

Psychological side effects of radiation therapy on cancer patients

Fatima Khurshid^{1*}, Ans Abdul Razzaq², Hafsa Khurshid³

¹ Medical Doctor, Department of Medicine, Mohi-Ud-Din Islamic Medical College, Mirpur AJK, Pakistan

² Dental Surgeon, Department of Dentistry, Islamic International Dental College, Islamabad, Pakistan

³ Research Scholar, Department of Chemistry, Mirpur University of Science and Technology, Mirpur AJK, Pakistan

Author's Contribution

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² Data analysis and interpretation, drafting, critical revision and final approval of the article

³ Writing & technical editing of the manuscript

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Correspondence

Fatima Khurshid

fatimakhurshid61@yahoo.com

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A B S T R A C T

Background: In this study, we investigated the prevalence of anxiety and depression in cancer patients undergoing radiation therapy and identified the factors associated with the multidimensional model, including sociodemographic, clinical, function and well-being, and symptom variables.

Methodology: The research was conducted at the Shifa International Hospital Ltd. in Islamabad's radiation oncology clinic from February 2022 to May 2022. Assessments of side effects and the intensity of typical symptoms experienced by cancer patients receiving radiation therapy have been carried out using the MD Anderson Symptom Inventory (MDASI) questionnaire. Version 20.0 of the Statistical Package for the Social Sciences (SPSS) has been used to analyze the data. They were described using categorical statistics using frequency and percentage.

Results: The majority of participants were women. During the treatment, patients experienced various psychological reactions, such as nausea, Pain, anxiety, depression, fear, fatigue, disturbed sleep, and shortness of breath. Many patients also reported feeling sad, losing enjoyment of life, and having disturbed relationships with people around them. However, the psychological state of patients improved at the end and after the Intervention.

Conclusion: Acute psychological side effects appeared in several patients receiving radiation therapy, such as anxiety, depression, fear, and low self-esteem. Hence, we concluded it has a high incidence. So, radiation therapy patients should receive support and care for their psychological well-being.

Keywords: Cancer Treatment, Radiation-Induced Psychological side effects, Radiation Reactions, Radiotherapy

Introduction

Radiation therapy is a frequently used treatment for cancer control or eradication. According to Cancer Facts and Figures 2000, more than a million people are diagnosed with cancer yearly. However, various adverse effects have been linked to localized radiation therapy.¹⁻⁴ Radiation therapy frequently causes side effects in cancer patients. Patients with cancer who get radiation therapy often experience psychophysical distress due to common side effects. Severe psychiatric mood disorders can develop from sadness, anxiety, and adjustment difficulties.

Following cancer treatment, side effects, particularly fatigue and sleep disturbance, have significantly impacted a patient's quality of life, including job, social, and emotional adjustment.⁵⁻⁷

The severity of radiation therapy-related side effects has been strongly linked to psychological distress, as seen by an increase in anxiety, rage, and sadness, in addition to disturbance of daily routines and a lower quality of life.^{8,9} Cancer patients typically indicate that fatigue, rather than the Pain, nausea, and vomiting related to the disease and

treatments, is radiation therapy's most upsetting side effect. All cancer patients should regularly have their levels of fatigue assessed.

This study aims to conduct a literature review and analysis of the psychological effects of radiation treatment on cancer patients to learn more about how patients perceive RT and associated processes.¹¹ This study aimed to assess how radiation therapy affected the psychological components of cancer patients' quality of life. To investigate the impact of the Intervention on the severity of side effects resulting from radiation therapy for various malignancies, a randomized clinical trial including patients was conducted. The informative Intervention for the patients will be based on factual information about what to anticipate during their therapy.¹

In this study, we looked at the frequency of anxiety and depression in cancer patients receiving radiation therapy and will determine the variables connected to the multidimensional model, including sociodemographic, clinical, function and well-being, and symptom variables. In this study, we investigated the prevalence of anxiety and depression in cancer patients undergoing radiation therapy and will identify the factors associated with the multidimensional model, including sociodemographic, clinical, function and well-being, and symptom variables.

Methodology

This study has been carried out on clinically and histopathological diagnosed cancer patients undergoing radiotherapy at the Radiation Oncology clinic of Shifa International Hospital Islamabad. The sample included a statistically substantial convenience of 100 diagnosed cancer patients who were undergoing radiation therapy in the period between Feb 2022 to May 2022 with the following inclusion criteria; Biopsy proven malignancies, diagnosed cancer patients undergoing RT, Patients receiving RT at the Radiation Oncology clinic of Shifa International Hospital Islamabad and Ability to communicate effectively with the study personnel. The findings were supported by a cross-sectional survey study that explored functioning, emotional distress, and symptoms in cancer patients undergoing radiation therapy. The survey was conducted using a standardized questionnaire, the MDASI core items, to evaluate the

intensity of symptoms that patients experienced and the disruption of daily activities.

The MD Anderson Symptom Inventory (MDASI) is a patient-reported outcome (PRO) assessment for several symptoms in clinical and research contexts. Use the MDASI to assess the severity of the symptoms that cancer patients report and the disruption to everyday functioning that these symptoms create.¹² The 13 symptom items that make up the core MDASI were those found to occur most frequently and severely in patients with a range of malignancies and treatment modalities. The MDASI is a brief assessment of the impact and severity of cancer-related symptoms. It has 15 main symptoms in all.

Each symptom is graded on an 11-point scale (0–10) to reflect its severity and presence over the past 24 hours (0–10 = "as bad as you can imagine"). Six symptoms that interfere with how a patient's life has been functioning during the past 24 hours are also included. The interference items are scored on a scale of 0 to 10, with 10 denoting complete interference.¹¹ In the past three months, radiation patients with cancer have been the subject of analysis. The study only included patients who met the requirements for inclusion, and survey data were used for analysis. Data has been analyzed using Statistical Package for the Social Sciences (SPSS), version 20.0. The frequency and percentage of categorical data were used to describe them.

This research study was ethically approved by the Institute Review Board (IRB) & Ethics Committee of Shifa International Hospital Islamabad (Ref: IRB # 251-21). All the patients were selected from the outpatient department. All the patients signed informed consent papers and voluntarily participated in the study. We assured the confidentiality of the participants.

Results

Radiation therapy's physical and psychological side effects can significantly affect a patient's general activity, walking, working, enjoyment of life, and mood. Patients may experience anxiety, depression, fear, fatigue, nausea, skin irritation, and changes in body image or self-esteem, leading to decreased social functioning, decreased ability to work, and decreased overall quality of life. The sample consisted of 100 cancer patients who were on radiotherapy. Regarding clinical data, all the patients

included in this study were clinically and histopathological diagnosed cancer patients. All the patients completed radiation treatment. Most participants comprised women; 62% and 38% were men.

In this study, all the patients developed some sort of psychological reaction, such as nausea, in 58% (1.23±1.774) patients. The Pain was exhibited by 57% (1.62±2.399) patients, fatigue was seen in 81% (0.66±1.799) patients, 59% (1.07±1.689) of the population complained of disturbed sleep, 81% (0.51±1.219) patients were distressed during the treatment, 36% (2.61±2.348) of the population experienced shortness of breath during the procedure. The 29% (3.01±2.672) patients experienced dry mouth, 36% (2.15±2.376) of the population experienced feelings of sadness, 39% (1.89±2.132) patients complained of loss of enjoyment of life, 62% (0.75±1.5) people felt disturbed relationship with people around them, 66% (0.89±1.614) people complained of uneasy walking, 65% (0.88±1.701) population complained of work being affected.

Generally, activity of daily life was found to be disturbed in 66% (1±1.896) of the population. 42% (2.28± 2.466) people experienced mood swings, 64% (1.31±2.078) people felt drowsy after the procedure, 16% (3.79±2.626) population experienced numbness and tingling sensation, 81% (0.82±2.002) population had vomiting & 42% (2.11±2.399) people experienced loss of appetite during the procedure. The overall psychological state of patients was improved at the end and after the Intervention.

Table 1: MDASI Score items used to assess the psychological impact of radiation therapy on cancer patients

MDASI Symptom Items	Symptom severity	Mean	Standard Deviation
Pain	57%	1.62	2.399
Nausea	58%	1.23	1.774
Numbness/Tingling	16%	3.79	2.626
Disturbed Sleep	59%	1.07	1.689
Distressed/Upset	30%	2.61	2.348
Sadness	81%	0.51	1.219
Dry Mouth	29%	3.01	2.672
Shortness of Breath	36%	2.15	2.376
Lack of Appetite	42%	2.11	2.399
Drowsiness	64%	1.31	2.078
Walking	66%	0.89	1.614
Vomiting	81%	0.82	2.002

Difficult Remembering	82%	0.69	1.74
Fatigue	81%	0.66	1.799
General Activity	66%	1	1.896
Walking	66%	0.89	1.614
Working	65%	0.88	1.701
Enjoyment of life	39%	1.89	2.132
Relations with people	62%	0.75	1.5
Mood	42%	2.28	2.466

Discussion

Radiation therapy is used in curative, palliative, and preventative treatment strategies, depending on the kind of cancer and the desired goals of the procedure. It can be administered via external beam, internal insertion, or systemic delivery. Radiation therapy affects a cell's DNA, which prevents it from proliferating. Malignant cells generally cannot repair the radiation-induced damage, but healthy, noncancerous cells typically recover from radiation therapy. Radiation exposure to noncancerous cells is minimized through careful treatment planning, minimizing side effects. The use of radiosensitizers and radioprotectants is a part of this.¹⁰⁻¹⁴ A cancer diagnosis significantly impacts emotional well-being. It's common to experience these kinds of life-altering emotions after a diagnosis. These feelings are typical and healthy; straightforward people should deal with them.

An individual may experience exhaustion from starting cancer treatment, such as radiation therapy, which can result in emotional discomfort and anxiety. Radiation therapy has an impact on both your thoughts and feelings in addition to your physical health.^{15, 16} The sort of radiation side effects the patient experience varies on the dose and schedule recommended. Most adverse effects go away within a few months of treatment being finished. Some adverse effects could continue even after treatment since it takes time for healthy cells to recover from radiation. Specific adverse effects may limit your capacity to do certain tasks. Some patients with radiation therapy can attend work or participate in leisure activities while undergoing treatment. Some people work less well and require more sleep than usual.¹⁷

Compared to the Pain, nausea, and vomiting brought on by the malignancy and therapies, the most upset side effect of radiation therapy is frequently found by cancer patients to be weariness.¹⁰ Vomiting and nausea are frequent and occasionally dangerous adverse effects of

cancer treatment. Cancer therapies such as chemotherapy and radiation can make patients feel queasy and sick. These symptoms might range from minor to major. If the patient is undergoing radiation therapy applied to substantial areas of the body, especially the GI system, liver, or brain, the likelihood of experiencing nausea-related symptoms increases. Radiation therapy also damages the cells that line the intestines, making these regions more susceptible. In contrast to diarrhoea, which can happen at any time of the day, nausea and vomiting are frequently experienced shortly after the treatment. Patients probably feel better when they don't receive radiation therapy.¹⁵ It's crucial to manage and reduce nausea and vomiting. These issues may impact daily activities, mental and physical health, and even treatment if they are not addressed. A crucial component of cancer care and therapy is relieving side symptoms, commonly known as palliative or supportive care.¹⁶

Even if the patients obtain the recommended amount of rest and sleep, they may still feel physically, emotionally, and mentally exhausted. Patients often feel worn out. In patients undergoing multiple types of treatments, such as radiation therapy and chemotherapy, the level of weariness may rise.¹⁵ The most frequently reported symptom of cancer and its treatment is exhaustion or fatigue. It's normal to have extreme fatigue while receiving radiation therapy. It can be due to the physical demands of the treatment, as well as the emotional stress of dealing with cancer. Fatigue can also be a side effect of cancer itself. Many things, like stress, discomfort, or anaemia, can contribute to or make one feel more exhausted. Fatigue can be minor to severe, depending on each person's general health. Cancer-related fatigue is commonly characterized by exhaustion after resting and a lack of energy for daily duties.¹⁶

Sometimes receiving radiation to the breast might result in radiation pneumonitis, an inflammation of the lungs. Radiation pneumonitis is the medical term for lung inflammation caused by radiation therapy to the chest (or, less frequently, the breast). It may occur three to six months after getting radiation therapy. If you also have emphysema, which results in the progressive destruction of lung tissue, your chances of developing this condition increase. One of the primary symptoms of radiation pneumonitis is breathlessness, which usually worsens with

effort, weakness, coughing, chest pain, etc.¹⁷ Radiation treatment to the head, face, or neck may cause a dry mouth. The salivary glands may take up to six months or longer to start producing saliva after radiation therapy is done. Dry mouth generally improves within the first year after radiation therapy. But many people continue to have chronic dry mouth to some extent. It is prevalent if radiation therapy is administered to the salivary glands, but several ways exist to decrease or prevent this. ASCO suggests using radiation therapy techniques, including intensity-modulated radiation therapy (IMRT), that reduce radiation exposure to the salivary glands.¹⁵

Radiotherapy-induced peripheral neuropathy is a persistent disability that may be worrying because it advances and is frequently irreversible. It typically develops several years after treatment. With longer-term cancer survival rates improving, its rarity is rising. We still don't fully comprehend the pathophysiological mechanisms. However, cytokines released from cancer cells during RT can damage adjacent noncancerous cells. This inflammatory reaction can result in nerve damage in the form of fibrosis, atrophy, ischemia, or ulceration of vessels and nerves.¹⁸ In addition to reducing saliva production in the morning, radiation therapy also affects appetite by generating symptoms of xerostomia, taste sensitivity, analgesic use, and oral mucositis. Depending on the dose and schedule of radiation therapy, different precautions should be taken to prevent a decrease in appetite brought on by side effects. These findings give healthcare professionals crucial knowledge they need to comprehend, encourage proper nutritional intake, and improve the quality of life for cancer patients undergoing radiation treatment.¹⁸

Conclusion

For cancer patients, radiation therapy is a frequent form of treatment. While it can effectively destroy cancer cells, it can also have psychological side effects on patients. These side effects can vary in severity and affect patients during and after treatment. Radiation therapy's physical and psychological side effects can significantly affect a patient's general activity, walking, working, enjoyment of life, and mood. Patients may experience fatigue, weakness, and changes in body image or self-esteem, making it difficult to perform daily activities like walking or

working. These physical side effects can also lead to decreased enjoyment of life and may contribute to feelings of depression and anxiety. Additionally, anxiety and depression can further impact a patient's mood and quality of life. The treatment can be a stressful and frightening experience, and patients may worry about the potential side effects and long-term effects of radiation exposure.

After radiation therapy, patients may continue to experience psychological side effects. They may worry about the cancer returning or the long-term effects of radiation exposure. They may also experience changes in body image or self-esteem, especially if the treatment causes scarring or other physical changes. Therefore, patients need to receive support and care for their psychological well-being during and after radiation therapy, including counselling, support groups, or other forms of treatment, and to talk openly about their feelings and concerns with their healthcare providers and loved ones. Healthcare professionals can assist patients in maintaining their quality of life and enhance their general mood by addressing treatment's physical and psychological components.

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