

Radiation Induced Sexual Dysfunction in Prostate Cancer Patients

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ABSTRACT

Objective: To estimate the sexual dysfunction in biopsy proven prostate cancer patients and to identify the characteristics associated with sexual dysfunction in survivors of carcinoma prostate.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted at the Oncology department of Nishtar Hospital, Multan from November 2023 to September 2024.

Methods: This study aimed to determine the prevalence of sexual dysfunction (SD) in prostate cancer patients who had undergone pelvic radiotherapy. Data was collected using a structured questionnaire that included demographic information, treatment details and the International Index of Erectile Function (IIEF-5) questionnaire to assess the severity of sexual dysfunction (SD), ECOG performance status 0-1, intermediate and high risk cancer patients and duration post radiotherapy.

Results: Among the 25 patients with SD, 4 (16.0%) were in the intermediate risk group, while 21 (84.0%) were in the high-risk group. Additionally, 6 patients (24.0%) with SD had diabetes, and 20 patients (80.0%) underwent concurrent hormonal therapy. Prior to radiation, 5 patients (20.0%) had SD, whereas 20 patients (80.0%) developed it six months after radiation, a statistically significant difference ($p < 0.001$).

Conclusion: Sexual dysfunction is common among prostate cancer survivors, influenced by cancer treatment, risk stratification and age. Treatments like radiation can damage hormone-producing organs, leading to SD. Together, cancer treatment, risk stratification and aging contribute to the higher incidence of sexual dysfunction in prostate cancer patients.

Key Words: Sexual dysfunction, Radiotherapy, Cancer, Diabetes, Risk stratification

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INTRODUCTION

In males, cancers of the pelvic region account for over 25%¹ of all newly diagnosed cancers. This type of cancer is also associated with long-standing severe sexual dysfunction in at least half of all patients². Sexual dysfunction (SD), or the inability to get and sustain an erection sufficient for satisfactory sexual activity, is one of the most painful sequelae of cancer diagnosis and management among men³.

Numerous factors contribute to Erectile Dysfunction which goes without saying that prostate cancer also leads to Erectile Dysfunction (ED)⁴. Prostate cancer is known to be the second most frequent cancer amongst

men and has predominant causative risks of having erectile dysfunction which include cardiovascular conditions and metabolic diseases, all of which a male with cancer does not suffer from⁵. However, the risk of ED is higher in males with prostate cancer due to the increased incidence of lower urinary tract symptoms and psychological distress. Indirectly, cancer treatment modalities, including surgery, chemotherapy, radiotherapy and hormone therapy, are among the most common causes of ED in this population⁶.

Few males are able to achieve a normal erection following pelvic surgery, with studies reporting that less than 25%⁷ of those with excellent baseline erectile function retain or recover their previous erection quality after treatment. The pelvic surgeries most commonly associated with erectile dysfunction are radical prostatectomy, radical cystectomy, and low anterior or abdominoperineal resections⁸.

Sexuality and intimacy are key to quality of life and may ease psychosocial distress linked to cancer⁹. Maintaining sexual function in men with cancer can help reduce suffering. With rising cancer cases and improved survival rates, quality of life post-treatment is important^{9, 10}. Research on ED in cancer survivors is limited, focusing mostly on pelvic cancers. Prevalence estimates of ED in this group are rare. Pooled data on ED prevalence and its links can highlight the issue's

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scale. This helps clinicians identify at-risk patients and offer holistic, long-term cancer care.

METHODS

This cross-sectional study aimed to determine the prevalence of sexual dysfunction (SD) in male patients who had undergone pelvic radiotherapy. The study was conducted at oncology department of Nishtar Hospital, Multan from November 2023 to September 2024. Non probability consecutive sampling technique was adopted. Written informed consent was obtained. Data were collected using a structured questionnaire that included demographic information, treatment details, and the International Index of Erectile Function (EF) (IIEF-5) questionnaire to assess the severity of ED. ECOG performance <1, intermediate and high risk cancer patients, more than 6 months duration of radiotherapy and patients with biopsy proven prostate cancer were included. ECOG performance status >1, early and metastatic stage of cancer, <6 months duration of radiotherapy, pre-existing SD unrelated to radiotherapy, untreated hypogonadism were excluded. CT simulations were done supine with full bladder and empty rectum. Organs at risks and target volumes were delineated. After treatment planning, radiation was delivered with 3D-conformal technique. Patients were required to attend follow-up examinations at regular intervals, with this schedule continuing consistently over a six-month period to ensure ongoing monitoring and evaluation of their condition.

Frequencies and percentages were calculated for categorical variables. Whereas, mean and standard deviation was calculated for age/numeric variable. Chi-square test was applied to check the significance of prevalence of sexual dysfunction prior to radiation and 6 months after radiation.

RESULTS

Of the 40 patients in the study, 25 (62.5%) experienced sexual dysfunction (SD) after receiving radiotherapy (RT), while 15 (37.5%) did not. (Figure. I). The mean age of patients with SD was 64.80±11.97 years, with 8 patients (32.0%) aged 60 years or younger and 17 patients (68.0%) older than 60 years. Among the 25 patients with SD, 4 (16.0%) were in the intermediate risk group, while 21 (84.0%) were in the high-risk group. Additionally, 6 patients (24.0%) with SD had diabetes, and 20 patients (80.0%) underwent concurrent hormonal therapy. (Table. 1).

Prior to radiation, 5 patients (20.0%) had SD, whereas 20 patients (80.0%) developed it six months after radiation, a statistically significant difference (p < 0.001). (Table. 2).

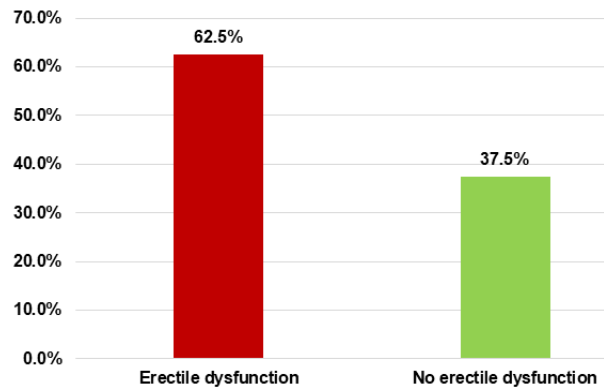


Figure No. 1: Prevalence of sexual dysfunction after RT

Table No. 1: Demographic and baseline characteristics of the patients' sexual dysfunction after RT n=25

Variable	N (%)	Mean±S.D
Age (years)		64.80±11.97
≤60 years	8 (32.0)	
>60 years	17 (68.0)	
Risk stratification		
Intermediate risk	4 (16.0)	
High risk	21 (84.0)	
Diabetes	6 (24.0)	
Concurrent hormonal therapy	20 (80.0)	

Table No.2: Comparison of sexual dysfunction prevalence at prior radiation and at 6 months after radiation n=25

Sexual dysfunction prevalence	Prior to radiation	6 months after radiation	p-value
	5 (20.0)	20 (80.0)	<0.0001

DISCUSSION

The prevalence of sexual dysfunction (SD) in our study was significantly higher at 64% compared to findings reported in other cohort studies of childhood cancer survivors (CCS), such as the 12.3% prevalence reported by Ritenour et al¹¹ and the 31.8% prevalence reported by Sung H et al¹². These stark differences may reflect variations in study populations, methodologies, or underlying risk factors.

Among the patients experiencing sexual dysfunction, 6 individuals (24%) had a diagnosis of diabetes, while concurrent chemotherapy or hormonal therapy was noted in 28 patients (80%). The link between diabetes and erectile dysfunction is well-established¹³, with evidence suggesting that more than half of men in the United States with diabetes are affected by this condition. Despite this significant prevalence, the studies do not currently provide specific guidelines for the screening or management of erectile dysfunction in

diabetic men¹⁴. However, clinicians are encouraged to address this common quality-of-life concern during consultations with their diabetic patients, as proactive discussions may help identify and manage this condition effectively.

Studies conducted by Cheng et al¹⁵ and Rojanasart et al¹⁶ have reported erectile dysfunction (ED) prevalence rates ranging widely from 4% to 70%, with variations depending on the specific age groups studied and the methods used to assess ED. Of the men aged 20 to 29 years, the prevalence of ED was noted to be, by and large, lower, in this case, a rough estimate was about 15.1 percent, 12.2 - 18.1 percent. On the other hand, among men aged 60 years and older, figures were considerably higher at about 70.0 percent (99% CI: 62.3 to 77.7). This difference further emphasizes the relevance of age and evaluation criteria in determining surveyed ED prevalence.

Blood flow dynamics and erectile hemodynamics have also been studied using duplex ultrasonography by Tal et al¹⁷. More patients with or without hypogonadism at 12 months after treatment did not have any difference thus, suggesting hyperadrenergic mediated causes of ED. In this study including 85 patients, 12.5% had ED before radiotherapy and 87.5% had ED at 6 months after radiotherapy ($p < 0.001$). A meta-analysis performed by Pizzol et al¹⁸ evaluated a sub-cohort experiencing ED amongst cancer patients, and ED was reported at a prevalence of 40.72% whereby 28.60% of patients had this at diagnosis and 42.70% post treatment with significant difference across stages and types of cancer.

A follow-up 12 year study found that 84% of men with prostate cancer who received radical prostatectomy and 80% of those made active surveillance reported ED (erectile dysfunction) compared to 43% in a matched control group. The same results have been seen in men treated for other pelvic cancers like anal, rectal or bladder cancers.¹⁹

It is important for clinicians to recognize and address the significant impact of erectile dysfunction (ED) on the overall quality of life and mental health of cancer survivors. ED can deeply affect a survivor's sense of well-being, as it can interfere with their ability to experience intimacy and sexual fulfillment²⁰. These elements of sexuality and relationships are crucial for emotional connectedness, self-esteem, and social health. For numerous survivors, sustaining intimate relationships, and an enjoyable sex life, can help ease some of the psychosocial difficulties and psychosocial health issues that are frequently experienced alongside a cancer diagnosis and treatment. Thus, in the years of care and rehabilitation of cancer survivors, clinicians must take into account the psychological and relational dimensions of SD, as the medical approach to SD is only part of the solution and we cannot neglect the

effective theme in the care of this population, which is certainly intertwined with the patients' mental health²¹.

CONCLUSION

Sexual dysfunction (SD) is common among prostate cancer survivors, influenced by the cancer treatment, risk stratification and age. Treatments like radiation and hormonal therapy can damage hormone-producing organs, leading to SD. Together, cancer treatment, risk stratification and aging contribute to the higher incidence of SD in prostate cancer patients.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Sarah Khan, Imran Hyder
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Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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