitioner (66.7% vs. 95.0%, p = 0.022) than Caucasian patients, and significantly less likely to have received information after treatment completion (30.8% vs. 65.0%, p = 0.025). Younger age (OR 0.29, 95% CI 0.11–0.79, p = 0.015) and late FIGO stage (OR 7.72, 95% CI 1.34–44.40, p = 0.022) independently predicted high distress.

Conclusions

Sexual health morbidity is common after pelvic radiation, and Hispanic survivors report less comfort discussing sexual health and less post-treatment counseling than Caucasian survivors. Younger, more advanced-stage patients may be at greatest risk for distress.

Implications for Cancer Survivors:

Proactive, culturally responsive sexual health counseling, initiated early and repeated throughout survivorship, may help close a communication disparity affecting Hispanic cervical cancer survivors.

Introduction

In the United States, cervical cancer is diagnosed in an estimated 13,490 women and causes approximately 4,200 deaths annually [1]. Five-year relative survival for cervical cancer has changed little over the past five decades: 69% in 1975–1977, rising to 73% in 1995–1997, then declining to 68% in 2015–2021 [1]. This burden is not shared equally: 5-year survival is approximately 63% among White women compared with approximately 56% among Black women [4]. Globally, cervical cancer burden and mortality are concentrated in low-resource settings, where it remains the most common cancer in 42 countries [2] and the leading cause of cancer death for women in 37 countries, most in sub-Saharan Africa and Central/South America [3]. In these settings, ensuring basic access to treatment remains the primary concern. By contrast, in higher-resource settings such as the United States, where treatment access is more assured, quality-of-life outcomes after treatment, including sexual health, are increasingly recognized as a survivorship priority.

Radiotherapy, delivered as primary or adjuvant treatment via external beam radiation and/or brachytherapy, is a cornerstone of cervical cancer management. Pelvic radiation is associated with a range of complications, including vaginal stenosis, enteritis, avascular necrosis, and gastrointestinal or genitourinary fistulas [5, 6]. Vaginal stenosis alone has been reported in 38% to 89% of patients within 6 to 9.6 months of treatment [6]. A common and often under-addressed consequence of these complications is sexual health dysfunction [7, 8]. Longitudinal studies show that sexual dysfunction and adverse vaginal changes after radiotherapy persist for at least two years post-treatment with little spontaneous improvement [8, 9]. Despite this burden, radiation oncologists and other cancer providers often lack training in discussing sexual health, and surveys of both radiation oncologists and patients confirm that these conversations occur infrequently in routine oncologic care [10, 11].

Racial and ethnic disparities in radiotherapy outcomes have been documented for other pelvic malignancies, with Black and Hispanic patients reporting worse sexual health and urinary function after treatment [13]. Similar racial and ethnic disparities are well documented among patients diagnosed with cervical cancer specifically. Hispanic populations have the highest incidence rates of human papillomavirus (HPV)-associated cervical cancer, while Black patients have the highest cervical cancer mortality rates [14]. Black patients receive brachytherapy, a critical component of curative-intent cervical cancer radiotherapy, at significantly lower rates than White patients even after accounting for insurance status [15]. Despite this broader context of inequity, racial and ethnic disparities in radiotherapy complications and sexual health outcomes among cervical cancer survivors have not been well characterized.

This study had two aims. First, we sought to describe the prevalence of chart-documented radiation-related complications and patient-reported sexual health outcomes among cervical cancer survivors treated with pelvic radiation, including gaps in sexual health counseling across the care continuum. Second, we compared these outcomes and counseling experiences between Hispanic and Caucasian

survivors, the two largest racial/ethnic groups in our cohort, to identify potential disparities that could inform more equitable survivorship care.

Methods

Study Design and Participants

We conducted a retrospective chart review paired with a cross-sectional telephone survey of cervical cancer patients treated with pelvic radiotherapy at a single academic institution. Eligible patients were identified using an Honest Broker process. Of 500 patients identified and contacted, 66 completed the telephone interview (13.2% response rate), constituting the full survey cohort for this analysis. Among the 434 contacted patients who did not complete the interview, the majority could not be reached despite repeated attempts (no answer). Other non-participants were ineligible (did not have a cervical cancer diagnosis or had not received pelvic radiation), did not have time or did not wish to participate, or, in the smallest subgroup, declined specifically due to discomfort discussing sexual health.

Chart review confirmed documented pelvic radiotherapy (radiotherapy type, treatment modality, radiation dates, and dose) for 51 of the 66 interviewed patients. The remaining 15 patients lacked chart documentation of radiotherapy type, treatment modality, dates, and dose, and were therefore excluded from analyses of chart-documented, radiation-specific complications. Because patient-reported sexual health outcomes reflect the cumulative experience of cancer and its treatment rather than outcomes of radiotherapy alone, all 66 interviewed patients were retained for the patient-reported outcome and counseling-gap analyses, consistent with the study's original design.

Survey Instrument

Sexual health outcomes were assessed using a clinical needs assessment survey originally developed by Wo and colleagues at Massachusetts General Hospital to evaluate sexual health needs among patients receiving pelvic radiotherapy [16]. The survey comprised 22 items administered by telephone interview, spanning demographic and relationship characteristics, perceived impact of cancer treatment on sexual health and associated distress (each on a 4-point scale: Not at all, A little, Quite a bit, Very Much), open-ended identification of the most distressing sexual health concerns (independently coded into thematic categories), attitudes toward sexual health counseling and resources (4-point Likert scale: Strongly Disagree to Strongly Agree), and the timing of sexual health information received across five points in the cancer care continuum (at diagnosis, before treatment, during treatment, after treatment completion, and at follow-up). Telephone interviews lasted approximately 30 minutes on average, including consent and surveys.

Chart Review Variables

Chart review captured demographics (age at diagnosis, race, ethnicity), disease characteristics (stage per the International Federation of Gynecology and Obstetrics [FIGO] system, dichotomized as early [I–IIA] versus late [IIB–IV]), and treatment characteristics (radiotherapy type, treatment modality, radiation dates, and total delivered dose). Eight complications were abstracted: fistula development, urinary/bowel dysfunction, early menopause, dyspareunia, atrophic vaginitis, vaginal stenosis, pelvic pain, and whether the patient had expressed sexual health concerns to the care team. A composite Radiation Toxicity Score (range 0–7) was derived as the unweighted count of the first seven complications present per patient.

Statistical Analysis

Continuous variables are summarized as mean ± standard deviation (SD) and median, while categorical variables are displayed as frequencies and percentages of non-missing responses. For the racial/ethnic comparison, Hispanic and Caucasian patients (self-reported race/ethnicity; the two largest groups in the cohort, n = 39 and n = 20 respectively) were compared on sexual health impact and distress (dichotomized as High ["Quite a bit"/"Very Much"] versus Low ["Not at all"/"A little"]), comfort discussing sexual health, attitudes toward sexual health resources, and timing of information received by using the chi-square test of independence, with Fisher's exact test substituted whenever an expected cell count was below 5. A multivariable logistic regression estimated independent predictors of high sexual health distress (Radiation Toxicity Score, FIGO stage, and age at diagnosis, standardized as z-scores for continuous predictors) among the chart-confirmed radiotherapy subgroup (n = 51 total; n = 47 complete cases). Analyses were conducted in Python (pandas, SciPy), and two-sided $p < 0.05$ was considered statistically significant. Given the exploratory, hypothesis-generating nature of this study, no correction for multiple comparisons was applied, and this is noted as a limitation.

Results

Cohort and Demographics

Sixty-six of 500 contacted patients completed the interview. All participants were female. By self-reported race/ethnicity, the majority identified as Hispanic (59.1%) or Caucasian (30.3%), with smaller proportions identifying as Asian American/Pacific Islander (6.1%), Native American (1.5%), Multiracial (1.5%), or Black/African American (1.5%). Ninety-four percent of participants reported being attracted to men, 4.5% to both men and women, and 1.5% to women exclusively. Just over half (56.1%) were currently in a relationship, of whom 67.6% were married, and the mean relationship duration was 269.7 months (~ 22.5 years). Of the 43.9% not currently in a relationship, the most common statuses were divorced (37.9%) and widowed (27.6%), with the remainder reporting a prior relationship more than a year ago (20.7%) or another status (10.3%).

Chart-Documented Radiation-Related Complications

Among the 51 patients with chart-confirmed pelvic radiotherapy, atrophic vaginitis was the most prevalent complication (62.7%), followed by urinary/bowel dysfunction (56.9%), vaginal stenosis (43.1%), and pelvic pain (43.1%) (Fig. 1). Dyspareunia was documented in 29.4% of patients, and fistula and early menopause each occurred in 15.7%. It was documented that the patient had expressed sexual health concerns in 41.2% of cases. The mean Radiation Toxicity Score (composite of fistula, urinary/bowel dysfunction, early menopause, dyspareunia, atrophic vaginitis, vaginal stenosis, and pelvic pain, range 0–7) was 2.7 ± 1.5 (median 3).

Patient-Reported Sexual Health Outcomes and Counseling Gaps

Among all 66 interviewed patients, 59.1% reported that cancer or cancer treatment had changed their sexual health "Quite a bit" or "Very Much," and 30.3% reported comparable levels of distress about their sex life and/or sexual health. The most frequently endorsed themes among coded free-text concerns were lack of sexual libido (31.8%), vaginal dryness (27.3%), pain (24.2%), and vaginal shrinking/thinning (15.2%).

Regarding counseling, most patients did not perceive their oncologists or nurses/nurse practitioners (NPs) as uncomfortable discussing sexual health, with 81.8% disagreeing that their oncologists were uncomfortable and 68.2% disagreeing that their nurses/NPs were uncomfortable. Most patients themselves reported comfort discussing sexual health with their oncologist (74.2%) and nurse/NP (75.8%). Despite this reported comfort, information delivery was inconsistent across the care continuum: only 31.8% of patients recalled receiving sexual health information at diagnosis, 28.8% before beginning treatment, rising modestly to 34.8% after treatment started, 39.4% after treatment completion, and 37.9% during follow-up visits. This indicates that most patients, at every stage of care, did not recall receiving this information. Sixty-nine percent of patients agreed or strongly agreed that access to sexual health resources is important to them, and 63.6% agreed there are good resources within the cancer center, while 63.6% expressed interest in a multidisciplinary sexual health program in the oncology clinic.

Racial and Ethnic Differences in Sexual Health Survivorship

Hispanic (n = 39) and Caucasian (n = 20) patients, the two largest racial/ethnic groups in the cohort, were compared across measures of sexual health burden, counseling comfort, and information timing (Table 1, Fig. 2). More Caucasian than Hispanic patients reported high sexual health impact (65.0% vs. 53.8%) and high distress (40.0% vs. 23.1%), but neither difference reached statistical significance (impact: $p = 0.588$; distress: $p = 0.291$).

In contrast, two comfort-related measures differed significantly by ethnicity: Hispanic patients were less likely than Caucasian patients to report feeling comfortable discussing sexual health with their oncologist (61.5% vs. 95.0%, $p = 0.015$) and with their nurse/NP (66.7% vs. 95.0%, $p = 0.022$). Notably, perceived provider discomfort did not differ significantly by patient ethnicity (oncologist perceived as

comfortable: 82.1% Hispanic vs. 80.0% Caucasian, p = 1.000; nurse/NP perceived as comfortable: 61.5% vs. 80.0%, p = 0.253).

Timing of information delivery also differed significantly at one point in the care continuum. Hispanic patients were significantly less likely than Caucasian patients to recall receiving sexual health information after treatment completion (30.8% vs. 65.0%, p = 0.025). Differences at the other four timepoints (diagnosis, before treatment, treatment started, follow-up visits) and in attitudes toward sexual health resources or interest in a multidisciplinary program trended in a similar direction (Caucasian patients generally more likely to endorse receiving information or expressing interest) but did not reach statistical significance (all p > 0.10; Table 1).

Table 1
Racial and Ethnic Comparison of Sexual Health Survivorship: Hispanic vs. Caucasian Patients

Measure	Hispanic (n = 39)	Caucasian (n = 20)	Test	p
High sexual health impact ("Quite a bit"/"Very Much")	53.8%	65.0%	Chi-square	0.588
High sexual health distress ("Quite a bit"/"Very Much")	23.1%	40.0%	Chi-square	0.291
Perceives oncologist as comfortable discussing sexual health	82.1%	80.0%	Fisher's exact	1.000
Perceives nurse/NP as comfortable discussing sexual health	61.5%	80.0%	Chi-square	0.253
Patient comfortable discussing with oncologist*	61.5%	95.0%	Chi-square	0.015
Patient comfortable discussing with nurse/NP*	66.7%	95.0%	Fisher's exact	0.022
Agrees sexual health resources are important	64.1%	75.0%	Chi-square	0.580
Agrees good resources exist within cancer center	71.8%	70.0%	Chi-square	1.000
Interested in multidisciplinary sexual health program	56.4%	70.0%	Chi-square	0.465
Received info: at diagnosis	41.0%	25.0%	Chi-square	0.352
Received info: before treatment	35.9%	25.0%	Chi-square	0.580
Received info: after treatment started	43.6%	25.0%	Chi-square	0.266
Received info: after treatment completed*	30.8%	65.0%	Chi-square	0.025
Received info: at follow-up visit	33.3%	55.0%	Chi-square	0.186

NP nurse practitioner. Denominators vary slightly by item due to missing responses.

** p < 0.05.*

Predictors of High Sexual Health Distress

Among the 47 patients with complete data for the multivariable model (of 51 with chart-confirmed pelvic radiotherapy), a logistic regression evaluating Radiation Toxicity Score, FIGO stage, and age at diagnosis as predictors of high sexual health distress (Table 2) found that younger age (odds ratio [OR] 0.29 per 1-SD increase, 95% confidence interval [CI] 0.11–0.79, p = 0.015) and late FIGO stage (OR 7.72, 95% CI 1.34–44.40, p = 0.022) were independently and significantly associated with higher distress. Radiation Toxicity Score showed a non-significant trend toward an inverse association with distress (OR 0.47 per 1-SD increase, 95% CI 0.21–1.08, p = 0.076). However, given the small sample and the possibility of confounding by age and stage, this counterintuitive trend should not be over-interpreted.

Table 2
Multivariable Logistic Regression: Predictors of High Sexual Health Distress (N = 47)

Predictor	OR	95% CI	p
Radiation Toxicity Score (per + 1 SD)	0.47	0.21–1.08	0.076
FIGO late stage (yes vs. no)*	7.72	1.34–44.40	0.022
Age at diagnosis (per + 1 SD)*	0.29	0.11–0.79	0.015

OR odds ratio, CI confidence interval, SD standard deviation, FIGO International Federation of Gynecology & Obstetrics

** p < 0.05.*

Discussion

In this mixed chart-review and patient-reported outcomes study of cervical cancer survivors treated with pelvic radiation, there was a high prevalence of radiation-related complications, with nearly two-thirds of survivors experiencing atrophic vaginitis and more than half experiencing urinary or bowel dysfunction. This is consistent with published rates of pelvic floor and sexual dysfunction after cervical cancer treatment [7, 17]. Nearly 60% of survivors reported substantial impact on their sexual health, and 30% reported substantial distress, underscoring that sexual morbidity remains common and consequential well into survivorship.

Our most novel finding is that Hispanic survivors reported significantly less comfort than Caucasian survivors discussing sexual health with both their oncologist and their nurse/NP and were significantly less likely to have received sexual health information after treatment completion. This disparity was not

explained by a difference in how patients perceived their providers' comfort with the topic, as Hispanic and Caucasian patients rated their oncologists and nurse/NP as similarly comfortable discussing sexual health. This pattern suggests that the disparity may lie less in provider behavior and more in structural or cultural factors shaping patients' own willingness or opportunity to initiate these conversations, echoing broader literature describing racial and ethnic disparities in radiotherapy-related outcomes for other pelvic malignancies [13] and in cervical cancer treatment access more broadly [15].

These findings should be interpreted alongside other known cervical cancer disparities: Hispanic women have the highest incidence of HPV-associated cervical cancer nationally, and Black women have the highest cervical cancer mortality [14]. While our cohort was too small to meaningfully examine Black patients as a separate group (n = 1), the Hispanic-Caucasian comparison presented here adds a survivorship-specific dimension (sexual health communication and counseling) to this broader disparities literature.

The independent association between younger age and higher sexual health distress is consistent with prior work suggesting that younger women experience a more pronounced disruption to sexual identity, body image, and relationship expectations after gynecologic cancer treatment, in part because premature menopause and treatment-related sexual changes depart further from their expected life stage [7]. The association between late FIGO stage and higher distress may reflect more extensive disease and treatment, such as larger radiation fields or combined-modality therapy, that we did not have the detailed data to characterize.

Across the full cohort, information about sexual health was inconsistently delivered. At every stage of the care continuum assessed, a majority of patients did not recall receiving this information, despite most patients reporting comfort raising the topic themselves. This gap mirrors international survey data showing that radiation oncologists infrequently address sexual health with their patients [10, 11] and that formal training in sexual medicine remains rare among radiation oncologists [10]. A survey of gynecologic oncology providers treating ovarian cancer similarly found that 98% believed sexual issues should be addressed, yet only 21% actually discussed these issues with patients [12]. The finding that patients, particularly Hispanic patients, report high interest in a multidisciplinary sexual health program (56–70% across groups) suggests receptivity to a more structured, proactive counseling model, one that may need to be delivered with particular attention to cultural and linguistic accessibility to close the disparity we observed.

Limitations

This study has several important limitations. The sample is small and drawn from a single academic institution (13.2% response rate among contacted patients), limiting generalizability and statistical power, particularly for the racial/ethnic subgroup comparisons (n = 39 and n = 20). Patients who agreed to complete this sexual health survey may also represent a self-selected group that is more comfortable with or attentive to sexual health and survivorship issues than the broader population of cervical cancer

survivors who were approached. Since discomfort discussing sexual health was the least common reason for non-participation, our cohort's reported prevalence of distress and complications may not fully generalize to patients least willing to discuss these topics. With this sample size, several descriptive differences between Hispanic and Caucasian patients, including the overall difference in sexual health distress, did not reach statistical significance and should be considered trends rather than confirmed disparities. We have reported these transparently alongside the statistically significant findings rather than overstating the evidence. The multivariable regression events-per-variable ratio, while improved by using a parsimonious 3-predictor model, remains modest, and the wide confidence interval around the FIGO stage association (up to ~ 44) reflects real imprecision. The chart-review component is subject to documentation bias, and the cross-sectional survey was administered at a single, variable time point post-treatment. Finally, 15 patients lacked chart-confirmed radiotherapy documentation and were excluded from the complication-specific analyses. Their retention in the patient-reported outcome analyses means those results reflect the broader cervical cancer survivorship experience rather than radiotherapy-specific effects alone.

Conclusion

Sexual health morbidity is common among cervical cancer survivors treated with pelvic radiation, and sexual health counseling remains inconsistently delivered throughout the care continuum. Hispanic survivors report significantly less comfort discussing sexual health with their care team and are significantly less likely to receive counseling after treatment completion than Caucasian survivors, a disparity not explained by differences in perceived provider comfort. Younger survivors and those with more advanced disease at diagnosis may be at particular risk for high distress. These findings support integrating proactive, culturally responsive sexual health counseling, potentially through a multidisciplinary survivorship program, into routine gynecologic oncology care, with particular attention to closing the communication gap experienced by Hispanic survivors. Further prospective, multi-institutional research is needed to confirm these findings, better characterize the drivers of racial and ethnic disparities in sexual health survivorship, and evaluate interventions to close these gaps.

Declarations

Acknowledgments:

The authors thank the patients who participated in the chart review and telephone survey. The sexual health clinical needs assessment survey instrument was adapted with permission from the tool developed by Wo and colleagues at Massachusetts General Hospital [16].

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Competing Interests

All authors have no relevant financial or non-financial interests to disclose.

Author Contributions

Conception, material preparation, data collection, and analysis were performed by Megan Ryu, Jovana Mahho, and Amber Duong. The first draft of the manuscript was written by Megan Ryu and Jovana Mahho, and all authors commented on previous versions of the manuscript. Study supervision and critical revision were provided by Jill Tseng. All authors read and approved the final manuscript.

Ethics Approval

This retrospective chart review and survey study involving human participants was conducted in accordance with the ethical standards of the institutional and national research committee and with the 1964 Declaration of Helsinki and its later amendments. This study was approved by the Institutional Review Board of the University of California, Irvine (IRB No. 1110).

Consent to Participate

Verbal and written informed consent were obtained from all individual participants prior to the telephone interview.

Consent to Publish

While written consent was obtained from all individual participants, this manuscript does not contain identifiable individual patient data, images, or case details.

Data Availability

The de-identified dataset generated and analyzed during the current study is available from the corresponding author on reasonable request, consistent with institutional data-sharing and patient privacy requirements.

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Figures

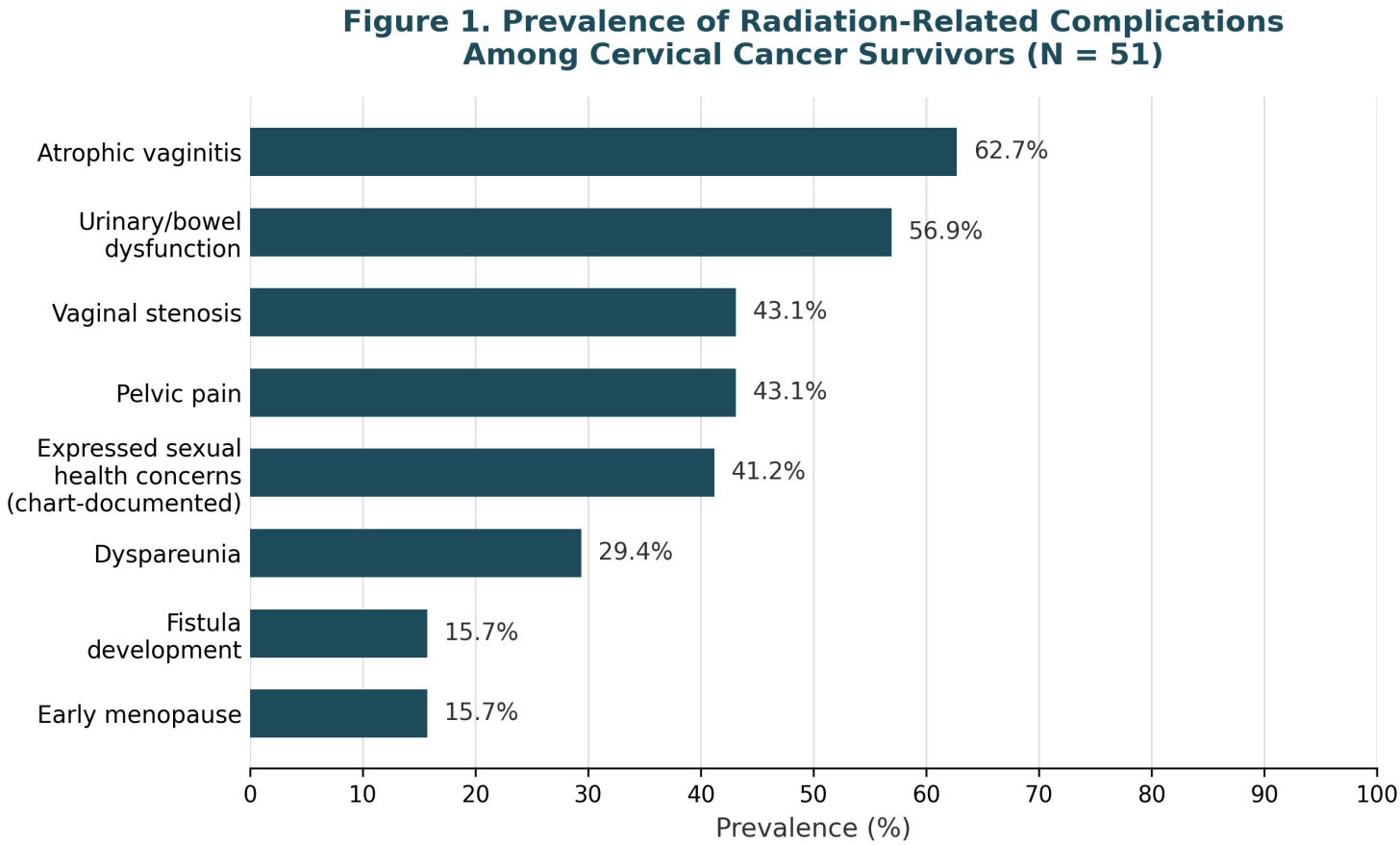

Figure 1

Prevalence of chart-documented radiation-related complications among cervical cancer survivors with confirmed pelvic radiotherapy (N = 51).

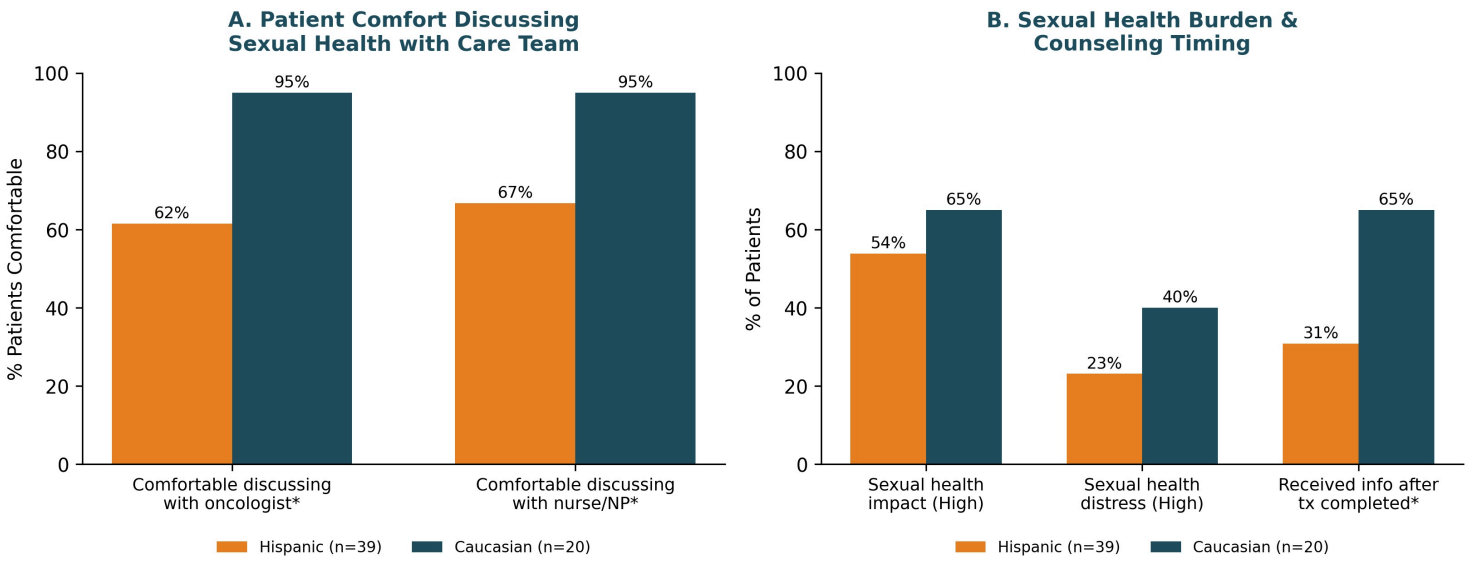

Figure 2

*Statistically significant and illustrative non-significant racial/ethnic differences in sexual health survivorship between Hispanic (n=39) and Caucasian (n=20) cervical cancer survivors. * p<0.05 (chi-square or Fisher's exact test).*