Radiofrequency Ablation Therapy: Effect of Educational Nursing Guidelines on Knowledge and Post Ablation Syndrome for Patients with Hepatocellular Carcinoma

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Abstract: Radiofrequency ablation (RFA) has emerged as a safe and predictable technology for treating certain patients with cancer who otherwise have few treatment options. Patients need to be familiar with all phases of the RFA procedure to decrease post ablation syndrome. **Aim:** This study aims to evaluate the effect of educational nursing guidelines on knowledge and post ablation syndrome for patients with hepatocellular carcinoma under radiofrequency ablation therapy. **Design:** A quasi experimental design was used. **Setting:** This study was conducted at the Interventional Radiology Unit, affiliated to Ain Shams University Hospital **Sample:** A purposive sample included 80 patients with hepatocellular carcinoma; 40 randomly allocated to study group, and 40 allocated to the control group. **Tools:** 1) Patients' interview radiofrequency ablation sheet. (pre/post tests), (2 Post ablation syndrome questionnaire (post test), and 3) Patient's satisfaction scale (post test). **Results:** there were statistically significant differences between the study and control groups as regards their knowledge about radiofrequency ablation therapy. As well, there are statistically significant differences between both groups regarding decrease post ablation syndrome post educational nursing guidelines. In addition, there statistical significance differences were detected between both groups as regards patients' satisfaction and length resume of normal activity. **Conclusion:** The radiofrequency nursing guidelines were helpful on the improvement knowledge of the patients with hepatocellular carcinoma which leading to decreasing post ablation syndrome. **Recommendations:** There is a need for sustained patients' educational sessions; Radiofrequency ablation guidelines should be available for all patients with hepatocelullar carcinoma. Further studies should be done on a large number of subjects for evidence of results and generalization.
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1. Introduction

Hepatocellular carcinoma (HCC) is one of the most malignant tumors with a high mortality, aggressive growth behavior and a high recurrence rate. It the sixth most common cancer worldwide and the third most common cause of cancer death with prevalent areas in Asia and sub-Saharan Africa. In Egypt, Hospital-based studies reported an overall increases in the relative frequency of all liver related cancers in Egypt (>95% as HCC), from approximately 4% in 1993 to 7.3% in 2003 **Ibrahim et al., (2008).**

Recent imaging modalities have been able to detect HCC and liver metastases at an early stage, with surgical resection as the choice of management. However, because of poor liver reserve, co-existing liver cirrhosis and multiplicity of tumors, resection is only feasible in 10-30% of HCC or liver metastases on presentation. Thus, various local tumor ablation modalities are being

Developed to effectively ablate small liver tumors. Of these, percutaneous ethanol injection and radiofrequency ablation (RFA) are the two best

options because of their high effectiveness and minimal invasiveness **McGahan and Dodd, (2001).**

Radiofrequency is a procedure that uses high frequency radio waves directed at specific sites in the body. Radiofrequency is a form of electrical energy in the frequency range of 300 kilohertz (kHz) to 1 megahertz (MHz). During these procedures, a needle-like probe is inserted through the skin and into the organ containing the tumor being treated. This probe is used to generate heat within the tumor which produces destruction (necrosis) of the tumor. As tissue temperature increases above 50ºC, cell protein is permanently damaged and coagulation necrosis starts. Above 60ºC, cell death occurs almost instantly. Approximately 15-30 minutes are required to perform a 3-5 cm ablation   **Treacy, (2011).**

RFA has the particular advantage of more predictable ablation areas and fewer treatment sessions required. It has been applied for local ablation of liver malignancy since 1990 and is currently widely accepted as an alternative to resection in small, un-respectable or even respectable liver malignancies. Because current RF devices can only effectively ablate 3 cm tumors in a single RF electrode introduction, recent advances have focused exclusively on improving RF devices, including the design of electrodes and the algorithm to magnify the ablation

zone in a single session or over a short duration **Lin, (2009)**.

Despite, RFA has emerged as a safe and predictable technology for thermal ablation in soft tissue and nerve ganglia. It is contraindicated in the following cases: uncorrectable coagulopathies and uncontrolled infection, bile duct or major vessel invasion, significant extra-hepatic disease, child class C cirrhosis or active infection, decompensate liver disease, lesions that are difficult to reach with electrodes or when electrode placement is impaired. In addition, tumors that occupy >40% of the volume of the liver cannot be safely ablated. Also, proximity to vital structures like vessels and adjacent organs and lesions larger than 5 cm it is relative contraindication of RFA **Bilchik et al.,(2001) and Van et al., (2006).**

Many studies have confirmed that RFA is a relatively low-risk procedure with low rate of morbidity and mortality. But there are major complications associated with RFA is less than 5% as damage to the bile ducts, resulting in biliary obstruction, damage to the bowel, bleeding, capsular hematoma, intraperitoneal bleeding or ascites, infection and portal thrombosis, liver abscess shoulder pain, and cholecystitis. Numerous factors are thought to be related to causing major complications; these factors include tumor size, number of ablation sessions, electrode type (single or cluster), and operator experience **Curley, (2003) and Giorgio, et al., (2005).**

Post ablation syndrome is a common phenomenon after RFA of solid abdominal tumors **Carrafiello et al., (2007).** The symptoms of post ablation syndrome are flulike and include low-grade fever, delayed pain, malaise, myalgia, nausea, and vomiting. Patients should be informed about postablation syndrome and its self-limiting nature before the procedure **Livraghi, et al., (2003).** Also, the anxiety is the most commonly seen in hepatocellular cancer patients and undergoing to RFA. Anxiety is defined as extending along a continuum ranging from common normal feeling of vulnerability, sadness and fear to problems that can become disabling such as depression, anxiety and Panic, social isolation and spiritual crisis (National comprehensive cancer network 2007).

Patient education guidelines are the first key strategy for decreasing post ablation syndrome, which can early detected and minimize the frequency of complications and help them to resume normal activity within few days (7-10 days). Patients should be aware that these mild symptoms are normal and they should continue hydration for the next five to seven days. Continued hydration is important to flush the kidneys of byproducts of the ablation and may limit renal toxicity or acute tubular necrosis from contrast or post ablation syndrome. IV fluids should be given as ordered by physicians, and nurses should encourage oral fluids up to two liters over the following 24 hours (if no cardiac or renal insufficiency exists). Patients are adequately hydrated if they are urinating every two to four hours **Halpern et al., (2005).**

Post procedure instructions also should include monitoring for signs of infection and taking temperature three times per day. Patients should call their physicians immediately if their temperature is greater than 100.9°F. Post procedure resumption of diet depends on usual anesthesia or sedation guidelines**.** The patients also instructed that the needle is removed; an adhesive bandage at the skin puncture site is typically the only dressing required. If the liver has been treated, positioning a patient on his or her right side for at least one hour may put pressure on the site, possibly decreasing the chance of bleeding. Hematuria is unusual but may be normal after kidney ablation and should resolve over 8–24 hours **Wah et al., (2005).**

Patient satisfaction is now considered to be as important as clinical outcomes, so information needs to be tailored to their needs. Conflicting advice causes patients problems, and therefore it is essential that health care team should be given the same level of information. Lack of information has been shown to increase anxiety and distress **Wong, (2002) and Mills and Davidson, (2002).** It is important that the information that is provided 'should be high quality, accurate, culturally sensitive, specific to local provision of services, free at the point of delivery and timely' **Department of Health, (2004).** The majority of patients feel that it is necessary to have a booklet to address their information needs**.** Training is a fundamental, essential of every RF safety program; Training should be including basic information and potential health effects **Schafer, (2000)**.

The nurse who is a skilled educator should take the lead in improving patients' awareness. The responsibilities of the nurse include ensuring that the patient understands the regimen arranging needed follow-up **(Taylor et al., 2001) Livraghi, et al. (2003) and Carrafiello et al., (2007).** In addition, Nurses should inform patients and their families that being anxious is normal and that anesthesia, conscious sedation, or deep sedation will be administered. Nurses often provide pre-RFA patient education, which can allay many patients' anxieties. Therefore, the nurses should be familiar with all phases of the RFA procedure to create an optimal environment for patients **Macatula et al. (2011) and Hjorth (2011).**

Significance of the study:
Radiofrequency ablation remains the most widely used thermo ablative technique worldwide. Reviewing the admission rate of patients at the Interventional Radiology Unit, affiliated to Ain Shams University Hospital showed that about 400 cases required radiofrequency ablation therapy for patients with hepatocelular carcinoma during

the last year (2010) according to statistical research office at Ain shams University Hospital. In addition, around 80% of these patients complained of post ablation adverse effects that hindered their ability of resume normal activity that lead to subsequent financial load on the patients and their families, as well as the healthcare system.

Patient with a new therapy may react with a lot of fears and insecurity feelings, which lead to increased patient's anxiety. The nurses had the responsibility to explain to patients and their families what to expect during and after a treatment session, and give them the opportunity to talk about their concerns before therapy begins. All patients with hepatocellular carcinoma under radiofrequency ablation therapy need to understand and be aware about its treatment and its adverse effects. I hope that findings of this study will help in providence based data can promote nursing practice and research.

Aim of the study

This study aimed to evaluate the effect of educational nursing guidelines on knowledge and post ablation syndrome for patients with hepatocellular carcinoma and undergoing radiofrequency ablation therapy through:

Assess patients' knowledge about radiofrequency ablation therapy to identify their needs.

Develop and implement radiofrequency educational nursing guidelines for patients according to their needs.

Evaluate the effect of educational nursing guidelines on knowledge, post ablation syndrome and satisfaction at the study group comparing with control group.

Hypothesis

It was hypothesized that the educational nursing guidelines will be:

•	Increasing patients' knowledge about radiofrequency ablation therapy in the study group versus control group

•	Significantly decreasing post ablation syndrome in the study group versus control group.

2. Subjects and Methods

Design:

A quasi-experimental design was used for the conduction of this study.

Setting: The study was carried out at the Interventional Radiology Unit, affiliated to Ain Shams University Hospital.

Subjects:

A purposeful eighty patients admitted to the interventional radiology unit and undergoing radiofrequency therapy. The sample was calculated by power and sample size calculation program to give power of 80%. These patients were consecutively recruited upon admission to the unit according to criteria in Hospital Ablation Registry Form. The inclusion criteria were being diagnosed as hepatocellular carcinoma patients, the tumor size is ≤ 3cm, unicentric and unilateral tumor and not involving the skin and pathology confirms ductal in situ or infiltrating ductal carcinoma, grade I-III. The patients who had previous chemotherapy course and who had combined course of chemotherapy and radiotherapy excluded.

Then, the studied sample divided randomly into two equal groups (study and control). Study group have educational nursing guidelines, and control group have the routine care.

Tools of data collection:

Three tools were used for data collection:

Patients' interview radiofrequency ablation sheet. It was adapted from Locklin and Wood, (2005) and translated into Arabic with a few modifications. It divided into 2 parts.

A-	Socio-demographic patients' characteristics: to assess patients' data about age, gender, level of education, occupation and duration of illness.

B- Patient's knowledge assessment sheet: To assess current patient's knowledge regarding to radiofrequency ablation therapy for the hepatocellular carcinoma. It was applied in both groups (study and control); and filled in by the researchers; It was consists of three section. Section 1 included 12 questions about radiofrequency ablation therapy such as definition of RFA, benefits, indications and complications (short essay form). Section 2 included 18 true and false questions; (10) questions about instructions before the procedure such as pre investigation, pre assessment, diet regimen, (3) questions about instructions during the procedure such as positions during procedure, (5) questions about instructions after the procedure such as, length of hospitalization, normal activities, potential post adverse effects and diet regimen. Section 3 included 10 questions (true and false) covering patients' knowledge about general instructions regarding home care such as assessment of post ablation syndrome and normal activity such as bathing, diet, fluid, return to the work and couple relation . This tool used before and after the RFA therapy.

Scoring: For each of the knowledge items, a correct response scored as (1) and the incorrect (zero). The satisfactory level was from 70% while the unsatisfactory level was less than 70%.

2- Post ablation syndrome questionnaire: it was used to assess daily post ablation syndrome for patient after discharge. The patients were followed for 3 weeks (the period of post ablation adverse effects that is occurs). It was translated and written in simple Arabic language and applied in both groups (study and control), it was contains:

A)- Index of fever, chills, malaise, and sites of pain: it was adopted from ***Dodd et al., (2005)*** to assess patient's

fever, chills, malaise and sites of pain (at treatment site, at shoulder and other sites).

b)- Rhodes Index of Nausea, Vomiting and Retching (RINVR) questionnaire: It was adopted from *Kim et al. (2007).* It is an eight 5-point patient self-report to assess the nausea, vomiting (frequency, severity, and amount of emesis) and retching.

Scoring: The patient had to record the grade of nausea, vomiting and retching as follows: 0 = none, 1 = mild discomfort, 2 = moderate or definite discomfort, 3 = great discomfort and 4= severe or marked discomfort that prevents taking fluid or food by mouth. As regard to the amount of vomiting; it was graded as, Very large (3 cups or more), Large (2-3 cups), Moderate (1/2-2 cups), Small (up to 1/2 cup) and I did not throw up.

Nausea, vomiting and retching were defined by (Dodd et al. 2005) as "nauseated or sickness at stomach", "threw up or vomiting", and "retching or dry heaves", respectively. Nausea was defined as the desire to vomit without indulging in expulsive muscular movements. Vomiting was defined as the oral expulsion of gastrointestinal contents, while retching was the attempt to vomit without expelling any material

c) – Analogue Scale for pain. It was adapted from *Flaherty.(1996)* and modified by the researchers to assess pain intensity at the site of ablation and around it after the procedure The scale determines the level of pain intensity was scaled as follows: (0) no pain, (1,3) mild pain, (3-5) moderate pain and (6-10) sever pain.

d- Self-Rating Anxiety Scale (SAS)): (pre/post) it was adopted from *Zung, (1997)* it was used to assess level of patient's anxiety. H:\15-8-2012\Local Settings\Temporary Internet Files\Administrator\Desktop\untitled folder\Zung_Self-Rating_Anxiety_Scale.html - cite_note-0It is 16 questions with total score of 48 marks graded from never (0) to all times(3) scored as: Never (0), sometimes (1), always (2), all times (3) the level of anxiety was scored as follows:

- No anxiety when total score is less than 12.
  - Mild level of anxiety from 12 to 23.
- Moderate level of anxiety from 24 to 35.
- Sever level of anxiety from 36 to 48.

3-Patient's satisfaction sheet: It was adopted from *Cheng, et al. (2008)* and modified by the researchers. To assess the patients' satisfaction regarding the usefulness of the educational radiofrequency nursing guidelines in improve knowledge about radiofrequency therapy reducing post ablation syndrome and home instruction.

Scoring: The level of satisfaction ranging from not useful at all (scored 0) to extremely useful (scored 5). The patient filled it after 3 weeks from the radiofrequency ablation procedure.

Content validity and reliability:

Content validity test for study tools was done by five experts, (3) from Medical Surgical Nursing specialty and (2) from radiofrequency consultants. Reliability tests were done on a sample of 10 subjects "test-re-test results" revealed that all items of the Patients' interview radiofrequency ablation sheet were significantly correlation coefficient and has above the significant level (R=0.82) and Post ablation syndrome assessment had acceptable reliability (alpha coefficients ranged from 0.70 to 0.76).

Ethical considerations and human rights

Before the initial interview, an oral consent was secured from each subject after being informed about the nature, purpose and benefits of the study. Patients were also informed that participation is voluntary and about their right to withdraw at any time without giving reasons. Confidentiality of any obtained information was ensuring through coding of all data. The researchers reassured patients that the data would be used for only the research purpose. The control group received the same educational guidelines booklet at the end of the study.

Pilot study:

A pilot study was carried out on eight patients (10%) of the total study sample to test the clarity and practicability of the tools and to estimate the needed time to fill in each form. Necessary modifications were done according to the pilot study results. Pilot subjects were later excluded from the main study sample.

Field work:
• Approval was taken by official letters to director of Interventional Radiology Unit before starting application of study plan and informed him about time and date of data collection
•Tools were reviewed by experts in the different fields of nursing and radiofrequency specialties.
• Content validity and reliability tests was done before starting of data collection
• The data collection as pre/post was done by the researchers available 2 days / week at morning shift.
• The educational radiofrequency nursing guidelines were designed based on analysis of the actual patients' needs from pre tests (patients' knowledge sheet and self-rating anxiety scale).
• The study was conducted from February to October 2011

Guidelines construction was divided into four phases:-
Assessment phase:-

Pre-radiofrequency ablation procedure, the researchers interviewed with each patient individually, from 10-15 minutes and explained the aim of this study, then asked each one to fill the radiofrequency

ablation sheet was prepared in a simple Arabic language as a pre test. The tool took 15-20 minutes to be filled. Determined patients' needs were based on answer of each patient in the pervious tool.

Planning phase:

Nursing guidelines related to radiofrequency ablation therapy was designed according to predetermined actual patients needs. The content met patients needs [pre, during and after procedure for three weeks].

The written Arabic guidelines consisted of three parts as follows:

Part one:

- Meaning of radiofrequency ablation therapy
- Indications, Contraindication and complications
- Benefits of RFA
- Post ablation syndrome

Part two:

Patients guidelines pre, during and after procedure contain the following:-

- Pre assessment for the patients
- Diet, fluid and pain relieve measures before the procedure
- Patients' investigation before the procedure
- Patients' positions during procedure

Part three:

- Home care instructions
- How to assess post ablation syndrome
- Medication intake
- Instructions regarding nausea, vomiting and pain alleviation methods
- Normal daily activity such as (hygiene, movement, diet regimen and exercise return to work).
- Couple relations

Method of teaching

- Presentation
- Group discussion

Media of teaching:

- Illustrated guidelines, computer & board.

Implementing phase:-

After patients in the study group filling in the radiofrequency ablation sheet with orientation about the content and purpose of the study. It was taken in eight sessions; each one consists of 10 patients. The researchers explained the content of the booklet of guidelines and clarified each item in it. Then to explain how to fill the Post ablation adverse effects assessment. Each session within 50 – 60 minutes. The booklet was handled for each patients in the study group at the end of session.

Evaluation phase: (after 3 week's procedure).

Evaluation of the effect of nursing guidelines on knowledge and post ablation syndrome was done through comparison between both groups (study & control) pre / post procedure.

Statistical analysis:

The Statistical Package for Social Science (SPSS) version 12 was used for data analysis. Data were presented using numbers, percentage, chi-test and t-test. Level of significant was thresholds at $p<0.05$.

3. Results:

As regard the socio-demographic and duration of illness of patients in the study and control groups, *table (1)* revealed that, no statistically significant differences, as showed in both groups. Most of studied patients their age was more 50 years with the mean age of both groups (study & control) was (51.6 ± 4.5 & 49.7 ± 4.1 respectively) $X^{2}= 0.2$ at $P>0.05$. More than two thirds of them were females (62.5% & 67% respectively). In addition around two fifth of studied groups were having high education (40% & 35% respectively). As well, more than three fifth of both groups (study & control) were employed (67.5% & 60% respectively). As regard to the duration of illness in this study (60.0% &75.5% respectively) were more than 12 months.

Table 2 indicates that there were statistically insignificant differences between both groups as regards patients' level of knowledge pre educational nursing guidelines regarding radiofrequency ablation therapy ($\chi^{2}= 1.9$ $p>0.05$). Meanwhile, There was a highly statistical significant difference between two groups (study and control) post guidelines ($X^{2}= 40.9$ at $p<0.01$).

Fig.1. Shows that the distribution of post ablation syndrome was higher in the control group compared to patients in the study group post educational nursing guidelines, and there was a highly statistically significant difference at ($p< 0.01$).

Table (3) demonstrates that the mean scores of nausea, vomiting and retching were higher in the control group compared to patients in the study group post educational nursing guidelines, and the difference was statistically highly significant ($p< 0.01$).

Table (4) displays the distribution of pain intensity at the site of radio frequency ablation insertion in the study and control groups post the education nursing guideline. There were statistically significant differences between study and control groups post nursing guidelines ($\chi^{2}=10.4$ at $P<0.05$).

As regards the level of anxiety in both groups pre /post guidelines, Table (5) denotes that there was no statistical significant difference between both groups pre guidelines (χ^{2} 2.3 at $P > 0.05$). While, post guidelines the level of anxiety was decreased in study group versus to control group, which indicates highly statistically significant between them (χ^{2} 13.3 at $P < 0.01$).

Table (6) reveals that there were highly statistically significant differences observed in the study groups versus to control group regarding all variables of patients' satisfaction (T= 6.3, 20.3, 13.2, 18.2, &11.9 respectively).

Table (7) shows that, There was a statistical significant difference between two groups (study and control) as regards length of resume normal activity post educational nursing guidelines $(\chi^2 = 10.4$ at $P<0.05)$.

Table (1): Socio demographic characteristics and duration of illness in the study and control groups

Socio demographic Characteristics	Groups				χ^2 test		
	Study group (N = 40)		Control group (N = 40)		χ^2	P	Sig.
	No	%	No	%			
Age							
44 -	16	40.0%	18	45.0%	0.2	> 0.05	NS
50 +	24	60.0%	22	55.0%			
Mean± SD	51.6 ± 4.5		49.7 ± 4.1				
Gender							
Male	25	62.5%	27	67.5%	0.2	> 0.05	NS
Female	15	37.5%	13	32.5%			
Education							
Read and write	12	30.0%	13	32.5%			
Middle education	12	30.0%	13	32.5%	0.2	> 0.05	NS
Higher education	16	40.0%	14	35.0%			
Occupation							
Worker	10	25.0%	12	30.0%			
Housewife	3	7.5%	4	10.0%	0.5	> 0.05	NS
Employee	27	67.5%	24	60.0%			
Duration of illness							
> 12 month	16	40.0%	11	27.5%	1.4	> 0.05	NS
< 12 month	24	60.0%	29	72.5%			

Statistically insignificant at p>0.05

Table (2): Patients' level of knowledge pre/post educational nursing guidelines regarding radiofrequency ablation therapy in the study and control groups (No=80).

Patient's knowledge	Per-guidelines				Post-guidelines			
	Study group		Control group		Study group		Control group	
	No	%	No	%	No	%	No	%
Information about (RFA) •-Satisfactory •-unsatisfactory	2 8	5 20	1 10	2.5 25	9 2	22.5 5	1 11	2.5 27.5
2- Information about (RFA) procedure(pre, during /Post instruction) •-Satisfactory •-unsatisfactory	3 11	7.5 27.5	2 15	5 37.5	10 5	25 12.5	1 14	2,5 35
3- Information about home care instruction •-Satisfactory •-unsatisfactory	2 14	5 35	0 12	0 30	11 3	27.5 7.5	2 13	5 32.5
Total	χ^2= 1.9 (NS)				χ^2= 40.9 (HS)*			

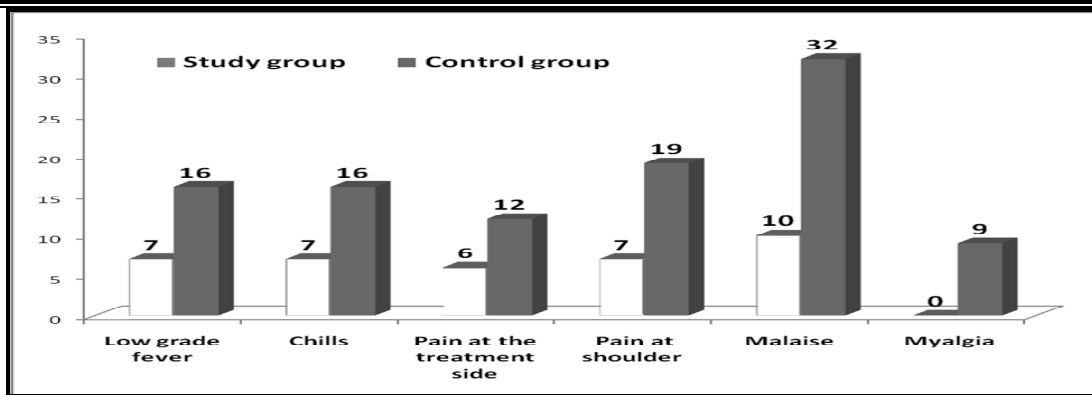Statistically insignificant at p>0.05 (*) highly statistically significant at p<0.01

Fig. 1. Distribution of post ablation syndrome in the study and control groups

Table 3. Mean scores distributions in the study and control groups regarding nausea, vomiting and retching post-educational nursing guidelines

Item	Study group (N = 40)		Control group (N = 40)		T test		
	Mean	SD	Mean	SD	T	P	Sig.
Vomiting							
Frequency	3.7	0.9	4.3	0.7	3.5	< 0.01	HS
Distress	2.3	0.7	4.4	0.7	14.3	< 0.01	HS
Amount	3.6	0.7	4.5	0.7	5.9	< 0.01	HS
Nausea							
Duration	1.9	0.8	3.4	1.1	7.1	< 0.01	HS
Frequency	2.5	0.8	4.4	0.8	10.4	< 0.01	HS
Distress	1.8	0.9	4.0	1.0	10.1	< 0.01	HS
Retching							
Frequency	1.8	0.9	4.1	0.8	12.1	< 0.01	HS
Distress	2.2	0.6	3.8	1.3	7.3	< 0.01	HS

Table 4. Distribution of pain intensity at the site of radio frequency ablation insertion in the study and control groups post education nursing guidelines

Pain	Groups				X^2 test		
	Study group (N = 40)		Control group (N = 40)				
	No	%	No	%	χ^2	P	Sig
No	2	5.0	0	0.0			
Mild	20	50.0	10	25.0	10.4	< 0.05	S
Moderate	14	35.0	17	42.5			
Sever	4	10.0	13	32.5			

(S) Statistically significant at p<0.05

Table 5. Level of anxiety in the study and control groups pre/post education nursing guidelines

Items	Level of anxiety			
	Pre-guidelines		Post-guidelines	
	Study group (N=40)	Control group (N=40)	Study group (N=40)	Control group (N=40)
No	8 (20%)	10 (25%)	13(32.5%)	9(22.5%)
Mild	19 (47.5%)	20 (50%)	23(52.5%)	22(55%)
Moderate	7 (175%)	8 (20%)	4(10%)	5(12.5%)
Severe	6 (15. %)	2 (5%)	0(0%)	4(10%)
	χ^2= 2.3 (NS)		χ^2= 13.3 *(HS)	

(NS) no statistically significant at p>0.05 *(HS) highly statistically significant at p<0.01

Table 6. The mean scores of patients' satisfaction in the study and control groups post educational nursing guidelines

| Patient satisfaction variables | Degree of patients satisfaction Scored (5-1) | | | | T test | | |
| | Study group (N = 40) | | Control group (N = 40) | | | | |
	Mean	SD	Mean	SD	T	P	Sig
Improve knowledge	4.9	±0.2	2.8	±2.2	6.3	< 0.01	HS
Reduce nausea and vomiting	4.8	±0.4	2.7	±0.5	20.3	< 0.01	HS
Anxiety alleviation	4.9	±0.5	1.3	±1.6	13.2	< 0.01	HS
Decrease pain	4.9	±0.3	1.0	±1.3	18.2	< 0.01	HS
Home care instruction	4.8	±0.4	2.2	±1.3	11.9	< 0.01	HS

(HS) highly statistically significant at p<0.01

Table 7. Percentage distribution regarding length of resume normal activity in the study and control groups post education nursing guidelines

| | Groups | | | | χ^2 test | | |
| | Study group (N = 40) | | Control group (N = 40) | | | | |
Length of resume normal activity	No	%	No	%	χ^2	P	Sig
5 – 9 days	16	40	10	25			
10 – 15 days	14	35.0	7	17.5	10.4	< 0.05	S
16 – 21 days	10	25	23	57.5			

4. Discussion:

Radiofrequency ablation is a relatively new, minimally invasive technique for the treatment of primary and metastatic malignant hepatic tumors that has been reported as safe and with minimal post ablation syndrome. A significant number of patients undergoing radiofrequency ablation of hepatic tumors become quite ill a few days after the procedure. These patients exhibit a flulike illness that manifests as fever, malaise, chills, pain, and nausea *(Giovannini et al., 2003)*.

According to the demographic characteristics in the study and control groups the present study revealed that, there are no statistically significant differences between them. This was important to ensure comparability of the two groups, and indicate successful randomization of the two groups.

The current study discovered that, the majority of the patients at two groups (study & control) had inadequate knowledge regarding (RFA) therapy at pre guidelines that indicates there were no statistical significant differences between them. This may be due to lack of knowledge about RFA and absence of an Arabic guidelines book in the unit to be used as guidance for patients. This expectation achieved when noted that there was statistical, significant differences between study and control groups at post guidelines. This finding is agreement with *Hjorth (2011) and Samaraee (2010)* who stated that, Patient education and appropriate guidelines on first day about RFA procedure and recovery period is very important to each patient tailored to his/her needs and level of understanding. The patients should be allowed to ventilate feelings and have time to participate in their care plan. This result may reflect the importance to listen for the patient pre- operatively to determine patient's needs before starting patient care plan.

Kim (2002) revealed that Patients benefit from knowledge of what to expect during their radiofrequency treatment. Ideally, this information should be given to the patient when the treatment option is first discussed. This discussion often takes place away from the radiotherapy department, and therefore it is important that the staffs who are involved in the discussion and in supporting the patient have the appropriate knowledge and understanding to facilitate this process.

Meanwhile, *Department of Health, (2000)* stated that there are many misconceptions about cancer and radiofrequency therapy as a treatment. It is therefore important that practitioners who are caring for patients with hepatocellular carcinoma have the knowledge that will help them to dispel these misconceptions, not just in patients they are caring for but also in fellow practitioners. On the same line, *Department of Health, (2004)* revealed that everyone, including patients and their families, should understand the exact goals of treatment and possible outcomes prior to the procedure. Also, *Neeman and Wood (2002)* stated that nurses need to be familiar with all phases of the RFA procedure to create an optimal environment for patients. Before RFA, nurses should focus on patient education.

As regards the distribution in both groups (study & control) as regards post ablation syndrome, findings of the current study in (Fig.1) revealed that, there are significant

improvement was observed among nausea, vomiting, and retching syndrome in study group versus to control group after educational guidelines. This result may be due to the positive feed back of nursing guidelines on patients' knowledge to their procedure helped patients to deal with her/his adverse effects at home. This finding was consistent with **Carrafiello *et al. (*2007)** revealed that the post-ablation syndrome is a common phenomenon after RFA. Post RFA syndrome' consisting of unspecific symptoms including fever, nausea, vomiting and/or malaise occurring in approximately one-third of treated patients.

Similarly, *Livraghi et al. (2003)* stated that Nurses should be learned the patients monitor vital signs, including temperature, intake and output, and skin integrity, closely and report any changes to the physician. Although uncommon, minor complications may include pain, shoulder pain, fever, nausea, vomiting, arthralgia, headache, and tiredness. Procedural and anesthesia complications also may occur, such as aspiration pneumonia or pulmonary embolism. Early ambulation following RFA may help to prevent these.

Locklin and Wood (2005) emphasized on that post ablation syndrome is characterized by low-grade fever, pain, mild flu-like symptoms and a general feeling of malaise and may be similar to a mild tumor lyses syndrome. Patients should be aware that these mild symptoms of post ablation syndrome are normal and they should continue hydration for the next five to seven days.

The present study assessed the pain intensity at the site of RF ablation insertion among the study and control groups. The findings revealed that there was a statistically significant difference between the two groups (study & control) post guidelines. This may be due to the guidance of patient's about pain sensation in the booklet may help them decrease the level of pain post procedure. This result is agreement with study finding of *Synder et al. (2010)* who mentioned that the value of incorporating nursing guidelines improved patient post procedure/ operatively through decreasing level of pain. In addition, *Gordon et al. (2004)* who has mentioned that, the patients should be assessed for pain type and intensity, duration, past experiences with pain, and responses to analgesics for pain relief or side effects**.** Nurses should perform a thorough pain assessment, including minimum pain intensity, temporal characteristics of the pain, and impact on daily function. In these respect, *Sullivan (2004)* **who stated that,** Inpatients may benefit from patient-controlled analgesia (PCA), which should be immediately available post-RFA. Starting PCA pre procedure may facilitate this. Instructions should be given to patients on the use of PCA with the goal of obtaining a pain rating that allows a patient to recover with relative ease. Patients also may

resume their normal levels of activity as tolerated usually 7- 10 days after RFA.

In the current study discovered that, the majority of the patients in both groups had moderated and severed anxiety pre guidelines. While post guidelines the degree of moderate and sever anxiety decreased in study group compared to control group. *Hjorth (2011)* was in agreement with this finding and reported that radiotherapy information and education improve patient outcomes, improve patient knowledge and understanding which leading to reduce anxiety/ uncertainty, identify needs and timely referrals. Additionally, *Ahmed (2004)* reported that teaching patients contributes to decrease level of anxiety. Similarly, *Gadaleta et al., (2004)* concluded that teaching and reassuring the patients is a vital part in the procedure which leading to alleviate anxiety regarding to pain and nausea as the sedation wears off. Almost all of the patients are admitted overnight after the procedure to make sure that any pain is addressed with medication and to be certain that there are no post-procedure complications.

Finally, the study results discovered that the nursing guidelines significantly decrease the post ablation adverse effect in the study group versus control group through increasing patients' knowledge about radiofrequency ablation therapy which to achieved the study hypothesis.

The mean score of patient's satisfaction after implementation of the nursing guideline was higher among the study group versus to control group. This result was congruent with *Wahet al., (2005) and Wolber et al. (2010)* who mentioned that overall patient satisfaction and self-reported clinical outcome are comparable for outpatient and inpatient catheter ablations. Patients undergoing outpatient procedures may return to work earlier. Therefore, ablation procedures may be considered for selected patients without significant co-morbidities.

The present study showed that there were statistically significant differences between the study and control groups as regards length of resume normal activity. *Grundmann (2008) and Wolber et al. (2010)* reported that variation of patients' length resume normal activity after RFA could be due to multiple factors including the proper pre assessment of patient, level of pain sensation. So the active participation of patient in his/her care plane to decrease length of resume normal activity and return to work earlier.

Conclusion:

In view of the study results and research hypothesis, it can be concluded that the nursing guidelines for patient with hepatocellular carcinoma under radiofrequency ablation therapy can improve patients' knowledge which indicate to minimized RF post ablation syndrome, Improve

patients' satisfaction and decrease length of resume normal activity in the study group versus to control group. Therefore, the study hypothesis that the guidelines significantly decreasing the post ablation adverse effect in the study group versus control group through increasing patients' knowledge about radiofrequency ablation therapy was achieved.

Recommendations:

Radiofrequency ablation guidelines should be available in simple Arabic booklet for all patients with hepatocelullar carcinoma

Training programs about radiofrequency ablation therapy for patients should be held.

Further studies should be carried out on a large number of subjects for evidence of results and generalization.

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