

Efficacy of a Pre-Radiotherapy, Nurse-Led Instructional Program to Enhance the Level of Awareness of Patients Receiving Radiotherapy for First Time

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ABSTRACT

Objective(s): To evaluate the effectiveness of instructional program on increase awareness level among cancer patients receiving radiation therapy for the first time.

Methods: A quasi-experimental design, with a non-probability (purposive) sample of 128 patients with cancer were randomly assigned to either study group (n=64) who received a pre-radiation therapy instructional program and a control group (n=64), who only receive the routine instructions. Study instruments consist of three parts: Part I: Socio-Demographic Characteristics, Part II: Clinical Data, and Part III: Awareness Questionnaire consists of 13 items, scored by rating (2) for the correct answer and (1) for the incorrect answer. Statistical package SPSS ver. (24) was used in order to analyze of the collected data.

Results: This study found that the level of awareness in the study group was low (89.1%) in the pre-test phase and raised to (100%) in the post-test phase.

Conclusions: There is a positive effect of the instructional program on enhancing the level of awareness about radiation therapy for cancer patients receiving radiation therapy for the first time.

Recommendation: This study suggest conducting an in-person education sessions that focus on patients' awareness about radiotherapy.

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فعالية البرنامج الإرشادي المخصص قبل العلاج الإشعاعي بقيادة الممرض لتعزيز مستوى وعي المرضى الذين يتلقون العلاج الإشعاعي للمرة الأولى

المستخلص

الهدف: لتقييم فاعلية البرنامج الإرشادي في زيادة مستوى الوعي لدى مرضى السرطان الذين يتلقون العلاج الإشعاعي للمرة الأولى.

المنهجية: دراسة ذو تصميم شبه تجريبي مكون من عينة غير احتمالية (هادفة) (١٢٨) مريضاً مصاباً بالسرطان تم تعيينهم عشوائياً في إحدى مجموعتي الدراسة (٦٤ مريضاً) تلقوا برنامجاً تعليمياً قبل العلاج الإشعاعي ومجموعة ضابطة (٦٤ مريضاً) لم يتلق التعليمات الروتينية. تتكون أدوات الدراسة من ثلاثة أجزاء: الجزء الأول: الخصائص الاجتماعية والديموغرافية، الجزء الثاني: البيانات السريرية، والجزء الثالث: استبيان التوعية الذي يحتوي على ١٣ فقرة تم تقييمها حسب (٢) للإجابة الصحيحة و(١) للإجابة غير الصحيحة.

النتائج: أظهرت النتائج بان مستوى الوعي لمرضى السرطان خلال مرحلة ما قبل الاختبار كان منخفضاً حيث بلغ (٨٩.١٪)، ارتفع مستوى الوعي ليصل إلى الحد الأقصى (١٠٠٪) بعد الاختبار في مجموعة الدراسة.

الاستنتاجات: خلصت هذه الدراسة إلى وجود تأثير إيجابي للبرنامج التعليمي في تعزيز مستوى الوعي حول العلاج الإشعاعي لدى مرضى السرطان الذين يتلقون العلاج الإشعاعي لأول مرة.

التوصيات: توصي الدراسة بتخصيص جلسات تثقيفية شخصية تركز على وعي المرضى بالعلاج الإشعاعي.

الكلمات المفتاحية: فعالية، العلاج الإشعاعي، مرضى السرطان، ارشاد بقيادة الممرض، الوعي.

Introduction

In view of its rank as a significant cause of mortality after heart disease, cancer has always been a global multifaceted health issue.⁽¹⁾ Cancer is responsible for a substantial burden on communities and, mainly, on developing countries.⁽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 lifestyle adoption.⁽³⁾

About 50% of patients with cancer will experience radiotherapy at some point during their course of treatment, making it a prevalent kind of cancer treatment.⁽⁴⁾ In contrast to chemotherapy, RT is typically localized, noninvasive, and does not cause systemic damage following treatment it uses ionizing radiation to eliminate cancer cells that is either external beam radiation therapy (EBRT) given by linear accelerators, or internally (brachytherapy) supplied by the use

of radioisotopes.⁽⁵⁾ External beam radiation therapy (EBRT) treatments are normally given throughout the week one dose of radiation to more than can be given every day as part of external beam radiation therapy using high intensity x-ray.⁽⁶⁾ With extraordinary technological advancements, RT has emerged as one of the most crucial approaches in the arsenal of anti-cancer treatments.⁽⁷⁾ For the patients to effectively cooperate and participate in decision-making, they must have a sufficient comprehension of the pertinent features of radiation therapy.⁽⁸⁾

A low level of awareness and knowledge deficit about RT may negatively effects on patient engagement with the planned nursing care plan.⁽⁹⁾ The study was conducted at the radiotherapy unit and outpatient clinics of the clinical oncology department at Menoufia University Hospital Head and Neck Cancer patients undergoing external radiation from a consecutive sample of 100 patients assessed the impact of specially created nursing education on

awareness of patients receiving head and neck radiation therapy, conclusion of the intervention, the total knowledge score of the study group has significantly improved compared to the control group.⁽¹⁰⁻¹¹⁾ Tønning, (2021) conducted a study about the effectiveness of patient education practices in increasing knowledge and reducing anxiety related to radiation therapy. This three-pronged study's objective were to evaluate patient knowledge and anxiety in light of current educational practices, where patients obtain information about radiation treatment and whether this information is changing, and whether or not education is tailored to the needs of patients receiving radiation therapy results showed that concern over the impacts of radiation therapy on one's life and its adverse effects was greatest prior to and after treatment The treatment team's confidence increased from pre- to post-treatment by 19.2%, and they were substantially more satisfied with their education, $p=0.001$.⁽⁶⁾

Patients have particular expectations of and gratitude for oncology nurses and radiation technicians who are giving them pertinent and timely information about their condition and/or treatment. Patients with confirmed diagnosis of cancer had recognized that these health care professionals may be their allies for psychological and emotional support both during and after radiation.⁽¹²⁾

Nurses have a variety of fundamental and multifaceted responsibilities such as: educating patients and their families about medications, pain assessment, and treatment plans, and acting as the patients' advocate to ensure that patients receive their legal entitlements to comprehensive management to fulfill all of these tasks.⁽¹³⁾

Methods

Study Design

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

Study Setting

This study was conducted on adult patients with cancer who were admitted to Maysan Oncology Center, Maysan, Iraq from December 13th, 2022 to March 19th, 2023.

Samples and Sampling

A non-probability (purposive) sampling approach was used to select the study sample. The study sample included patients with cancer who were receiving radiotherapy for first time. The criteria used for inclusion in the study were as follows: adult patients who have the ability to understand the given instructions (Nursing Counseling), patients with age ≥ 18 years, having no history psycho-mental diseases (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 follows: 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.

Sample Size Calculation

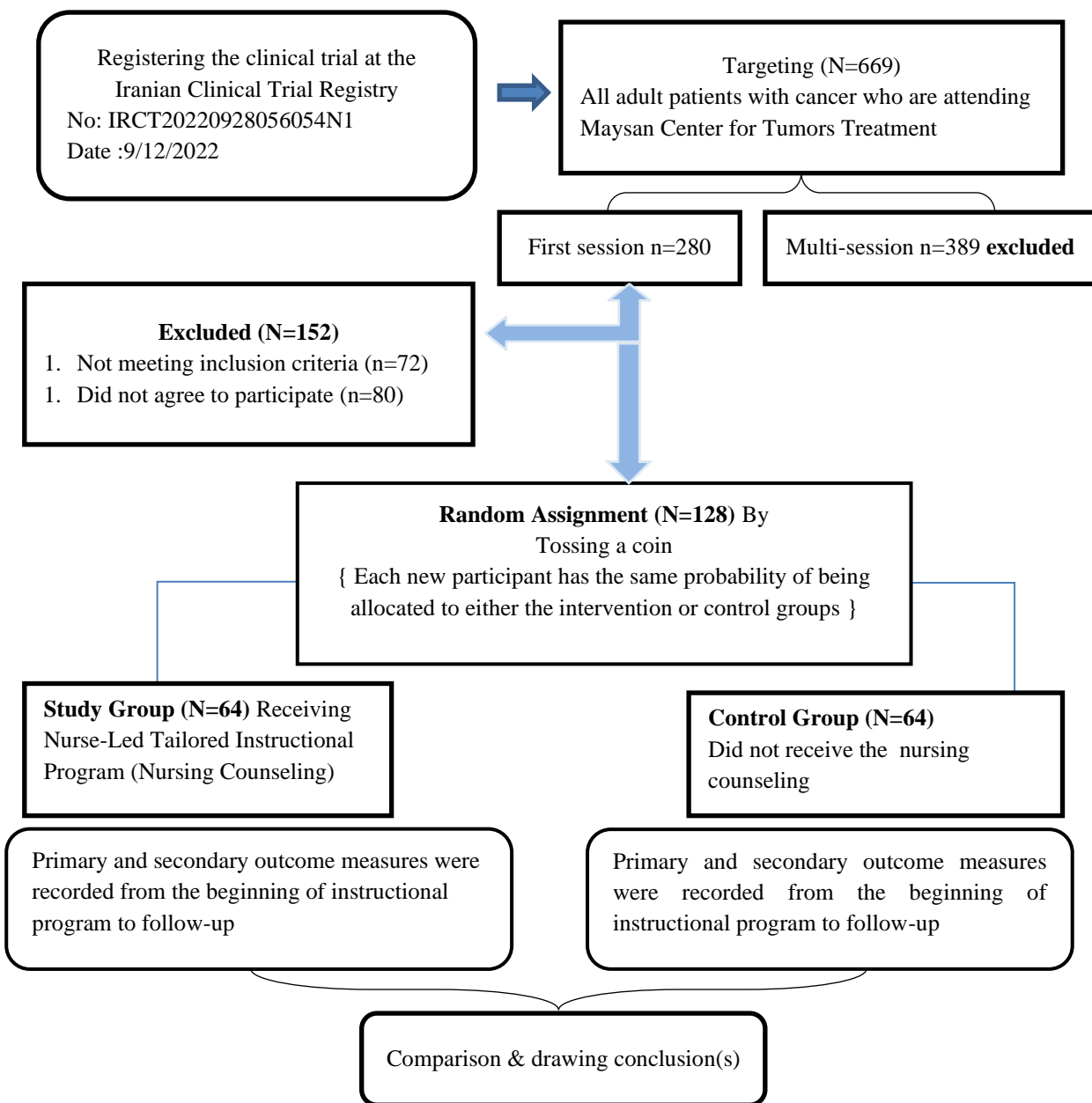
The sample size was calculated according to a-priori sample sizes for student t-tests (Table1), the number of these subjects can be seen in Study Protocol Algorithm Section Figure (1). There have been (128) patients in the sample.

Table 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

- *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

Figure 1. Study Protocol Algorithm



Data Collection and Study Instruments

Part I: Socio-Demographic Characteristics

The demographic data section was designed to obtain the data of participants in the study. These data included age, gender, social status, area of residence, level of education, occupation, and economic status. These data were collected using both self-report and interview techniques.

Part II: Clinical Data

The clinical data were collected from the official health care records included type of cancer, stage of cancer, site of treatment on patient’s body, history of chemotherapy before the last 3 months, duration of disease, and duration of RT session.

Part III: Awareness Questionnaire

This part consists of 13 items which was used to measure the level of awareness among patients with cancer toward RT. The

level of awareness was scored by rating (2) for the correct answer and (1) for the incorrect answer, as shown in (table 2). The researcher emailed authors who built the questionnaire.⁽¹⁴⁾ All were contacted and granted permission to use the questionnaire in this research study.

The awareness questionnaire translated into Arabic language by back-to-back translation. Then, the researcher used the content validity type and presented it to (12) experts to verify its validity. The Content Validity Index (CVI) = 0.97⁽¹⁵⁾. As for the reliability measure, the awareness questionnaire was tested by conducting a pilot study that targeted 15 patients. The Cronbach alpha reliability coefficient was (0.79), indicating that the instrument is reliable for measuring the study phenomenon now and in the future.

Table 2. Scores of Awareness Questionnaire

Awareness levels: Mini score = 13 and Max Score = 26	
Category	Scores
Low awareness	13-17
Moderate Awareness	17-22
High Awareness	22-26

Pilot Study

Pilot study was conducted on 15 patients who were scheduled for radiation therapy session in Maysan Center for Tumors Treatment. They were divided both randomly and equally into a study and a control groups. Participants in the pilot study had the same selection criteria as the actual study sample. The purpose of the pilot study was to determine the feasibility, in terms of time, cost, safety, efficacy and pitfalls of the instructional program, and to identify study elements that were considered deemed infeasible and should be modified.

Intervention(s)

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 the study group, face to face approach of counseling was used, and the program 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.

Ethical Considerations

This research was confirmed by the Committee of Scientific Research in the College of Nursing, University of Baghdad on November 20th, 2022. After obtaining the approval from the Ministry of Planning (Central Statistical Organization) on

November 30th, 2022, the official approvals were taken to start work from Maysan Health Department. Finally, an approval from Maysan Center for Tumors Treatment was granted on December 11th, 2022 to collect the samples. Oncology 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.

Data Analysis

Descriptive statistics, using frequencies, percentages, and standard deviation, were used to describe the awareness level. The Statistical Package for the Social Sciences (SPSS) version 24.0, was used for statistical analysis of the collected data.

Results

Table 3. Descriptive Statistics of Patients Clinical Data

	Study group		Control group	
	f	%	f	%
Type of cancer				
Breast Cancer	18	28.1	20	31.3
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
Stage of cancer				
Stage I	7	10.9	6	9.4
Stage II	13	20.3	16	25.0
Stage III	21	32.8	14	21.9
Stage IV	23	35.9	28	43.8
Body part that targeted by RT				
Chest	21	32.8	25	39.1
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
History of receiving chemotherapy during the last three months	f	%	f	%
None	36	56.3	34	53.1
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
Duration of disease	f	%	f	%
< 6 months	25	39.1	21	32.8
>6 months	14	21.9	11	17.2
≤12 months	25	39.1	32	50.0
Duration of RT session	f	%	f	%
<10 minute	35	54.7	48	75.0
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

F= frequency, %= percentage.

The underlined numbers represent the highest percentages of the selected variables. In the study group, the highest proportion is patients with breast cancer, representing (28.1%) of the total study group sample. While, the lowest (4.7%) proportion is patients 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 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. 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 <10minute duration RT session.

Table 4. The level of awareness in patients with cancer.

No.		Patients' responses	f	%
1	Radiation therapy will reduce my lifespan	1	40	62.5%
		2	24	37.5%
2	I will become radioactive after radiation therapy	1	57	89.1%
		2	7	10.9%
3	Radiation therapy is painful	1	61	95.3%

		2	3	4.7%
4	Radiation therapy will cause cancer to spread	1	47	73.4%
		2	17	26.6%
5	Radiation therapy is the last resort	1	62	96.9%
		2	2	3.1%
6	Radiation therapy should not be used to treat children and elderly	1	49	76.6%
		2	15	23.4%
7	Radiation therapy will mutate my genes and I will pass on these mutations to my children.	1	59	92.2%
		2	5	7.8%
8	We are getting radiation all the time (from TVs, cell phones, wireless networks, electromagnetic fields, microwave ovens) so that's why cancer is on the rise	1	21	32.8%
		2	43	67.2%
9	Radiation therapy can be productive if the patient is diagnosed early; otherwise, side effects deteriorate patient's quality of life	1	50	78.1%
		2	14	21.9%
10	Radiation therapy should be used for late-stage disease; otherwise, other options such as surgery should be used	1	57	89.1%
		2	7	10.9%
11	Radiation is poison	1	52	81.3%
		2	12	18.8%
12	Radiation is just like light and doesn't treat, is just given to deceive patients	1	48	75.0%
		2	16	25.0%
13	Radiation kills body cells; therefore, it is harmful and only can be used when there is no alternative	1	63	98.4%
		2	1	1.6%

F= Frequency, % = percentage, **False answer =1, True answer = 2.**

The majority of patients believed that RT kills body cells; therefore, it is harmful and only can be used when there is no alternative. The highest rate of correct responses was recorded for the item “we are getting radiation all the time (from TVs, cell phones, wireless networks, electromagnetic fields, microwave ovens) so that's why cancer is on the rise” which had a correct score of (67.2%).

Table 5. A Comparison of Awareness Levels between pre- post Test Phases

	Study Group			Control Group		
		f	%		f	%
Low Awareness 13 – 17	Pre-test	57	89.1	Pre-test	45	70.3
	Posttest	0	0	Posttest	45	70.3
Moderate Awareness 18 – 22	Pre-test	6	9.4	Pre-test	18	28.1
	Posttest	0	0	Posttest	18	28.1
High Awareness 23 – 26	Pre-test	1	1.6	Pre-test	1	1.6
	Posttest	64	100.0	Posttest	1	1.6

F= Frequency, %= percentage.

Table 5 indicates that the highest percentages of awareness level showed by patients in the study group, during the pre-test phase, representing (89.1%), which was low. However, in the post-test phase, the awareness level has risen to reach the maximum level, representing (100.0%). While

no change in the awareness level have been recognized with the control group subjects. 70.3% patients in the control group showed low level of awareness during both the pre and posttest phases.

Table 6. Comparison of awareness levels between pre-test posttest (study group)

Paired Samples Test (Study group)		Mean	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)	Cohen's D Effect Size
Awareness	Pre-test	15.5938	-10.04688	1.93078	-41.628	63	0.0001	8.1
	Post-test	25.6406						

Effect sizes= small (d = 0.2), medium (d = 0.5), and large d = (0.8)

t=t-test, df=degree of freedom, p value= 0.001.

A paired sample t-test was conducted to compare the statistical differences in the scores of dependent variables between pre-test and post-test results (study group). In response to the applied educational program, the results show that there are highly significant differences between the pre and posttest in the study group, patient's awareness(p=0.0001).

Discussion

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

In the present study, it was found that less than half were breast cancer in study group and less than one third was 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. ⁽¹⁶⁾ 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. ⁽¹⁷⁾

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. These findings are almost similar to a quasi-experimental study conducted in Pakistan, 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. ⁽¹⁸⁾ 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. ⁽¹⁹⁾

Regarding the body part that was targeted by RT, chest was the targeted body area both in the study and control groups. Unlike a quasi-experimental longitudinal study from Saudi Arabia showed that the majority of study participants treatment site was abdomen and pelvis. ⁽⁸⁾ These percentages are not surprising due to the characteristics of the study sample. In the present study, more than half in study and control groups had not

a history of chemotherapy. These results are consistent with a survey result 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.⁽²⁰⁾

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. These results are similar to survey of (199) adult patients underwent RT in Ottawa Hospital Cancer Center showed that the majority (85%) had been diagnosed with cancer since less than year.⁽²¹⁾ 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.⁽²²⁾ reported that the majority of their sample (60.5%) spent 15 minutes in RT sessions.

The current study found that the level of RT awareness among respondents was low. The majority of respondents (98.4%) responded that “radiation kills body cells; therefore, it is harmful and only can be used when there is no alternative”. Of equal importance, about (62.5%) thought that “RT will reduce their lifespan” and (89.1%) “will become radioactive after radiation therapy”, (76.6%), also responded that “RT should not be used to treat children and elderly”. These results agreed with a study that discovered that respondents had a poor level of RT awareness⁽¹⁵⁾. In which, the majority of responders (83.1%) thought that RT would shorten their lives, and over (60%) feared that

“they would eventually become radioactive”. More than (60%) of responders were unaware that advanced cancer, kids, and elderly patients may be treated with RT.⁽²³⁾ On the other hand, RT awareness and attitudes were important predictors of RT uptake. Only over (45%) of respondents with little awareness would be willing to accept RT, compared to nearly (70%) of respondents with high awareness. Low knowledge of and negative attitudes toward RT may limit its utilization by fostering worries about potential side effects among referring physicians, patients, and their families.⁽²⁴⁾

Further, this study approved that the patients’ level of awareness that the awareness level has been risen as a direct result of the nurse-led, tailored instructional program on patient’s awareness, who were receiving radiation therapy for the first time in their cancer management course. These results supported by a study in India of 60 purposive Cancer patients. It showed that there was a significant statistical difference between the knowledge and practice scores of the experimental and control groups after the post-test phase.⁽²⁵⁾

Patient awareness is mostly increased by the nurse-led educational program, as shown through the results of a study that showed significant difference in the awareness scores between the pretest and the posttest phases could be attributed to the success of the research approach in addressing the awareness gaps. Moving from (89.1%) of subjects who had low awareness, during the pre-test phase to (100%) of subjects with full awareness at the posttest phase, is tangible evidence. This discrepancy between the pre-test and post-test awareness levels may be attributable to a systematic instructional program on subjects’ capacities. These percentages are not surprising due to

the fact that the study group had received instructions compared to control group who did not. ⁽⁵⁾

There was a statistically significant difference between the pre and posttest in the study group, in terms of patient's awareness level ($p=0.0001$). This finding is support by a quasi-experimental study on effectiveness of teaching program on knowledge and attitude among cancer patients receiving RT. Their results showed a statistically significant difference between the pre and posttest ($p<0.01$), ($t=7.088$) in the study group.⁽²⁶⁾ One of the nurses' key duties is to instruct patients who have cancer, patients and their families must be made aware of what to anticipate, given the option to ask questions, and provided with the opportunity to get the answers to those questions. ⁽¹¹⁾

Conclusions

This study illuminates that patients receiving radiation therapy for the first time in the targeted Oncology Center were unaware about their scheduled management line, reflecting both a serious knowledge deficit and nurses' failure in addressing that serious gap and there was positive effect of applying a nurse-led instructional program on awareness among patients receiving radiation therapy for the first time.

Recommendations

To raise awareness levels among the vulnerable population, posters should be published and educational pamphlets distributed in public places to educate citizens about radiotherapy potentials in fighting cancerous lesions. An educational program, booklets, and in-person education sessions that focus on patients' awareness about radiotherapy should be developed, targeting a national level. Emphasizing nurse-educator and counselor role in oncology centers is

mandatory particularly when developing nursing care plan on admission of patient to the first session.

Limitations

The corresponding author of the selected research tool(s) 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 a week for maintenance; 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.

References

1. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2022. CA: A Cancer Journal for Clinicians [Internet] 2022 Sep;72(1):7–33. Available from: <https://acsjournals.onlinelibrary.wiley.com/doi/10.3322/caac.21708>
2. Alaa H, Shah SA. Perception of cancer risk and its associated risk factors among young Iraqis living in Baghdad. Asian Pacific Journal of Cancer Prevention. 2019; 20(8): 2339–43. DOI: 10. 31557/APJCP. 2019. 20.8. 2339
3. Mahalhal, Hadeel Hussein, Hawraa. Dietary habits of Iraqi women with breast cancer at oncology hospitals in Baghdad city: comparative study. Indian Journal of Forensic Medicine & Toxicology [Internet], 2020; 15(1): 2322-8. DOI: <https://doi.org/10.37506/ijfmt.v15i1.13748>

4. Institute, N. C. Cancer Statistics. (2018). Retrieved from. <http://www.cancer.gov/about-cancer/understanding/statistics>
5. Al-Attar WA, Majeed H J. Effectiveness of an educational program on nurses knowledge concerning side effect of radiotherapy at Al-Amal National Hospital for cancer management in Baghdad city. *Kufa Journal for Nursing Sciences*, (2015); 5(2), 66–74. DOI: <https://doi.org/10.36321/kjns.vi20152.2594>
6. Tønning, K. The effectiveness of patient education practices in increasing knowledge and reducing anxiety related to radiation therapy. [Published doctoral dissertation]. Pacific University, (2021); Retrieved from <https://commons.pacificu.edu/work/sc/deeef1cb-dd1a-4a41-9d3a-efd90fc99efa>
7. Chetty IJ, Martel MK, Jaffray DA, Benedict SH, Hahn SM, Berbeco R, et al. Technology for Innovation in Radiation Oncology. *International Journal of Radiation Oncology Biology Physics*, 2015; 1;93(3): 485-492. DOI: <https://doi.org/10.1016/j.ijrobp.2015.07.007>
8. Almerdhemah H, Mulla Z, Muamenah H M, Weber A, Boubakra T, Taha H, et al. Site-specific education using digital media to improve patient understanding of the radiotherapy trajectory: an interventional study. *Advances in Radiation Oncology*, 2021; 6(6), 100742. DOI: <https://doi.org/10.1016/j.adro.2021.100742>
9. Evans KM, Bodmer J, Edwards B, Levins J, O'Meara A, Ruhotina M, et al. An exploratory analysis of public awareness and perception of ionizing radiation and guide to Public health practice in Vermont. *Journal of Environmental and Public Health*. 2015; pp. 1–6. DOI:10.1155/2015/476495.
10. Sundaresan P, King M, Costa D, Milross C. Barriers to radiotherapy utilization: Consumer perceptions of issues influencing radiotherapy-related decisions. *Asia-Pacific Journal of Clinical Oncology*. 2017;13(5). DOI:10.1111/ajco.12579
11. Abdel Gawad D, Fareed M, Abd El- Bary N, Attallah H. Effect of designed nursing education on awareness of patients receiving head and neck radiation therapy. *Menoufia Nursing Journal*. 2020;5(1):1–15. DOI:10.21608/menj.2020.122670
12. Halkett G, O'Connor M. What is the best way to support patients undergoing radiation therapy? *Journal of Medical Radiation Sciences*. 2015;62(1):3–5. DOI:10.1002/jmrs.100
13. El-Aqoul A, Obaid A, Jarrah I, Al-Rawashdeh K, Al Hroub A. Effectiveness of education program on nursing knowledge and attitude toward pain management. *Asia-Pacific Journal of Oncology Nursing*. 2020;7(4):382–8. DOI: 10.4103/apjon.apjon_17_20
14. Soko GF, Burambo AB, Mngoya MM, Abdul BA. Public awareness and perceptions of radiotherapy and their influence on the use of radiotherapy in Dar es Salaam, Tanzania. *Journal of Global Oncology*. 2019;(5):1–10. DOI:10.1200/jgo.19.00175
15. Yusoff MS. ABC of content validation and content validity index calculation. *Education in Medicine Journal*. 2019; 11 (2): 49–54. DOI:10.21315/eimj2019.11.2.6
16. Polgár C, Kahán Z, Ivanov O, Chorváth M, Ligačová A, Csejtei A, et al. Radiotherapy of breast cancer-professional guideline 1st Central-Eastern European professional consensus statement on breast cancer. *Pathology and Oncology*

- Research. 2022;28. DOI:10.3389/pore.2022.1610378
17. Al-Gburi AS, Alwan NA. Correlation between breast self-examination practices and demographic characteristics, risk factors and clinical stage of breast cancer among Iraqi patients. *Open Access Macedonian Journal of Medical Sciences*. 2019;7(19):3216–20. DOI:10.3889/oamjms.2019.805
 18. Zaheer S, Gul RB, Bhamani SS, Memon MA. The effect of individualized education with support on breast cancer patients' anxiety and depression during Radiation therapy: A pilot study. *European Journal of Oncology Nursing*. 2020;48:101826. DOI:10.1016/j.ejon.2020.10182
 19. Wu SY, Singer L, Boreta L, Garcia MA, Fogh SE, Braunstein SE. Palliative radiotherapy near the end of life. *BMC Palliative Care*. 2019; 18(1). DOI: 10.1186/s12904-019-0415-8
 20. Sharifzadeh Y, Slade AN, Weiss E, Sutton AL, Sheppard VB. Attitudes and perceptions towards radiation therapy in breast cancer patients: The role of a multidisciplinary care team. *Journal of Cancer Education*. 2020; 36(3): 639–45. DOI: 10.1007/s13187-019-01677-1
 21. Samant R, Cisa-Paré E, Balchin K, Renaud J, Bunch L, Wheatley-Price P, et al. Assessment of patient satisfaction among cancer patients undergoing radiotherapy. *Journal of Cancer Education*. 2021; 37(5): 1296–303. DOI:10.1007/s13187-020-01950-8
 22. Vieira B, Demirtas D, van de Kamer JB, Hans EW, Rousseau L-M, Lahrichi N, et al. Radiotherapy treatment scheduling considering time window preferences. *Health Care Management Science*. 2020; 23 (4):520–34. DOI:10.1007/s10729-020-09510-8
 23. Shaverdian N, Wang X, Hegde JV, Aledia C, Weidhaas JB, Steinberg ML, et al. The patient's perspective on breast radiotherapy: Initial fears and expectations versus reality. *Cancer*. 2018;124(8):1673–81. DOI:10.1002/cncr.31159
 24. Maliti BK. Management of retinoblastoma in Zambia. *Asia-Pacific Journal of Oncology Nursing*. 2017; 4(3): 184–6. DOI:10.4103/apjon.apjon_24_17
 25. Shatrughan P, Santosh M, Harindarjeet G. A structured teaching program to assess the knowledge and practices of cancer patients regarding radiotherapy induced skin reactions: A quasi experimental study. *International Journal of Nursing Education and Research*. 2017;5(2):198. DOI: 10.5958/2454-2660.2017.00043.6
 26. Chand T, Universe *International Journal of Interdisciplinary Research*. Effectiveness of structured teaching program on knowledge and attitude regarding radiation therapy among cancer patients receiving radiation therapy residing at selected communities, Bharatpur [Internet]. 2021 [cited 2024 Jan 9]. DOI: <https://doi.org/10.1016/j.ijrobp.2015.07.007>