

# Efficacy of a pre-radiotherapy, nurse-led instructional program on anxiety level of patients receiving Radiotherapy (RT) for first time

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ABSTRACT

Background: Patients, family members, and caregivers may become anxious and apprehensive after receiving a cancer diagnosis and going through many treatment options, including both medical and surgical ones. In fact, 40% to 62% of patients reported feeling anxious prior to radiation, with the first session being the most stressful.

Aim: This study was conducted in order to evaluate the effectiveness of a pre-radiation therapy, nurse-led tailored instructional program increasing level of anxiety in adult patients undergoing RT for first time.

Methods: A quasi-experimental design, with the application of a pre-test/ post-test approach, was employed in this study. The study was conducted on 128 adult patients, who received RT at Maysan Center for Tumors Treatment. The patients were randomized into 2 groups: study group (n=64) and control group (n=64). Patients who were allocated to the study group received the nurse-led tailored instructional program which was introduced using direct face to face approach of educational counseling. The program was implemented in classroom-like session direction, which was designed and scheduled for approximately 30-45 minutes for 3 times per week. After 2-3 week of introducing the program for the study group only, all patients in this study sample were exposed to post test. Regarding the control group, the same above steps were followed except for the instructional program.

Results: The results show that there are highly significant differences between the pre and post-test in the study group, in terms of patient's anxiety levels (M=11.87500, SD=4.38793, t (63)=21.650, p=0.0001) The effect size for this analysis (d=17.2, while control group had no statistically significant differences between the pre and post-test (mean difference =-0.12500, p <-1.528).

Conclusions: The study illuminates that patients receiving radiation therapy for the first time in the targeted setting were having sever level of anxiety that has not been addressed by all their health care providers including nurses, about their scheduled management line. This reflect that nursing educational counselling is an overlooked duty. Of equal importance, the tailored nurse-led instructional program successfully prove its efficacy in managing subject's anxiety.

**Key words:** radiation therapy, instructional program, anxiety

## INTRODUCTION

Cancer is responsible for a substantial burden on communities and, mainly, on less developed countries[1]. Over the past ten years, cancer rates have increased among people in the Middle East, especially in Iraq[2]. The current rise in incidence is correlated with population growth and aging and due to the increment of the risk factors, such as low physical activity, smoking, and obesity, as a result of western lifestyle adoption [3].

Lack of knowledge and awareness is another important factor because it causes misunderstandings about the severity of the condition's symptoms. The anxiety that results from these misunderstandings can make it harder for patients to perform daily tasks and worsen their quality of life [4]. Even while the amount of anxiety decreases as the therapy advances in subsequent visits, the patient's first visit to the cancer center appears to be particularly stressful [5]. Giving patients accurate information in a timely manner prior to treatment is crucial to improving understanding and lowering fear, anxiety, and stress in patients [6].

Cancer patients may experience anxiety, panic attacks, actual or imagined social shame, and a deterioration in their Quality Of Life (QoL) [7, 8]. Due to factors like tumor diagnosis, a lack of understanding of the diagnosis, knowledge gaps regarding the treatment location and equipment, invisibility of the immediate treatment effect, protracted waiting periods before treatment, uncomfortable orientation, lack of company during the treatment, and potential side effects, RT is thought to be a significant source of stress in cancer patients, especially during the first session. Unauthorized sources that disseminate false information run the risk of jeopardizing patients' commitment to their treatment. Therefore, one of the major stressors that cancer patients may suffer during their treatment is dread of RT [9].

A study on the depression and anxiety levels in lung cancer patients to measure the amount of anxiety and depression in lung cancer patients [10]. A total of 110 patients were chosen from the Al-Diwaniyah Teaching Hospital's cancer department, the

study found that there is a high significant difference in depression symptoms with regard to older age patients, with a *p*-value (0.00). Patients with cancer tend to experience higher levels of anxiety than those with other illnesses.

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## MATERIALS AND METHODS

Treatment options for cancer patients may combine several different strategies such as surgery, chemotherapy, radiation therapy, immunotherapy, and/or endocrine therapy depending on the patient's diagnosis, cancer stage, and general condition, different treatment modalities are chosen [1, 11] assessed how individual education and support interventions affected the anxiety and depression levels of radiation therapy patients who had breast cancer (RT). After educational program, anxiety and sadness levels significantly decreased between the pre-test and post-test ( $p=0.000$ ). There was no discernible difference in the control group's overall mean anxiety and sadness levels ( $p=0.187$ ).

Because radiation therapy cannot be seen, heard, or felt, and because it is frequently difficult for patients to understand, patients undergoing radiation therapy have a particularly acute need for mental and social support. Individual treatment plans for patients is common practice. However, there is growing recognition that the emotional and social support provided should also be tailored to each patient's needs [12]. An oncology nurses can play a critical role in reducing the burden of associated with adverse effects of treatment [42].

When providing nursing care during radiotherapy treatment, oncology nurses should consider the experiences, attitudes, and knowledge of the patients. They should also anticipate the preferences and specific needs of their patients and draw attention to any differences between them and the patients with regard to matters such as emotional distress, physical needs, and quality of life. Further research into there is a knowledge gap and that there is no previous national research it also opened the way for researchers to carry out other similar studies. Therefore, this study aimed to answer the following research question: Does a pre-radiation therapy, nurse-led tailored instructional program has the potential to reduce anxiety of patients receiving radiation therapy for the first time in Iraqi health care setting?

### Research design

A quasi-experimental design was used with the application of a pre-test/ post-test approach for both groups (study and control group), using single-blind technique.

### Setting and samples

This study was conducted during the period of December 13th of 2022 to March 19th of 2023 on adult patients who were admitted to Maysan Center for Tumors Treatment in Maysan, Iraq. There have been (128) patients in the sample. The sample size was calculated according to A-priori sample sizes for student t-tests (Table1), number of these subjects as shown in Study Protocol Algorithm Section (Figure 1).

### Participants

The criteria used for inclusion in the study were as follows: Adult patient who have the ability to understand the given instructions (Nursing Counselling), patients with age  $\geq 18$  years, having no history psycho-mental disease (confirmed from medical record), having no history of using psychiatric medicines, and having no history of chemotherapy or radiotherapy within the last three months. The criteria used for exclusion in the study were as follow: Patient getting chemotherapy along with radiation, patients who have been scheduled for less than 10 RT sessions, patients with hearing and visual impairment, and patient with brain and larynx tumor (Table 1).

\*Minimum total sample size (one-tailed hypothesis): 102

\*Minimum sample size per group (one-tailed hypothesis): 51

\*Minimum total sample size (two-tailed hypothesis): 128

\*Minimum sample size per group (two-tailed hypothesis): 64

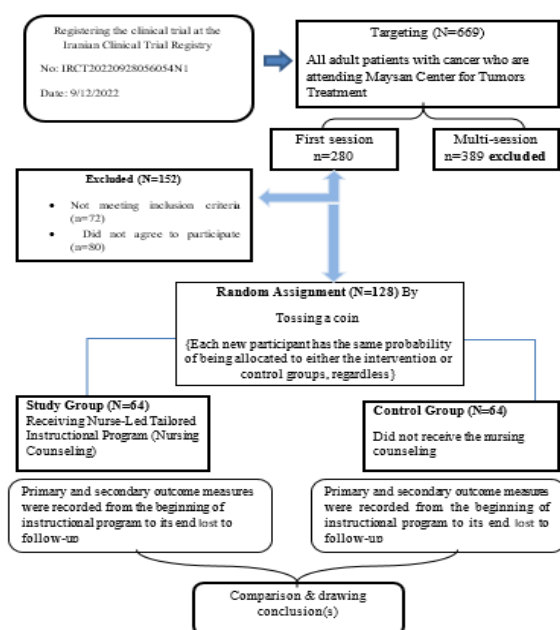


Fig 1. Study protocol algorithm

Tab 1. Minimum sample size determination	Parameter of calculation the minimum sample size	Selected Values
	Anticipated effect size (Cohen's d):	0.5
	Desired statistical power level:	0.8
	Probability level:	0.05

Tab 2. NB Scores-specific distribution of the DASS-21	Category	Depression	Anxiety	Stress
	Normal	0-9	0-7	0-14
	Mild	13-Oct	9-Aug	15-18
	Moderate	14-20	14-Oct	19-25
	Severe	21-27	15-19	29-33
	Extremely Severe	28+	20+	34+

## Data collection tools

Demographic data of patients section: The demographic data section was designed to obtain the data of participants in the study. These data included 7-items: Age, Gender, Social Status, Area of Residence, Educational Level, Occupation, and Economic Status. Collected by self-report interview questionnaire.

Clinical data section: The clinical data included the following items, which were collected by the researcher herself from the official health care records. These were: Type of Cancer, Stage of Cancer, and Site of treatment on patient's body, History of Chemotherapy before the last 3 months, Duration of disease, and Duration of session.

Depression, Anxiety and Stress Scale (DASS): DASS-21, was chosen to assess the level of different categories of psychological stress on patients with cancer, who were receiving RT for first time. The DASS is a series of three self-report scales used to assess the mental states of depression, anxiety, and stress. Each of the three DASS scales has seven elements that are categorized into subscales that are all assessed on the depression scale, the anxiety scale, and the stress scale. DASS Arabic version was produced by the Moussa [13]. This includes 21 items in a clear and understandable Arabic language, which includes 7 items for stress, 7 items for anxiety, and 7 items for depression (Table 2). The DASS questionnaire is public domain, and so permission is not needed to use it. The DASS questionnaire and scoring key were downloaded from the DASS website and copied without restriction.

The rating scale is as follows: "0 did not apply to me at all" or "1 applied to me to some degree, or some of the time" or "2 applied to me to a considerable degree or a good part of the time" or "3 applied to me very much or most of the time. Content validity was evaluated by 11 experts using the Content Validity Index, aiming for at least (0.94) of items to receive a rating of 4 or higher the Cronbach alpha reliability coefficient was 0.96, indicating that the instrument is reliable for measuring the study phenomenon in the future.

## Interventions

The study included adult patients who were chosen based on the aforementioned criteria. The study was carried out in Maysan Center for Tumors Treatment. Following that, upon signing the consent forms subjects (Total=128), were randomly divided into two groups. Tossing a coin method was chosen (i.e., heads control, tails intervention) to ensure randomization and non-bias: patients allocated to the control group (N=64), study group (N=64). The researcher introduced the patients to the Awareness Questionnaire

before administering nurse-led tailored instructional program.

In study group, using direct face to face approach of counselling, the program was implemented in classroom-like session direction. Which was designed and scheduled for approximately 30-45 minutes for 3 times per week. After 3 weeks of introducing the program for the study group only, all patients in this study sample were exposed to post-test. Regarding the control group, the same above steps were followed except for the instructional program.

## Data analysis

Descriptive statistics were used to describe the demographic data and awareness levels for Study and control groups). Analysis of Variance (ANOVA) was used to measure the difference in the awareness scores among all groups. The Statistical Package for the Social Sciences (SPSS) version 24, was used for statistical analysis of the collected data. In which descriptive and inferential statistical measures were employed.

## Ethical considerations

This research was confirmed by the Committee of Scientific Research at the College of Nursing, University of Baghdad on November, 20th, 2022. After obtaining the approval of the Ministry of Planning (Central Statistical Organization) on November 30<sup>th</sup>, 2022, the official approvals were taken to start work from the Maysan Health Department. And then approval of the targeted Maysan Center for Tumors Treatment was granted on December 11<sup>th</sup>, 2022 to collect the samples. The patients were informed that participation in the study is completely voluntary and would have no financial or legal consequences, and that the information will be kept in an absolute privacy.

## Clinical registry

As an essential step of original research, an approval was obtained for the registration of the trial protocol in the Iranian Registry of Clinical Trials (IRCT) on December 9<sup>th</sup>, 2022. The registration reference is IRCT20220928056054N1.

## RESULTS

The underlined numbers in (Tables 1-4) represent the highest percentages of selected variables. The study group that received the intervention consisted of 39 females (60.9%) and 25 males (39.1%). Of which (23.4%) were within the age range of (63-70) years old. Additionally, the highest dominant social status category was married (84.4%). More than three quarters (76.6%)

of subject's residency was urban. Elementary school graduates represented the highest level of education, composing (29.7%) of the total study group sample. More than half (51.6%) of patient's were housewives. Almost half (48.4%) of the study group sample's economic status were persons who earn <300.000 Iraqi dinners per month.

In comparison, the control group consisted of 33 females (51.6) and 31 males (48.4), of which (23.4%) of them were within the age range of (63-70) years old. More than three quarters were married (76.6%). Almost three quarters (73.4%) were urban residents of equal importance, less than one third (32.8%) were able to read

and write. (39.1%) were housewives and about half (50.0%) of the control group sample were persons who earn <300.000 Iraqi dinners per month.

The underlined numbers in Tables 2-4 represent the highest percentages of the selected variables. In the study group the highest proportion is subjects with breast cancer, representing (28.1%) of the total study group sample. While, the lowest (4.7%) proportion is subjects with stomach and lung cancer. Cancer stage IV represented (35.9%) of the total study group sample. (32.8%) of the total study group sample were having chest RT. More than a half (56.3%) of the study group were reported no

**Tab. 3.** Distribution of the Study Sample (Study and Control) according to the demographic data

Age Groups	Study group		Control group	
	f	%	f	%
19 – 27 Years	6	9.4	5	7.8
28 - 35 Years	6	9.4	4	6.3
36 - 44 Years	9	14.1	6	9.4
45 - 53 Years	8	12.5	12	18.8
54 - 62 Years	12	18.8	14	21.9
63 - 70 Years	15	23.4	15	23.4
≤71 Years	8	12.5	8	12.5
Total	64	100	64	100
<b>Gender</b>				
Male	25	39.1	31	48.4
Female	39	60.9	33	51.6
Total	64	100	64	100
<b>Social status</b>				
Single	5	7.8	9	14.1
Married	54	84.4	49	76.6
Divorced	2	3.1	2	3.1
Widower	2	3.1	1	1.6
Widow	1	1.6	3	4.7
Total	64	100	64	100
<b>Residency</b>				
Urban	49	76.6	47	73.4
Rural	15	23.4	17	26.6
Total	64	100	64	100
<b>Levels of Education</b>				
Unable to read and write	12	18.8	12	18.8
Read and write	8	12.5	21	32.8
Elementary school	19	29.7	9	14.1
Middle school	14	21.9	6	9.4
High school	4	6.3	6	9.4
Diploma	7	10.9	4	6.3
Bachelor	0	0	3	4.7
Master	0	0	2	3.1
Doctorate	0	0	1	1.6
Total	64	100	64	100
<b>Occupation</b>				
Housewife	33	51.6	25	39.1
Self- Employed	12	18.8	11	17.2
Governmental Employee	8	12.5	10	15.6
Retired	11	17.2	15	23.4
Others	0	0	3	4.7
Total	64	100	64	100
<b>Economic status</b>				
<300.000 Iraqi dinners	31	48.4	32	50
301.000 - 600.000 Iraqi dinners	15	23.4	18	28.1
601.000-900.000 Iraqi dinners	10	15.6	8	12.5
901.000-1200.000 Iraqi dinners	8	12.5	3	4.7
1201.000-1500.000 Iraqi dinners	0	0	1	1.6
>1501.000 Iraqi dinners	0	0	2	3.1
Total	64	100	64	100

**Tab. 4.** Descriptive statistics of subject's clinical data

	Study group		Control group	
	f	%	f	%
<b>Type of cancer</b>				
Breast Cancer	18	<u>28.1</u>	20	<u>31.3</u>
Prostate Cancer	9	14.1	14	21.9
Colon-rectum Cancer	6	9.4	4	6.3
Stomach Cancer	3	4.7	4	6.3
Lung Cancer	3	4.7	3	4.7
Bladder Cancer	6	9.4	6	9.4
Bone Cancer	4	6.3	5	7.8
Others	15	23.4	8	12.5
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>
<b>Stage of cancer</b>	f	%	f	%
Stage I	7	10.9	6	9.4
Stage II	13	20.3	16	25
Stage III	21	32.8	14	21.9
Stage IV	23	<u>35.9</u>	28	<u>43.8</u>
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>
<b>Body part that targeted by RT</b>	f	%	f	%
Chest	21	<u>32.8</u>	25	<u>39.1</u>
Abdominal and pelvis	12	18.8	14	21.9
Abdomen	8	12.5	9	14.1
Pelvis	11	17.2	8	12.5
Head and neck	8	12.5	4	6.3
Upper /lower limb	3	4.7	4	6.3
Others	1	1.6	0	0
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>
<b>History of receiving chemotherapy during the last three months</b>	f	%	f	%
None	36	<u>56.3</u>	34	<u>53.1</u>
4-6 months	22	34.4	20	31.3
7-9 months	4	6.3	7	10.9
≥10-12 months	2	3.1	3	4.7
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>
<b>Duration of disease</b>	f	%	f	%
< 6 months	25	<u>39.1</u>	21	32.8
>6 months	14	21.9	11	17.2
≤12 months	25	<u>39.1</u>	32	<u>50</u>
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>
<b>Duration of RT session</b>	f	%	f	%
<10 minute	35	<u>54.7</u>	48	<u>75</u>
10-15 minute	20	31.3	15	23.4
15-20 minute	8	12.5	1	1.6
20-25 minute	1	1.6	0	0
<b>Total</b>	<b>64</b>	<b>100</b>	<b>64</b>	<b>100</b>

**Tab. 5.** Descriptive Statistics: A comparison of anxiety levels

	Study group		f	%	Control group		f	%	
Anxiety	Normal	Pretest	0	0	Normal	Pretest	15	23.4	
		Post-test	32	<u>50</u>		Post-test	14	21.9	
	Mild	Pretest	0	0	Mild	Pretest	7	10.9	
		Post-test	21	32.8		Post-test	8	12.5	
	Moderate	Pretest	3	4.7	Moderate	Pretest	4	6.3	
		Post-test	5	7.8		Post-test	5	7.8	
	Severe	Pretest	2	3.1	Severe	Pretest	7	10.9	
		Post-test	6	9.4		Post-test	6	9.4	
	Extremely Severe	Pretest	59	<u>92.2</u>	Extremely Severe	Pretest	31	<u>48.4</u>	
		Post-test	0	0		Post-test	31	<u>48.4</u>	
	<b>Total</b>			<b>64</b>	<b>100</b>			<b>64</b>	<b>100</b>

history of chemotherapy. (39.1%) of the total study group sample reported having cancer for a duration of (<6 months and ≥1 year) respectively. Finally, more than a half (54.7%) of the study group subjected to <10 minute RT session.

Of equal importance, in the control group, there were (31.3%)

subjects diagnosed with breast cancer, representing the highest percentage among other cancer types. Stage IV cancer represented (43.8%) of the control group sample. (39.1%) of the control group subjects were having RT directed to their chest. About half (53.1%) of the control group sample reported having no history to chemotherapy during the last three months of data collection time.

**Tab. 6.** Statistical differences in the scores of anxiety between pre-test and post-test results (study group)

Paired Samples Test (Study group)	Mean	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)	Cohen's D Effect Size
Anxiety	Pre-test	15.7344	11.875	4.38793	21.65	63	0.0001
	Post-test	3.8594					

Similarly, A half (50%) of the control group subjects reported having cancer for a duration of ≥1 year .Finally, three quarters (75%) were subjected to <10 minute duration RT session .

The underlined numbers in Tables 4 and 5 represent the highest percentages of anxiety level showed by the subjects in the study group, during the pre-test phase, representing (92.2%), experiencing extremely sever anxiety. However, when done with post-test phase, the anxiety level has decreased to reach none, representing (0.0%). While no change in the anxiety level have been recognized with the control group subjects. Whereas (48.4%) of the control group subjects showed extremely sever anxiety level during both the pre and post-test phases.

A paired sample t-test was conducted to compare the statistical differences in the scores of anxiety between pre-test and post-test results (study group). In response to the applied instructional program, the results show that there are highly significant differences between the pre and post-test in the study group, in terms of patient’s anxiety levels. Whereas (M=11.87500, SD=4.38793, t (63) =21.650, p=0.0001).

## DISCUSSIONS

The importance of this study lies in that it investigates the effectiveness of an instructional program on reducing level of anxiety among patients receiving radiation therapy for first time. The study aimed at examining the effectiveness of a nurse-led, tailored instructional program on anxiety among patients receiving radiation therapy for the first time in their cancer management course.

The result of the current study is illustrated by the frequency and percentage in the presented tables, In terms of age (Table 1), the researcher found that more than a quarter of the study and control groups were between the ages of 63 and 70 years at the time of data collection. Cancer cases in people under the age of 40 years are uncommon, and for many cancers, older age is the primary risk factor. This age range is justifiable in light of the presented literature. However, younger age group are not immune against cancer, young individuals (ages 20 to 39) are most likely to develop the following cancers a (breast cancer, Hodgkin and non-Hodgkin lymphomas, Melanoma, Sarcomas are tumors that affect connective tissues, including muscles and bones cancers of the cervix and ovaries in women, the thyroid cancer, prostate cancer, carcinoma of the colon, malignancies of the brain and spinal cord) [14].

There are governorates in Iraq that are thought to be uranium-contaminated. There have been numerous reports of malignant tumors spreading rapidly throughout Iraq. Because a high blood uranium level is closely associated to cancer, the findings demonstrate that breast cancer patients' blood uranium levels are greater. This suggested a connection between the risk of developing breast cancer and the elevated uranium levels in blood [15].

In the present study, the majority of the sample were females when compared to males (Table 3). More than half in study group and control group were females. This result is supported

by descriptive study conducted in India that aimed to assess the level of knowledge, belief, and attitude of cancer patients for 150 patients, in which 67 (52%) of them were females [16]. This gender difference could be attributed to regulation at the genetic/ molecular level and sex hormones like estrogen. They are thought to be responsible for the difference in cancer incidence between both genders [17, 18]. Of equal importance, the study findings showed that highest dominant percentage were married in both the study and control groups (Table 3). Which is appropriate for our society, where both male and females appear to marry young[43].

Regarding residency, the highest percentages in both the study and the control groups when resident of urban areas (Table 3). Which is similar to the results of the study conducted in Iraq that studied the association between the compliance of lung cancer patients with nursing instructions. In which the majority (65%) of patients were living in urban [19, 20]. Cities that are overcrowded, polluted by factories and vehicles, and have a high population density. All of these elements contribute to the cancer prevalence [21].

In the terms of the level of education, it has been found that more than a quarter of the study group subjects were elementary school graduates, compared to a less than three quarter who were able to read and write, in control group (Table 3). Unlike a descriptive study of convenience sample of 103 cancer patients conducted in Iran. They found that more half (58.3%) of subjects were high school graduates [22].

This is agreement with study showed most of study participants read and write(30.0)[23].Additionally, the study findings showed that both of the study and the control groups were housewives (Table 3). This result is supported by Hu et al., in a cross-sectional study which was conducted on patients with lung cancer in China. The sample was 289 patients whereas the majority (48%) of the patients were housewives.in another previous research, it has shown a link between the risk of breast cancer and the type of occupation [24, 25]. Unbalances in sex hormones are intimately associated to the chance of developing breast cancer. High estrogen and other ovarian hormone exposure is a major contributor to breast cancer development physical inactivity and hormonal imbalance are closely associated lifestyle factors. The level of steroid sex hormones is decreased by physical exercise, and this reduction lowers the risk of malignancies linked to hormones [26]. The literature have demonstrated a connection between the wars in Iraq and the rise in cancer cases as a result of the pollutants associated with war [27].

Regarding economic status, both in the study and the control groups, the majority of subjects earned an amount of less than 300.000 Iraqi dinners per month (Table 3). This finding is supported by a descriptive study at the Department of Oncology in Al- Diwanayah Teaching Hospital that aimed to assess level of anxiety and depression among patients with lung cancer. In which the study sample was (100) patients. Who reported that their monthly income was insufficient [28, 29]. The patient's



information about self-care may be influenced by their monthly income, and poverty is seen as a significant risk factor that could increase cancer risk and delay early detection due to family financial constraints [30].

In the present study, it was found that less than half were breast cancer in study group and less than one third were breast cancer in control group. These percentages are not surprising due to the fact that characteristics of the study sample whose majority were females at menopause age which is a major non-modifiable risk factor of breast cancer. Based on recent scientific data, RT is recommended in cases with ductal carcinoma in situ (stage 0) after Breast-Conserving Surgery (BCS) because it reduces the incidence of local recurrence by 50–60%, following BCS. RT is still a common treatment for early-stage (stage I-II) invasive breast cancer [31].

With (19.6%) of all cancer diagnoses and (34.3%) of cancer diagnoses in women, breast cancer continues to be the most common. Only little more than 50% of the educated female population in Iraq practiced the breast self-examination maneuver, for reasons related to illiteracy of proper BSE technique [32].

Regarding the stage of cancer, more than one third of the study sample were medically categorized as IV stage, in both the study and control groups (Table 4). These findings are almost similar to a quasi-experimental study in Pakistan that aimed to assess how individual education and assistance affected the anxiety and sadness of breast cancer patients receiving radiation treatment. It showed that the majority (87%) of patients in the experimental group and 97% in the control group were either at stage II or stage III [33]. This finding may be attributable to that RT plays an important role as palliative care for signs and symptoms of many types of cancers in late stages [34].

Regarding the body part that was targeted by RT, it was found that both in the study and control groups, chest was the targeted body area (Table 4). Unlike a quasi-experimental longitudinal study that sampled 52 adult patients who were taking their first course in RT in Saudi Arabia. It showed that the majority of study participant's treatment site was abdomen and pelvis [35]. These percentages are not surprising due to the characteristics of the study sample. Whereas, most of them were patients of breast cancer.

In the present study, more than half in study and control groups had not a history of chemotherapy (Table 4). These results are consistent with a survey results that covered 185 women with invasive, non-metastatic breast cancer that was conducted in Washington. It showed that more than two third (62%) of subjects did not received chemotherapy [36]. However, in a randomized trial, which was conducted in Iran, with a sample of 60 patients, who were newly diagnosed with head and neck cancer, their results showed that more half (56.7%) of study sample had a history of chemotherapy in last 3 months of data collection phase [37].

In terms of duration of disease, both the study and the control groups' subjects, had a disease duration ranging from less than 6 months - 12 months (Table 4). These results are similar to survey of (199) adult patients underwent RT in Ottawa Hospital Cancer Center. It showed that the majority (85%) had been diagnosed with cancer since less than year [38]. The current study findings are expected considering the fact that most patients did not have a long history with cancer diagnosis. The study inclusion criteria

recruited patient receiving RT for the first time and had not a history of chemotherapy in past 3 months of data collection phase.

On the other hand, the duration of RT session lasted less than 10 minutes, in both the study and the control groups (Table 4). Vieira et al., (2020) reported that the majority of their sample (60.5%) spent 15 minute in RT sessions. other previous studies reported that 25-35 minutes, was the duration of RT session [39].

Regarding anxiety levels, results in Table 5 showed that it has been descriptively proven that the anxiety level has reduced as a direct result of the nurse-led, tailored instructional program on patients' anxiety who were receiving radiation therapy for the first time in their cancer management course. This results supported by a study which showed that the majority of patients experienced a decreased anxiety levels post the educational program. These findings are not surprising due to the fact that the study group had received instructions compared to control group who did not. Additionally, there are a number of misunderstandings, including such as the idea that radiation therapy causes cancer rather than only treating it. These kinds of notions could cause stress and hinder a patient' compliance. Some of these technical details of radiotherapy such as the purpose of the tattoo marks and the daily and weekly imaging of the radiotherapy simulation, may raise the anxiety level.

Misunderstanding about RT technical issues, may lead to false beliefs and increases patient's anxiety. This highlights the importance of providing adequate patient education both before and during the radiation therapy process. Previous studies shown that such interventions are successful in raising patient awareness of the condition, as well as in diagnosing it, treating it, and enhancing their physical and mental well-being.

In Table 6, the statistical differences between anxiety at the pre-test and post-test phases were represented. A statistically significant difference between the pre and post-test in the study group, in terms of patient's anxiety levels ( $p=0.0001$ ) was proven. A previous study conducted in Iran on patients with cancer, who were undergoing RT for first time. Their results showed that there were statistically significant differences in anxiety measures between the multimedia groups and the control groups [40]. Similarly, Kaur's study, which assessed how an orientation program affected patients' anxiety when they were first exposed to radiotherapy and came to the conclusion that educational interventions had a lowering effect on anxiety levels, with booklet and PowerPoint presentation having a stronger effect than routine care.

According to Nabavi, multimedia has a detrimental effect on patients' anxiety. The behavioral response of patients to such material may in reality depend on a number of aspects, including the information's stepwise flow and the training's clarity and transparency. Lewis showed that immediately following the first session of RT, the patient's anxiety level rapidly decreased, albeit without any more help. A study, which showed that, high levels of anxiety might be due to lack education [41]. Nursing intervention has a positive effect on the feeling of hope, physical and emotional aspects of the patient with cancer. Psychological discomfort refers to non-specific feelings of stress, worry, and sadness. High levels of psychological discomfort are suggestive of poor mental health and may represent common mental diseases such as depression and anxiety disorders[44]. The nurse who works in the oncology unit should follow best practices for nursing and have enough expertise to deal with cancer patients[45].

## CONCLUSION

This study illuminates the positive effect of applying a nurse-led instructional program on anxiety among patients receiving radiation therapy for the first time.

## RECOMMENDATIONS

Emphasizing nurse-educator and counselor role in oncology centers is mandatory particularly when developing nursing care plan on admission of patient for the first session. A dedicated nurse-specialist should be available for each admitted patient, providing psych-socio-spiritual counselling and give specific instructions and directives, which in turn reduce anxiety of patients and help responding to treatment. Of equal importance, a special unit for psychological counselling in the specialized centers for radiotherapy should be available in order to reduce the high levels of anxiety, especially for patients scheduled for the first session.

## LIMITATIONS

The corresponding authors of the selected research tools delayed responding to obtain their official permission. This was a delaying factor, which contributed to the delay in starting the collection of study samples. Of equal importance, there was a malfunction of the linear accelerator device used to treat cancer in the Maysan Center for Tumors Treatment. It took weeks for maintenance, Therefore, RT sessions had been postponed and this in turn affected samples collection phase. Whereas the center contains only two linear accelerators.

## CONFLICT OF INTEREST

None



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