

PREVALENCE OF ERECTILE DYSFUNCTION AFTER PELVIC RADIOTHERAPY

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Abstract: Erectile dysfunction (ED) is a common complication among male cancer survivors undergoing pelvic radiotherapy, significantly impacting their quality of life. Despite its high prevalence globally, data on ED among Pakistani cancer survivors remain limited. **Objective:** To determine the prevalence, severity, and associated risk factors of ED among male patients undergoing pelvic radiotherapy at Nishtar Medical University and Hospital, Multan. **Methods:** This prospective observational study included 50 male patients aged 50–85 years undergoing pelvic radiotherapy for malignancies. Baseline and six-month follow-up assessments of erectile function were conducted using the International Index of Erectile Function (IIEF-5) questionnaire. Factors associated with ED, including age, comorbidities, and treatment parameters, were analyzed using SPSS version 26. **Results:** The prevalence of ED six months post-radiotherapy was 61%. Advanced age (≥ 65 years) and diabetes were significant risk factors, with 71.4% and 88.9% of patients, respectively, developing ED. Moderate and severe ED accounted for 42.9% and 35.7% of cases, respectively. Cultural stigma and limited healthcare resources were additional barriers to managing ED in the Pakistani context. **Conclusion:** ED is highly prevalent among male patients undergoing pelvic radiotherapy, with advanced age and diabetes being significant contributors. These findings underscore the need for routine ED screening, culturally sensitive counseling, and targeted interventions to improve the quality of life for cancer survivors in Pakistan.

Keywords: Erectile Dysfunction, Pelvic Radiotherapy, Cancer Survivors, Risk Factors, Quality of Life, Pakistan

Introduction

Erectile dysfunction (ED) is a common yet often overlooked complication among male cancer survivors, particularly those undergoing pelvic radiotherapy for malignancies such as prostate, rectal, or bladder cancer. Globally, the prevalence of ED in cancer survivors ranges from 40% to 80%, with pelvic radiotherapy recognized as a significant contributing factor due to its impact on the neurovascular structures essential for erectile function (1, 2). In Pakistan, where the incidence of pelvic malignancies is rising, the burden of ED among cancer survivors is likely underestimated due to cultural stigmas, limited awareness, and inadequate healthcare resources (3, 4).

Pelvic radiotherapy, though effective in controlling malignancies, poses significant risks to surrounding healthy tissues, including the penile bulb, neurovascular bundles, and pelvic vasculature. These effects are further exacerbated by patient-specific factors such as age, comorbidities, and baseline sexual health. International studies have reported a prevalence of radiotherapy-induced ED as high as 65%, with severity often influenced by treatment modalities and dosimetry (5, 6). However, in resource-limited settings like Pakistan, the lack of standardized protocols and patient counseling further complicates the management of this condition. ED significantly impacts the quality of life (QoL) of cancer survivors, affecting not only physical health but also psychological well-being and interpersonal relationships. Studies from Pakistan highlight that cancer patients face additional challenges, including limited access to rehabilitation services and social stigma associated with discussing sexual health issues (7, 8). Despite the high

burden of ED, there is limited research on its prevalence and associated factors in the Pakistani population, particularly among patients undergoing pelvic radiotherapy. Age and comorbidities such as diabetes and hypertension are well-established risk factors for ED, with older patients and those with metabolic disorders experiencing higher rates of sexual dysfunction post-radiotherapy. A study by Trost and Mulhall reported that diabetes increased the risk of radiotherapy-induced ED by 1.5-fold due to its impact on vascular and neural health (9). Similarly, Pinkawa et al. highlighted the importance of individualized treatment planning to mitigate these risks, emphasizing the need for improved patient education and multidisciplinary care (10). Given the rising prevalence of pelvic malignancies and the lack of local data on ED in Pakistan, this study aims to determine the prevalence and severity of ED among patients undergoing pelvic radiotherapy at Nishtar Medical University and Hospital, Multan. By identifying the associated risk factors and clinical correlates, the findings will provide evidence-based insights to guide clinical practice, improve patient counseling, and advocate for the integration of sexual health management into cancer care protocols. This research addresses a critical gap in the literature and seeks to improve the quality of life for cancer survivors in Pakistan.

Methodology

This study was conducted as a prospective observational study at the Department of Radiotherapy and Oncology, Nishtar Medical University and Hospital, Multan, Pakistan.

The objective was to determine the prevalence of erectile dysfunction (ED) following pelvic radiotherapy in male patients. Ethical approval was obtained from the Institutional Review Board (IRB) of Nishtar Medical University, and written informed consent was secured from all participants before enrollment. The study adhered to the ethical guidelines of the Declaration of Helsinki.

The study population included male patients aged 50–85 years who were undergoing pelvic radiotherapy for malignancies such as prostate, bladder, or rectal cancers. Patients with pre-existing ED or those on medications affecting erectile function were excluded to ensure the accuracy of the results. Using purposive sampling, a total of 50 patients were recruited over a six-month period.

Baseline data were collected through structured interviews and medical record reviews. The demographic information included age, comorbidities (e.g., diabetes, hypertension, coronary artery disease, and stroke), and cancer type. Participants' erectile function was assessed using the International Index of Erectile Function (IIEF-5) questionnaire before initiating radiotherapy and at six months post-treatment. This validated tool measures erectile function on a scale of 1 to 25, with scores ≤ 21 indicating ED. The severity of ED was classified as mild (17–21), moderate (12–16), and severe (1–11).

Pelvic radiotherapy was delivered using conventional external beam radiation therapy (EBRT) or intensity-modulated radiotherapy (IMRT), with doses ranging from 50 to 70 Gy over 25–35 fractions. Data on radiotherapy protocols, including dosage and fractionation, were recorded for all participants.

The follow-up assessment was conducted six months after completing radiotherapy. In addition to ED evaluation using the IIEF-5, clinical data on treatment-related toxicities and adherence to follow-up schedules were documented. The impact of potential risk factors, including age, comorbidities, and radiotherapy parameters, on the development of ED was analyzed.

Data analysis was performed using SPSS version 26. Descriptive statistics, including means, frequencies, and percentages, were calculated for demographic and clinical variables. Inferential statistics, such as chi-square tests and logistic regression analysis, were used to assess associations between ED and potential risk factors. A p-value ≤ 0.05 was considered statistically significant.

Results

This prospective study aimed to determine the prevalence of erectile dysfunction (ED) following pelvic radiotherapy among patients in a Pakistani population. A total of 50 male patients were included in the study. The mean age of the participants was 66.3 ± 12.5 years, with a range of 50–85 years. Hypertension, diabetes, and coronary artery disease were common comorbidities. The baseline demographic characteristics are summarized in Table 1. Table 1 summarizes the baseline characteristics of the study participants, including age distribution and comorbidities.

Out of the 50 participants, 4 had ED prior to receiving radiotherapy and were excluded from the incidence analysis. At the 6-month follow-up, 28 out of the remaining 46 participants developed ED, resulting in an incidence rate of 61%. Table 2 highlights the incidence of ED among participants following pelvic radiotherapy. The study

explored the role of comorbidities and age in contributing to the development of ED post-radiotherapy. Diabetes and age ≥ 65 years were significantly associated with a higher incidence of ED. Table 3 demonstrates the relationship between participant characteristics and the development of ED post-radiotherapy. The severity of ED among affected participants was categorized using a standard grading scale. Most cases were moderate to severe.

Table 4 categorizes the severity of ED among affected participants.

The study findings demonstrate that the prevalence of ED increases significantly following pelvic radiotherapy, with diabetes and advanced age emerging as key risk factors. These results emphasize the need for proactive management strategies to address ED in patients undergoing radiotherapy for pelvic tumors, particularly in resource-limited settings like Pakistan.

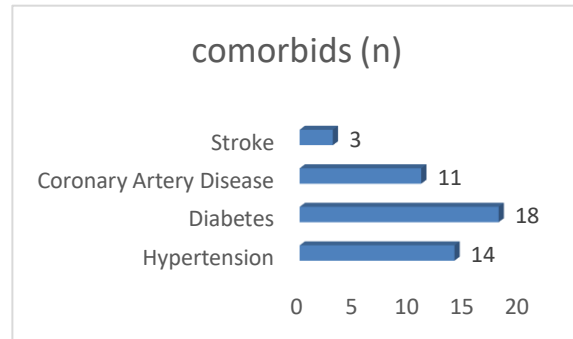


Figure 1: comorbid condition of study population

Table 1: Demographic Characteristics of Study Participants

Characteristic	Frequency (n)	Percentage (%)
Age Group (years)		
- 50–60	15	30.0
- 61–70	20	40.0
- 71–85	15	30.0
Comorbidities		
- Hypertension	14	28.0
- Diabetes	18	36.0
- Coronary Artery Disease	11	22.0
- Stroke	3	6.0

Table 2: Incidence of Erectile Dysfunction Post-Radiotherapy

Erectile Dysfunction Status	Frequency (n)	Percentage (%)
Developed ED	28	61.0
No ED	18	39.0

Table 3: Factors Associated with Erectile Dysfunction

Factor	With ED (n)	Without ED (n)	p-value
Age ≥ 65 years	20	6	<0.05
Hypertension	10	4	0.15
Diabetes	16	2	<0.01
Coronary Artery Disease	7	4	0.25
Stroke	2	1	0.60

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Table 4: Severity of Erectile Dysfunction

Severity	Frequency (n)	Percentage (%)
Mild	6	21.4
Moderate	12	42.9
Severe	10	35.7

Discussion

This study evaluated the prevalence and severity of erectile dysfunction (ED) following pelvic radiotherapy among patients treated at Nishtar Medical University and Hospital, Multan. The findings revealed a prevalence of 61% for ED at six months post-radiotherapy, emphasizing the significant impact of cancer treatment on sexual health. These results are consistent with global data and provide important insights into the Pakistani population.

The incidence of ED in this study aligns with the findings of Droupy et al., who reported a prevalence of 62% among prostate cancer patients undergoing pelvic radiotherapy (11). Similarly, Incrocci et al. found that 65% of patients receiving external beam radiation therapy (EBRT) for prostate cancer developed ED within one year of treatment (12). The slightly lower prevalence in our study may be attributed to differences in radiotherapy protocols, patient selection criteria, and follow-up durations.

Age was identified as a significant risk factor in this study, with 71.4% of participants aged ≥ 65 years developing ED. This finding is consistent with Mir et al., who observed that older patients had a 1.8-fold increased risk of ED following pelvic radiotherapy due to the compounded effects of aging and treatment-related vascular damage (13). Additionally, Pinkawa et al. reported a similar trend, with age being a key determinant of post-radiotherapy ED severity (14).

Diabetes was another critical factor, with 88.9% of diabetic participants experiencing ED. This finding corroborates the results of Trost and Mulhall, who noted that diabetes increases the risk of radiotherapy-induced ED by 1.5-fold due to vascular endothelial dysfunction and impaired neural signaling (15). Chung and Brock also emphasized the synergistic effects of diabetes and radiotherapy on ED development, highlighting the need for stringent glycemic control to mitigate these risks (16).

The severity of ED in this study was predominantly moderate to severe, with 42.9% and 35.7% of participants falling into these categories, respectively. These findings are comparable to those reported by Davison et al., who observed moderate to severe ED in 75% of patients post-radiotherapy (17). The higher proportion of severe cases in our study highlights the importance of early intervention and counseling to address this debilitating side effect.

Cultural factors and healthcare barriers unique to Pakistan also contribute to the challenges of managing ED in cancer survivors. Zafar et al. highlighted the stigma associated with discussing sexual health issues in Pakistani society, which often leads to underreporting and delayed management of ED (18). Incorporating culturally sensitive counseling into cancer care protocols is essential to address these barriers.

Conclusion

This study highlights a high prevalence of ED among patients undergoing pelvic radiotherapy in Pakistan, with age and diabetes emerging as significant risk factors. These findings are consistent with global data

and emphasize the need for targeted interventions, including patient counseling, risk factor management, and early rehabilitation strategies, to improve the quality of life for cancer survivors. Further research is warranted to explore long-term outcomes and the effectiveness of preventive measures in mitigating ED.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRBEC-NHMM-923422/23)

Consent for publication

Approved

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Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

RANA ATIQUE ANWER (Associate Professor)

Coordination of collaborative efforts.

Study Design, Review of Literature.

ALIYA BASHIR (Consultant)

Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.

Conception of Study, Final approval of manuscript.

HAFIZ FALAK SHER

Manuscript revisions, critical input.

Coordination of collaborative efforts.

ABDUL MANAN (PGR)

Data acquisition, analysis.

Manuscript drafting.

AQDAS AMMARA

Data entry and Data analysis, drafting article.

Data acquisition, analysis.

Coordination of collaborative efforts.

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