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Radiotherapy treatment method among Cancer Patients in the Southwestern Iranian Population: One-year Cross-Sectional study

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Abstract

Introduction: *The present study aimed to investigate the frequency of radiotherapy in patients suffering from prevalent cancers in the southwest of Iran and pave the way for providing treatment types to these patients.*

Material and Method: *The present research was a cross-sectional descriptive-analytical study on radiotherapy-undergoing patients referring to the oncology department of Ahvaz Golestan Hospital in 2018. In the end, the data collected from patients' records were categorized in terms of the frequency of demographics, tumor type, and male/female cancer patients and the non-provision or provision of radiotherapy as adjuvant, definitive, and palliative treatments.*

Results: *A total of 1480 patients participated in the study. Breast (37.7%) and head and neck (8%) cancers were the most frequent among male and female clients. The highest percentage was related to clients receiving adjuvant therapy, and the highest percentage of clients receiving definitive radiotherapy suffered from head, neck, and lymphoma cancers. Many of the adjuvant radiotherapy clients suffered from breast cancer. The most prevalence of palliative radiotherapy was provided for breast, head, neck, and bladder cancers.*

Conclusion: *This study revealed that the adjuvant radiotherapy of cancer patients in the southwest of Iran was increasing. Furthermore, head, neck, and breast cancers were the most prevalent cancers among males and females in this region of the country.*

Keywords: *.neoplasms, cancer, radiotherapy, iranian population.*

Introduction

Cancer refers to the uncontrolled growth and spread of abnormal cells that lose their control over the cellular cycle and continue multiplying constantly regardless of cellular consequences and growth factors. If this growth continues in an uncontrolled way, it will lead to the host's death [*Ermini L et al., 2023*]. In future decades, cancer will be one of the significant factors of disease load in the world. According to the latest statistical and epidemiological investigations in Iran, cancer will be the third cause of death after cardiovascular diseases and accidents, and it is predicted that cancer

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will be the first and most important cause of human death in 2030 [*Mattiuzzi C, Lippi G, 2019; G, 2019*]. Breast and prostate cancers are two common types of cancers that mainly or exclusively involve one gender and almost constitute 30% and 26% of cancer cases in males and females [*Smittenaar CR et al., 2016; De Silva F, Alcorn J. A., 2022*]. Bowel cancer is also one of the most prevalent cancers and the third cause of cancer deaths in men and women [*Azizidoost S et al., 2022*]. Today, many cancers are not definitely cured; however, several methods, such as surgery, radiotherapy, chemotherapy, hormonotherapy, and bone marrow transplantation, are used to prevent their growth and development [*Najafi M et al., 2021*]. Concurrent with surgery and chemotherapy, radiotherapy is still a pivotal approach to cancer treatment and a cheap and efficient therapy, approximately constituting 5% of the total cancer-treatment costs [*Abshire D, Lang MK., 2018*]. Radiotherapy uses strong energy rays, X or proton beams, to kill cancerous cells and can be internal or external [*Nag S et al., 2022*]. Radiotherapy aims to remove cancer cells maximally by hurting healthy tissues minimally. This treatment, which is mainly used to cure or weaken cancer diseases [*Shinohara ET et al., 2009*], has several targets, including neoadjuvant, adjuvant, and palliative therapies. The purpose of the palliative method is to downsize tumors, alleviate their topical symptoms, like severe pains, and lengthen the lifetime of patients [*Jones JA et al., 2014; Spencer K et al., 2018*]. The neoadjuvant therapy, as one of the adjuvant therapies, is provided before the main treatment, can reduce the probability of cancer recurrence, and is often used to facilitate or increase the effectiveness of the primary treatment, like surgery [*Burstein HJ et al., 2017; Feeney G et al., 2019*]. Likewise, adjuvant therapy is used when the target is to prevent the topical recurrence and remote spread of the disease until the therapy of the treated area is completed [*Baumann BC et al., 2021; Woelber L et al., 2022*]. Thus, considering the high incidence of the prevalent cancers and the need for palliative, adjuvant, and neoadjuvant radiotherapies in cancer patients, the present study aimed to investigate the frequency of palliative and therapeutic radiotherapies in patients suffering from prevalent cancers in the southwest of Iran and pave the way for providing treatment types in these patients.

Materials and methods

Design: The present research was a cross-sectional, descriptive-analytical, and retrospective study aiming to examine the frequency of palliative, definitive, and adjuvant radiotherapies in cancer patients and pave the way for providing treatment types in the patients in the southwest of Iran in a selected period. The data associated with prevalent cancers were investigated in an attempt to categorize the references of patients for definitive, palliative, and adjuvant radiotherapies in the southwest of Iran in 2018. In the beginning, the general principles and methodology of the study were confirmed by the ethics committee of Ahvaz Jundishapur University of Medical Sciences (AJUMS) (IR.AJUMS.REC.1399.052). In addition, the confidentiality of the data collected from the patients was preserved in all research phases.

***Participants*:** All male and female radiotherapy-undergoing patients who suffered from prevalent cancers and were referred to the oncology department of Ahvaz Golestan Hospital were entered into the study, and those patients whose medical records were incomplete or unreadable were kept out. Besides, patients not responding to telephone calls or lacking the necessary knowledge to complete the information of their records were excluded.

Data collection: The patients were selected by the census method and entered into the study based on their hospital records. The separately-recorded information associated with every patient included their demographic information, age and gender,

Table 1.

Distribution of frequency and percentage of research samples based on demographic characteristics.

Descriptive indicators		Frequency (%)	P-Value
Age (year), Mean ±SD	< 20	34 (2.3)	0.80
	20-29	43 (2.9)	
	30-39	139 (9.4)	
	40-49	332 (22.4)	
	50-59	392 (26.5)	
	60-69	345 (23.3)	
	70-79	128 (8.6)	
	> 79	67 (4.5)	
Gender, N (%)	Male	544 (36.8)	0.38
	Female	936 (63.2)	

TABLE 2.

Frequency distribution of tumor type in cancer patients in the study population (n=1480).

Tumor type	Frequency n (%)
Breast	552 (37.3)
Lymphoma	68 (4.6)
The rectum	137 (9.3)
Prostate	104 (7)
Skin	80 (5.4)
Head and neck	159 (10.7)
Bladder	84 (5.7)
Gastric	68 (4.6)
Cervix	77 (5.2)
Colon	31 (2.1)
Uterus	79 (5.3)
Esophagus	41 (2.8)

the research-required variables, e.g., the cancer type, and the radiotherapy form, e.g., adjuvant, neoadjuvant, and palliative. The data related to the examined variables were collected from male and female patients' medical files or through calling them on the phone and recorded for each patient. In the end, the collected data were categorized in terms of the frequency of demographics, tumor type, and male/female cancer patients and the non-provision or provision of radiotherapy as adjuvant, definitive, and palliative treatment.

Statistical analysis: The analyses were run in the SPSS software at the significance level of 0.05. Mean ± standard deviation was used for quantitative variables, and frequency and percentage were employed for qualitative variables. The Mann-Whitney U, Chi-squared, and multiple logistic regression were also applied for the multivariate analysis of the data, the normality of which was checked by the Kolmogorov-Smirnov and Q-Q tests.

TABLE 3.

Frequency distribution of cancer patients according to their gender in the study population(n=1480).

Tomur type	Female, N (%)	Male, N (%)	P-Value
Breast	552 (37.3)	0	
Lymphoma	23 (1.6)	45 (3)	
The rectum	54 (3.6)	83 (5.6)	
Prostate	0	104 (7)	
Skin	37 (2.5)	43 (2.9)	
Head and neck	40 (2.7)	119 (8)	
Bladder	9 (0.6)	75 (5.1)	**< 0.001**
Gastric	25 (1.7)	43 (2.9)	
Cervix	77 (5.2)	0	
Colon	18 (1.2)	13 (0.9)	
Uterus	79 (5.3)	0	
Esophagus	22 (1.5)	19 (1.3)	

RESULTS

A total of 1480 cancer patients undergoing radiotherapy were entered into the study. The mean age of the examined population was 54.01 ± 14.602. The lowest and highest ages of the participants were 5 and 92 years. **Table 1** presents the frequency distribution of gender in patients with prevalent cancers. Considering the results in the examined population, 36.8% were males, and the 40-69 age group had the highest frequency percentage of patients. Also, breast cancer enjoyed the highest incidence and frequency percentage among the patients (37.3%) (Table 2, and 3).

Table 4 displays the non-provision and total provision rate of radiotherapy in three definitive, palliative, and adjuvant modes. According to the results, adjuvant therapy was reported as the most frequent radiotherapy (51.4%). The outcomes also showed significant differences among references in four treatment types (P < 0.001) (Table 5). A large percentage of the clients referring for adjuvant radiotherapy suffered from breast cancer (31.41%). Moreover, among the references for definitive radiotherapy, the maximum percentage belonged to patients with head and neck cancers (7.1%). Only patients with breast (2%), head and neck (0.4%), and bladder (1%) cancers received palliative radio-

TABLE 4.

Comparison of the overall rate of providing radiotherapy in three ways of treatment and no radiotherapy.

Treatment method	Frequency n (%)
Without Radiotherapy	266 (18)
Adjuvant	762 (51.4)
Neoadjuvant	135 (9.12)
Definitive	276 (18.6)
Palliative	41 (2.1)

Table 5.

Distribution of the frequency of referrals for adjuvant, definitive and palliative radiotherapy by cancer type in the study population.

Treatment Method	Adjuvant, N (%)	Neoadjuvant, N (%)	Definitive, N (%)	Palliative, N (%)	P-Value
Breast	465 (31.41)	4 (0.27)	5 (0.4)	24 (2)	**< 0.001**
Lymphoma	10 (0.67)	2 (0.13)	56 (4.6)	0	
The rectum	29 (1.96)	87 (5.87)	0	0	
Prostate	44 (2.97)	0	28 (2.3)	0	
Skin	33 (2.23)	6 (0.4)	22 (1.8)	0	
Head and neck	44 (2.97)	12 (0.81)	86 (7.1)	5 (0.4)	
Bladder	23 (1.55)	6 (0.4)	10 (0.8)	12 (1)	
Gastric	33 (2.23)	6 (0.4)	5 (0.4)	0	
Cervix	27 (1.82)	0	47 (3.9)	0	
Colon	6 (0.4)	0	0	0	
Uterus	48 (3.24)	0	0	0	
Esophagus	0	12 (0.81)	17 (1.4)	0	

therapy. The findings revealed that many of the references were for adjuvant therapies, and the type of prevalent cancer and treatment were significantly associated ($P < 0.01$) (**Table 5**).

Discussion

Recording population-based cancer incidence and treatment type plays a pivotal role in planning for cancer control. These paramount data are inaccessible in many low- and middle-income countries with increasing cancer loads. Radiotherapy is among the most applied and non-invasive treatments in the cancer domain that, as a palliative therapy, is used alone or in combination with other cancer treatment methods, such as chemotherapy and surgery, to cure patients [*Chandra RA et al., 2021*]. In the present study, females outnumbered males, and the 40-69-year age group had the highest frequency percentage. Ashraf et al. [*Ashraf A et al., 2021*] reported that men outnumbered women among patients with colon cancer, and the highest number of patients fell into the 50-60-years age group. Their results conformed with ours in terms of the age range and contradicted in terms of the gender of the patients. Furthermore, in line with the data provided by other studies, the results of the present study showed that male patients outnumbered females in lymphoma, rectum, skin, head, neck, bladder, and gastric cancers [*Lopes-Ramos CM et al., 2020*].

Radiotherapy can also include adjuvant and neoadjuvant treatments that are often considered during the multimodal management of various cancers. Adjuvant radiotherapy is a proven approach that, along with surgery, is used as a tool to preserve topical control in patients with high risks of tumor recurrence [*Bui DL, Yu JB, 2015*].

Our results displayed that the highest percentage belonged to the clients with breast cancer, considering the references for adjuvant radiotherapy. Besides, breast cancer had the highest reference rate for adjuvant treatment, indicating the high incidence of breast cancer in women. However, this rate declined for the neoadjuvant therapy, denoting patients' improvement during the treatment. On the other hand, the number of clients with rectum cancer increased in the neoadjuvant therapy, implying the progression of the disease in cancer patients. Breast and rectum cancers had the highest reference rates for the adjuvant and neoadjuvant radiotherapies, respectively. This finding aligned with the outcome of the study by Mahmoudvand et al. (*2017*). Other studies in America and Sweden reached corresponding results with the present research. Through randomized trials, they showed the growth of adjuvant radiotherapy for patients with breast cancer, especially those who, after surgery, underwent radiotherapy, which reduced the recurrence risk of the disease among them [*Fisher B et al., 2002; Malmström P et al., 2003*]. Like-

wise, among the references for definitive radiotherapy in the present research, the highest percentage belonged to patients with head, neck, and lymphoma cancers, while no definitive radiotherapy was provided for patients with rectum, womb, and colon cancers. We can explain that the seriousness of head and neck cancers and the fast development of tumors in these areas raise references to definitive radiotherapy, which is usually simultaneous with chemotherapy. In addition, Farina et al. (2018) examined palliative therapies on metastatic cancers and reported that the highest palliative therapy was provided for advanced head and neck cancers, where the total palliative response rate was 91.7% with a 4-month average.

A comparison of the provision of three radiotherapies according to the tumor type in our study revealed that many clients received adjuvant therapies. Also, in line with the research by Bryant et al. (2017), there was a significant relationship between the type of prevalent cancer and treatment. Mohammadi et al. also showed a significant relationship between the type of prevalent cancer and treatment.

CONCLUSION

This study showed that adjuvant radiotherapy experienced an increasing in the southwest of Iran. Head, neck, and breast cancers were the most prevalent cancer types among southwestern males and females in Iran. These results can be useful for local and national planners and help them design and implement targeted and efficient control programs for these cancers.

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CONTENTS