Effect of Nursing Care Instructions on Outcomes of Patients with Hepatocellular Carcinoma Undergoing Radiofrequency Ablation Therapy

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Abstract

Radiofrequency ablation (RFA) is a safe and effective first-line treatment for patients with early-stage hepatocellular carcinoma (HCC). It is important to improve patient outcomes, including fewer delays, earlier discharges, fewer readmissions, more effective, efficient, and consistent care and communication. **Aim:** This study aimed to evaluate the effect of nursing care instructions on outcomes of patients with hepatocellular carcinoma undergoing radiofrequency ablation therapy. **Design:** A quasi experimental design was used. **Setting:**This study was conducted at radiofrequency department of the Oncology Hospital and Internal Medicine Outpatient Clinic affiliated with Ismailia University Hospitals, Egypt. **Sample:** A purposive sample of 60 patients with hepatocellular carcinoma; 30 randomly assigned to each study and control group. **Tools**:1) Patients' interview questionnaire (pre/post-tests), (2 Hepatocellular carcinoma patient outcome indicators (post-test). **Results:** There was a highly statistically significant differences between the two groups in terms of pain, anxiety level, nausea, vomiting, retching, and post procedure complications ($P \leq 0.001$). There was a positive correlation coefficient between total level of anxiety and total pain severity among study group patients post-nursing care instructions (r= .580 at P$\leq$ 0.01). Conclusion: The implementation of nursing care instructions for patients with hepatocellular carcinoma undergoing RFA therapy had a statistically significant positive effect on improving outcomes of patients in the study group compared to the control group, which supported the stated hypothesis. **Recommendations:** Further training programs about RFA therapy for patients should be conducted on a large number of subjects to demonstrate results and generalizability.

Key words: Hepatocellular Carcinoma, Nursing Care Instructions, Outcomes, Radiofrequency Ablation Therapy.

Introduction:

The incidence of liver cancer is one of the highest in the world. HCC accounts for up to 90% of all liver tumors. In Egypt, HCC is a major public health problem. It is responsible for 33.63% and 13.54% of all cancers in men and women, respectively. Hepatocellular carcinoma occurs in a number of pre-existing conditions, which usually include hepatitis C and B, alcoholic and non-alcoholic cirrhosis. It has a poor prognosis after detection, generally occurring late in the disease. This was closely linked to the hepatitis C virus epidemic, which has affected approximately 10-15% of the Egyptian population over the past 3 decades and has been reported as the highest prevalence of HCV in the world (***Elghazaly et al., 2018).***

There have been significant advances in the treatment of HCC over the past 10 years, with improvements in both technology and patient selection. The available treatment options can be divided into curative and non-curative interventions. Curative therapies include surgical resection, orthotropic LT, and ablative techniques such as thermal ablation. Each of these methods offers the possibility of a long-term response and better survival. Noncurative therapies that attempt to prolong survival by slowing tumor progression include trans arterial chemoembolization (TACE), trans arterial radio embolization (TARE), body stereotactic radiation therapy (SBRT), and systemic chemotherapy (*Marrero et al., 2018)*.

Ablation is a treatment that removes liver tumors without removing them. These techniques can be used in patients with a small tumor, no more than 3 cm (just over an inch) in diameter, slightly larger tumors (1 to 2 inches or 3 to 5 cm in diameter), which require embolization. It can be used when surgery is not a good option (often due to health problems or liver failure). They are less likely to cure cancer than surgery, but they can still be very helpful for some people. These treatments are also sometimes used in patients awaiting a liver transplant (*Violi et al., 2018)*.

The most widely used ablative technique is radiofrequency ablation (RFA), whose principle is based on ionic movement and heat generated by the electrical impedance of the tissue (*Lurje et al., 2019)*. RFA represents an effective therapeutic procedure to destroy unrespectable primary and metastatic liver tumors of various sizes and locations and has been shown to be successfully performed transcutaneously or by laparotomy or laparoscopy using ultrasound or guided by computed tomography (*Künzli etal., 2011)*.

RFA is contraindicated in the following cases: unresolved coagulopathies and uncontrolled infection, invasion of the bile ducts or main vessel, significant extra hepatic disease, childhood class C cirrhosis or active infection, decompensated liver disease, lesions of the worn with the pads or if the placement of the pads is damaged. In addition, tumors occupying > 40% of the liver volume cannot be safely removed. In addition, proximity to vital structures such as adjacent vessels and organs, and lesions larger than 5 cm are relative contraindications for RFA (*Salah et al., 2012).*

Complications of RFA include hemorrhage, infection, bile duct complications, liver failure, pneumothorax, pleural effusion, pneumonia, skin burns, vascular injury (portal vein thrombosis, vein injury, hepatic artery injury and visceral injury) (*Fonseca et al., 2014).*

Post-ablation syndrome is a frequent phenomenon after RFA of solid abdominal tumors. Symptoms of post-ablation syndrome are similar to those of the flu and include mild fever, delayed pain, malaise, myalgia, nausea, and vomiting. Patients should be made aware of post-ablation syndrome and its self-limiting nature prior to surgery. Additionally, anxiety is more common in patients with hepatocellular cancer undergoing RFA*(Salah et al., 2012).*

Patient education is the first important strategy to reduce post-ablation syndrome, which can identify and reduce the incidence of complications and help you return to normal activities within days (7 to 10 days .(days). Patients should maintain these normal mild symptoms and continue to drink fluids for the next five to seven days. Continued hydration is essential to clear the kidneys of ablation byproducts and may limit renal toxicity or acute tubular necrosis due to contrast media or post ablation syndrome (*Salah et al., 2012).*

Significance of the study:

Radiofrequency ablation remains the most widely used thermal ablation technique in the world. Review of the admission rate of patients in the Internal Medicine Outpatient Clinic affiliated with Ismailia University Hospital revealed that about 120 cases required RFA for patients with HCC for one year (2018), according to the Statistical Research Office of the Ismailia University Hospital.

The patient with a new treatment may react with great concern and a feeling of insecurity, leading to increased anxiety for the patient. All HCC patients on RFA should understand and be aware of their treatment and its side effects. It is hoped that the results of this study will help provide evidence that could support nursing practice and research.

Aim of the study

To evaluate the effect of nursing care instructions on outcomes of patients with hepatocellular carcinoma undergoing radiofrequency ablation therapy.

This aim was fulfilled through the following objectives:

1. Assess patients' physical status.
2. Assess the severity of pain and anxiety level for patients.
3. Assess for nausea, vomiting, retching, and complications post RFA procedure.
4. Design nursing care instructions for HCC patients.

5. Implement and evaluate the effect of the nursing care instructions on patients' outcomes.

Hypotheses

To achieve the purpose of this study, the following research hypotheses were formulated:

H1: Significant improvement in the physical condition in study group than patients in control group after implementation of the nursing care instructions.

H2: Mean score of nausea, vomiting, retching, pain, and anxiety of the patients in study group will be less than those in patients of control group after implementation of the nursing care instructions.

H3: Significant reduction in complications which may occur post RFA.

Operational definitions:

Nursing Care Instruction is a structured training program (Nursing Nursing) developed by researchers to provide information on RFA therapy in patients with hepatocellular carcinoma based on nursing instructions that have been developed.

The outcome is the result of a variety of care instructions given to the study patients, including physical conditions, pain, anxiety, retching, nausea, vomiting, and complications that may occur after RFA.

Subjects and methods:

Research Design:

A quasi-experimental research design was used to carry out the study.

Setting: The study was conducted in the radiofrequency ward of an oncology hospital on the second floor consisting of 8 rooms, each room with 2 beds, and in an outpatient internal medicine clinic affiliated with the Ismailia University Hospitals, in Egypt.

Subject

A purposive sample of sixty patients admitted to internal medicine on an outpatient basis and undergoing radiofrequency treatment. The sample was calculated according to Power and sample size calculator for 80% power. These patients were admitted sequentially upon admission to outpatient treatment. Inclusion criteria were patients diagnosed with HCC whose tumor size was ≤ 3 cm, while patients who had received prior chemotherapy and a combined cycle of chemotherapy and radiotherapy were excluded. Then, the study sample was randomly divided into two equal groups of 30 patients each (study and control). Only the study group received care instructions and the control group received routine care, including an RFA session and medical treatment.

Tools of data collection:

Tool I: **Patients' interview questionnaire.**

It was designed by the researchers based on literature reviews and expert judgment for content validity. It was translated into Arabic to avoid misunderstandings; it was applied to all patients in the study and control groups before (pre-test) and after (post-test) the implementation of the instructions. The questionnaire consisted of the following three main parts:

□ *Part I: Demographic characteristics*. . composed of 7 items with personal demographic characteristics of the patient such as age, sex, marital status, educational level, occupation, place of residence and smoking.

□ *Part II: Medical data:* It included 5 questions about the patient's medical history regarding diagnosis, onset of the disease, associated disease, family history of liver disease, and whether the patient had ever used radiofrequency. It was adapted from *(Awad, 2013).*

□ *Part III:* **physical examination assessment sheet:** contained 10 questions

in body systems including cardiovascular, respiratory, gastrointestinal and skin. It was adapted from *(Hassan, (2011) and Rawles et al, (2010)).*

Tool II: Hepatocellular carcinoma patient outcome indicators:

It was used to assess the outcome of the studied patients. It consisted of 4 parts: Pain assessment Scale, Zung Self-rating Anxiety Scale, Post-Rhodes Index of Nausea & vomiting and retching, and complications. It refers to the RFA technique.

Part I: **Pain assessment scale (post-test).** Visual analogue scales "VAS" was used to rate the subject's pain intensity on a scale of 0 to 10, with 0 indicating no pain and 10 indicating the worst pain. The subject was instructed to rate on the scale to indicate pain intensity after the procedure (**Mooventhan&Nivethitha,2014).**

Part II: Zung Self-rating Anxiety Scale (SAS) (post-test): It is a method of determining anxiety levels in patients with anxiety-related symptoms. The scale focused on the most common generalized anxiety disorders; Dealing with stress usually causes anxiety. The SAS test was self-administered and consisted of 20 questions. Each question is scored on a scale of 1 to 4 (none or a little of the time, sometimes, good part of the time, most of the time). There are fifteen questions formulated to increase anxiety levels and five questions formulated to decrease anxiety levels. It was adopted from *(Zung, 1971).*

The scores range from 20-80.
20-44 : Normal Range.
45-59 :Mild to Moderate Anxiety.
60-74 Marked to Severe Anxiety.
75-80 Extreme Anxiety .
A total score of 60 and above suggests the need for further medical evaluation of GAD.

Part III: Post-Rhodes Index of Nausea & vomiting and retching questionnaire sheet (post-test). It was adopted from *Thabet et al, (2019).* 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 ofnausea, 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. In terms of 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 have been defined by (Dodd et al. 2005) as "nauseated or sickness at stomach", "threw up or vomiting", and "retching or dry heaves", respectively.

Part IV: Physical Assessment for Patient Related to Complications which May Occur During Radiofrequency Ablation Procedure (post-test). These were complications related to the placement of image-guided electrodes, complications related to thermal injury, complications related to the medications used, and complications related to liver ablation. It was adapted from *Kong et al., (2009); Fonseca et al., (2014).* Each item was marked as 'present' and not present. These were each scored from 1 to zero.

Ethical considerations and human rights   Prior to the first interview, verbal consent was obtained from each subject after being informed of the nature, purpose, and utility of the study. Patients were also informed that the sharing is voluntary and that they can unsubscribe at any time without giving a reason. The confidentiality of the information received was guaranteed by the encryption of all data. Researchers assured patients that the data would be used for research purposes only. The control group received the same

nursing care instruction booklet at the end of the study.

Pilot study:

A pilot study was conducted in six patients (10%) of the total study sample to test the clarity and feasibility of the tools and to estimate the time required to complete each form. Based on the results of the pilot study, the necessary modifications were made. The subjects were then excluded from the main study sample.

Field work:
Approval was obtained by letters to the directors of the oncology hospital and the outpatient clinic hospital before starting the implementation of the study plan and they were informed of the time and date of the collection of data.

- **Testing validity and Reliability :** tools offered by the use of face and content validity. Face validation aimed to inspect the items to determine if the tools measure what they are supposed to measure. Content validity was performed to determine whether the content of the tools covered the objective of the study. The tools were reviewed by three experts in each specialty and academic position - a professor and two assistant professors in medical-surgical nursing - who reviewed the content of the tool for clarity, relevance, completeness, understanding and ease of implementation. In their opinion, minor changes have been made and the final form has been drawn up. The reliability of the tools was tested by the internal consistency method. Cronbach's alpha reliability coefficient was found to be 0.854, 0.844, 0.862, 0.840 for Pain assessment Scale, Zung Self- rating Anxiety Scale, Post-Rhodes Index of Nausea & vomiting and retching questionnaire sheet and physical assessment of complications associated which may occur during radiofrequency ablation procedure respectively.
- Content validity and reliability testing was conducted before data collection began.
- The data collection as pre/post was carried out by researchers available 2 days a week

at morning shift in study setting. The data collection phase started in March 2020 and lasted until August 2020.

• The radiofrequency nursing care instructions were developed based on the study of the real needs of patients from the previous test (physical condition of patients, self-rating anxiety scale, retching, nausea, and vomiting).

Nursing care instructions were divided intofour phases: -

Assessment phase: -

Prior to radiofrequency ablation, the researchers interviewed each patient in the two groups individually for 30 to 45 minutes, explaining the aim of this study, and then asked each patient to fill out the interview questionnaire prepared in plain Arabic as a pre-test. The tool took 15-20 minutes to complete. The patient needs identified were based on each patient's response to the above tool.

Planning phase:

The radiofrequency ablation therapy nursing care instructions have been developed based on the pre-established actual needs of the patients. The content matched the needs of the patients [pre, during and after the procedure for three weeks]. Written in Arabic, the instructions consisted of three parts, as follows:

Part one:
- Meaning of radiofrequency ablationtherapy
- Indications, Contraindication andcomplications
- Benefits of RFA
- Post ablation complications

Part two:
Patients' instructions pre, during and afterprocedure contain the following: -
- Pre assessment for the patients
- Diet, fluid and pain relieve measures before the procedure
- Patients' investigation before theprocedure
- Patients' positions during procedure

Part three:

- Home care instructions
- How to assess post ablation complications
- 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: -

The elaborate instructions were implemented in the form of sessions conducted in the study settings for the study group patients two days a week (Sunday and Tuesday). Patients in the study group were divided into small groups, comprising 5 patients in each group. The content of the instructions was divided into 6 consecutive sessions. The first session was an orientation session to clarify the aim and content of the instructions, their general objectives, teaching methods, student activities and assessment methods. One session covered the theoretical part of the instruction, including the definition of RFA, indications, contraindications, benefits of RFA and post-ablation complications.

Two pre-, during- and post-procedure Patients' instructions sessions included diet, fluids, pre-procedure pain management, pre-procedure patient investigation, and post-procedure Patients' positions.

Two home care instructions sessions included assessment of post-ablation complications, medication administration, instructions for nausea, vomiting and pain relief (breathing exercises), fever management, normal daily activities such as

(hygiene, movement, diet regimen, exercise, return to work) and couple relationships.

In addition, the researchers gave each patient in the study group a booklet containing the instructions. The duration of each session was 40 to 45 minutes.

Evaluation phase*: (after 3 week's procedure).*
The evaluation of the effect of nursing care instructions on the outcomes was carried out by comparing the two groups (study and control) pre / post procedure .

Statistical Design: -
The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g., frequency, percentages, mean and standard deviation). Qualitative variables were compared using qui square test (x2) as the test of significance, and independent (t) test was used to compare mean score between two groups. Correlation coefficient test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when p < 0.05 and a highly significant level value was considered when p < 0.01. No statistical significance difference was considered when p > 0.05.

RESULTS
According to the current study *table (1)* shows that, studied patients in the study and control groups were males (70% & 80% respectively), their age was over 50 years with the mean age of study and control groups   was (59.53 ± 7.25 &60.26 ± 8.01 respectively)**,** more than three fifths of patients had completed secondary education (66% & 60% respectively)**.** Finally, there was no statistically significant differences between the both groups (p value > 0.05).

Table (2): Shows almost less than two third (60%) of patients in study group were< 1 year regarding onset of disease versus half (50%) of patients in control group. Also 70%, 60% of study and control groups respectively their families had liver disease. As regards previous RF session 73.3 %, 83.3 % of study and control groups respectively had not previous session ofRF. There were no statistically significant differences between patients in the study and control groups in terms of medical history (p value > 0.05).

Table (3) illustrates that, all (100%) of patients in the study group had a normal temperature post nursing care instructions compared to only 6.7 % of patients in the control group. Regarding breath sounds (90%) of patients in the study group had clear sound post nursing care instructions compared to only 6.7 % of patients in the control group. Additionally, 90% of patients in the study group had no dyspnea post nursing care instructions compared to less than one fifth(16.7%) of patients in the control group. No statistically significant differences was found between the study and control groups (p value > 0.05).

As indicated in *table 4,* a highly statistically significant difference was found in both study and control groups after application of nursing care instructions regarding the pain and anxiety level (χ^2 13.35 at $P \leq$ 0.001& $\chi^2$19.85 at $P \leq$ 0.001respectively).

Table (5) demonstrates the levels of nausea, vomiting and retching of the studied groups after nursing care instructions. There were high statistically significant differences between patients in the study and control groups post nursing care instructions (χ^2 27.30 at P≤ 0.01, χ^2 31.57 at $P \leq$ 0.01, $\chi^2$27.02 at $P \leq$ 0.01 respectively).

As indicated in *table 6*, a highly statistically significant difference was found in the study and control groups following the application of nursing care instructions with respect to infection, fever, Post ablation syndrome, and allergy at P≤ 0.001).

Table (7) indicated that there was a positive correlation coefficient between Overall anxiety level and overall pain intensity in the patients in the study group post- nursing care instructions (r= .580 at P≤ 0.01). In addition, a positive correlation coefficient was found between overall nausea, vomiting, and retching and overall anxiety level and pain severity (r= .571 at P≤ 0.01, r= .510 at P≤ 0.01 respectively).

Table (1): Frequency and Percentage Distribution of Demographic Characteristics of The Study and Control groups(n=60).

Socio-demographic data	Study group (n=30)		Control group (n=30)		X^2	P-Value
	No.	%	No.	%		
Age (Year)						
50-<60	18	60	16	53.3	0.899	0.455
60-<70	10	33.3	12	40		
≥70	2	6.7	2	6.7		
x S.D	59.53 ± 7.25		60.26 ± 8.01		t=0.771	0.410
Sex						
Male	21	70	24	80	0.214	0.902
Female	9	30	6	20		
Educational level						
Illiterate	3	10	2	6.7		
Read and write	3	10	5	16.7	0.805	0.422
Secondary education	20	66.7	18	60		
High education	4	13.3	5	16.7		
Marital Status						
Single	6	20	4	13.3	0.441	0.854
Married	24	80	26	86.7		
Occupation:						
Working	16	53.3	12	40	0.511	0.788
Not working	14	46.7	18	60		
Residence						
Rural	18	60	15	50	0.450	0.861
Urban	12	40	15	50		
Types of smoker						
Smoker	7	23.3	6	20	0.400	0.901
Previous smoker	8	26.7	10	33.3		
Non smoker	15	50	14	46.7		

X^2**: Chi-square**   No statistically significant at p > 0.05.

Table (2): Comparison of Patients' Medical history In The Study and Control groups (n=60).

Medical history	Study group (n=30)		Control group (n=30)		X2	P-Value
	No.	%	No.	%		
Diagnosis:						
Hepatic focal lesion	30	100	30	100	**0**	**0**
Onset of disease						
< 1 year	18	60	15	50		
1-<5 years	6	20	8	26.7	**0.561**	**0.314**
5-<10 years	4	13.3	5	16.7		
≥10 years	2	6.7	2	6.7		
Associated Medical disease						
Yes	30	100	30	100	**0**	**0**
No	0	0.0	0	0.0		
If yes,						
Hypertension	14	46.7	16	53.4		
Diabetes	15	50	13	43.3	**0.247**	**0.997**
Renal disease	1	3.3	1	3.3		
Rheumatic heart failure	0	0.0	0	0.0		
Previous cerebral stroke	0	0.0	0	0.0		
psychological stress	0	0.0	0	0.0		
Family history suffering from liver disease						
Yes	21	70	18	60	**0.417**	**0.622**
No	9	30	12	40		
Previous RF session						
Yes	8	26.7	5	16.7	**0.375**	**0.511**
No	22	73.3	25	83.3		

X^2**: Chi-square**   No statistically significant at p > 0.05.

Table (3): Comparison of Patients' Physical Condition in The Studied Groups (Study and Control) Post Nursing Care Instructions(n=60) .

Physical assessment condition	Study group (n=30)		Control group (n=30)		X2	P-Value
	No.	%	No.	%		
Hemodynamics **Temperature**						
Normal	30	100	2	6.7		
Hyperthermia	0	0.0	28	93.3	**0.165**	**0.983**
Hypothermia	0	0.0	0	0.0		
Blood pressure						
Normal	28	93.3	3	10		
Hypertension	2	6.7	26	86.7	**0.318**	**0.711**
Hypotension	0	0.0	1	3.3		
Heart rate						
Regular	28	93.3	5	16.7	**0.422**	**0.601**
Irregular	2	6.7	25	83.3		
Respiratory system **Breath sounds**						
Clear	27	90	2	6.7	**0.281**	**0.820**
Crackles	2	6.7	26	86.7		
Wheeze	1	3.3	2	6.7		
Dyspnea						
Yes	3	10	25	83.3	**0.397**	**0.624**
No	27	90	5	16.7		
Skin **Color**						
NO abnormality	14	46.7	12	40		
Pale	4	13.3	5	16.7	**0.322**	**0.700**
Cyanotic	0	0.0	1	3.3		
Jaundice	12	40	12	40		
Extremities						
Normal	21	70	12	40	**0.417**	**0.612**
Edema of the lower extremities	9	30	18	60		
Gastrointestinal symptoms **Right upper abdominal pain**						
Present	7	23.3	26	86.7	**0.344**	**0.682**
Absent	23	76.7	4	13.3		
Nausea and vomiting						
Present	6	20	27	90	**0.318**	**0.693**
Absent	24	80	3	10		
Weight changes						
No change	15	50	13	43.3		
Weight gain	9	30	9	30	**0.514**	**0.387**
Weight loss	6	20	8	26.7		

X²: Chi-square   No statistically significant at p > 0.05.

Table (4): Levels of Pain and Anxiety of the Patients in the Study and Control Group Post Nursing Care Instructions (n=60).

	Study group (n=30)		Control group (n=30)		X2	P-Value
	No.	%	No.	%		
Levels of pain						
No pain	6	20	0	0.0		
Mild	22	73.3	3	10	**13.35**	**0.000****
Moderate	2	6.7	18	60		
Severe	0	0.0	9	30		
x S. D	**1.27±0.67**		**4.98±1.56**		**t=37.91**	**0.000****
Levels of anxiety						
No Anxiety	5	16.7	0	0.0		
Mild	18	60	6	20		
Moderate	7	23.3	9	30		
Severe	0	0.0	15	50	**19.85**	**0.000****
x S. D	**16.82±4.17**		**39.47±11.06**		**t=43.58**	**0.000****

X^2: Chi-square   No statistically significant at p > 0.05

Table (5): Levels of Nausea, Vomiting and Retching of The Patients in Studied Groups (Study and Control) Post Nursing Care Instructions(n=60).

Items	Study group (n=30)		Control group (n=30)		X^2	p-value
	No.	%	No.	%		
Frequency						
7 times and more	0	0.0	22	73.3		
5-6 times	0	0.0	6	20	**27.30**	.000**
3-4 times	3	10	2	6.7		
1-2 times	18	60	0	0.0		
None	9	30	0	0.0		
Severity						
Severe	0	0.0	27	90		
Great	0	0.0	3	10	**31.57**	.000**
Moderate	0	0.0	0	0.0		
Mild	18	60	0	0.0		
None	12	40	0	0.0		
Amount of emesis						
Very large (3 cups or more)	0	0.0	22	73.3		
Large (2-3 cups)	0	0.0	6	20	**27.02**	.000**
Moderate (1/2-2 cups),	3	10	2	6.7		
Small (up to 1/2 cup)	18	60	0	0.0		
Did not throw up	9	30	0	0.0		

X^2: Chi-square   p= p-value   **: Highly statistically significant at $p \leq 0.01$.

Table (6): Physical Assessment for the Study and Control Groups Related to Complications which May Occur Post Radiofrequency Ablation Procedure (n=60).

Items	Study group (n=30)				Control group (n=30)				X^2	p-value
	Present		Not-present		Present		Not-present			
	No.	%	No.	%	No.	%	No.	%		
Complications related to imaging-guided (electrode placement)									16.88	.000**
- Bleeding	0	0.0	30	100	0	0.0	30	100		
- Infection	0	0.0	30	100	21	70	9	30		
Complications related to thermal therapy (thermal injury)									19.20	.000**
- Fever	5	16.6	25	83.3	28	93.3	2	6.7		
- Post ablation syndrome (low-grade fever, chills, nausea, pain & malaise)	5	16.6	25	83.3	28	93.3	2	6.7		
Complications related medications used for analgesia and sedation									23.01	.000**
-Allergic reactions	0	0.0	30	100	5	16.6	25	83.3		
-Respiratory depression	0	0.0	30	100	0	0.0	30	100		

X^2: Chi-square   p= p-value   No statistically significant at $p > 0.05$.
**: Highly statistically significant at $p \leq 0.01$.

Table (7): Correlation between Pain, Anxiety, And nausea, vomiting &retching of

Patients in the Study Group Post-Nursing Care instructions

Variables		Total pain	Total anxiety
Total anxiety	r	.580	
	p	.000**	
Total nausea, vomiting and Retching	r	.571	.510
	p	.000**	.000**

r=correlation coefficient test   **highly significant at $p < 0.01$.

Discussion:

Hepatocellular carcinoma (HCC) is a malignant neoplasm with a high prevalence worldwide, occupying the seventh highest incidence in men and the fifth highest incidence in women among malignant neoplasms. Primary HCC has the second highest incidence among malignancies and mortality ranks third among malignancies globally. As a curative therapy, interventional ablations are more frequently used in HCC clinical practice, e.g. ARF, microwave ablation, laser ablation, and cryotherapy *(Jin, et al. 2019).*

In the present study, the demographic characteristics of the study and control groups revealed that, nearly three quarters of the patients in the study group and the majority of them in the control group were males over the age of fifty, with more than three fifths of patients in both groups had a secondary education. There were no statistically significant differences between the two groups. This was important to ensure comparability of the two groups and to indicate successful randomization of the two groups.

In terms of medical history, the results of the current study indicated that nearly less than two third of the patients in the study group had less than one year of disease onset, compared to half of the patients in the control group. This could be due to researchers' selection of newly diagnosed HCC patients who discovered tumors by chance. This result was consistent with Salah, et al (2012, revealed that nearly two thirds of the studied patients were discovered their disease within a month to less than a year. Additionally, the American Cancer Society, (2017) stated that early detection of HCC is often possible for more treatment options and better treatment outcomes.

Related to prior RF session, less than three quarters, most of patients in the study and control groups respectively had not had a prior RF session. This finding was not supported by *Ongiem, et al. , (2016)* in the study entitled "Assessment of Pain Severity after Radiofrequency Ablation in Patients with Hepatocellular Carcinoma" mentioning that nearly more than two thirds of the subjects had 1 in number of RFA treatments.

Concerning Physical condition of the patients in the study groups after nursing care instructions. the results of the current study indicated that all patients in the study group had a normal temperature post nursing care instructions, compared with less than one tenth of the patients in the control group. This finding is in agreement with *Goda, et al. (2020)* in the study entitled " Learning Needs Assessment for Hepatocellular Carcinoma Patients Undergoing Thermal Ablation" which found that two thirds of the study subjects had a fever preprogram before receiving any educational instruction.

Regarding dyspnea most of the patients in the study group hadn't present dyspnea post nursing care instructions , compared to nearly less than one fifth of the patients in the control group.

From the researcher's point of view, these data reflect importance of nursing care instructions pre procedure. This is supported by *Jones, Badger, et al. (2011)* **in the study entitled "** The role of microwave ablation in the management of hepatic colorectal metastases" who demonstrated that the nurse was responsible for educating the patient in the preoperative period. Training and psychological support had a positive effect on the patient's physical and mental health both before and after the operation. Also supported by *Feltracco, et al. (2013)* in the study entitled "Blood loss, predictors of bleeding, transfusion practice and strategies of blood cell salvaging during liver transplantation" who stated that the patients' education is a comprehensive and intended learning practice that is achieved through learning by long term , counseling and behavioral modification skills that offered to improve the patient's

knowledge and health behavior.

Concerning pain, the present study revealed that there was a statistically significantdifference between the two groups after instructions. Where, the majority of patients in the study group had pain levels between painless and mild, while most of the patients in the control group had pain levels between moderate and severe. This may be because patient instructions recommend pain relief methods that can help reduce pain levels after the procedure.

This result is in agreement with study finding of **Salah et al, (2012)** who mentioned that there was a statistically significant difference between the study & control groups post guidelines. On the other view **Ongiem et al, (2017)** explored that the incidence of moderate to severe post-RFA-pain on movement within 18 to 24 hours was 11.6%.

Regarding anxiety the present study revealed that there was a highly statistically significant difference between study and control groups after application of nursing care instructions. The majority of patients in study group were having anxiety level ranged between mild to moderate, while half of patients in control group were having sever anxiety.

These results are in the same line with **Salah et al, (2012)** who stated that the majority of the patients in both groups had moderated and severed anxiety pre guidelines. Post guidelines the degree of anxiety diminished in study group paralleled to control group. Also, **Yildirim et al, (2012)** mentioned that anxiety disorders are common and can occur comorbidly in a chronological sequence by elevating stress levels.

Concerning levels of nausea, vomiting and retching of the studied groups post nursing care instructions. The present study revealed that there was high statistically significant improvement was observed among nausea, vomiting, and retching syndrome of patients in study group than patients in control group after nursing care instructions. This result may be due to the constructive feedback of nursing instructions on patients' knowledge to their procedure helped patients to deal with opposing effects at home.

This finding was consistent with **Salah, et al. (2012)** in the study entitled **"**Radiofrequency Ablation Therapy: Effect of Educational Nursing Guidelines on Knowledge and Post Ablation Syndrome for Patients with Hepatocellular Carcinoma " who revealed that there was a statistically significant difference between the two groups (study & control) post guidelines. In addition, this finding is supported by the finding of **Goda, et al. (2020)** in the study entitled " Learning Needs Assessment for Hepatocellular Carcinoma Patients Undergoing Thermal Ablation" who stated that the mean scores of nauseas, vomiting and retching were higher post procedure.

Also, the finding of the study was in consistent with **Thabet, et al. (2019)** in the study entitled "Effect of using Ginger tea on chemotherapy- induced nausea and vomiting among women with cancer", they reported that there was a statistically significant association in intervention (ginger tea group) and control group on the second day, third day and fourth day post chemotherapy.

According to complications after radiofrequency ablation procedure, the present study showed that there was a highly statistically significant difference between study and control groups. More than two thirds of patients in control group were having infection after procedure. This is in agreement with **Fonseca et al, 2014 and Yamakado et al, 2014** who stated that infection is a common complication with an incidence ranging from 0.3% to 1.7%.

As regarding Post ablation syndrome, the present study revealed that there was a highly statistically significant difference

between study and control groups after application of nursing care instructions. Where, the majority of patient in control group were having post ablation syndrome (low-grade fever, chills, nausea, pain & malaise), while less than one fifth of the patients in study group were suffering from PAS. This result may be due to the affirmative feedback of nursing instructions on patients' awareness about the procedure this assist them to know the appropriate way to transact with their side effects at home.

This is in the same line with **Khalil** *et al,* *2018* who explored that there was a great improvement regarding incidence of post ablation syndrome among study group patients after application of the educational nursing instructions.

As respect to correlation between pain level and anxiety level, the current study indicated that there was a positive correlation coefficient between total level of anxiety and total severity of pain among study group patients post-nursing care instructions. This might be due to Postoperative pain can cause negative emotions, such as anxiety, fear, and depression, leading to disorders of the nervous, circulatory and immune systems, thereby delaying recovery and increasing medical costs *(Wu et al .2018).* This result was goes in the same line with *Lee & Lee (2015)* in the study entitled **"** The relationship between the spiritual health, anxiety and pain in hospitalized cancer patients" they reported that there was a positive correlation between anxiety and pain among cancer patients.

The results of this study was in agreements of *Alkhwaldeh & Abuhmaidan(2019*) in the study entitled " The Relationship between Levels of Pain, Anxiety and Depression with the Health-Related Quality of Life among Chronic Low Back Pain Patients " they stated that there was a positive correlation between pain level and anxiety level. Also, this results was

supported by *Sharma, et al. (2015)* in the study entitled " Assessment of Relationship between Pain and Anxiety Following Dental Extraction - A Prospective Study" they reported that there was a significant gender difference in pain and anxiety level.

Concerning correlation between total nausea, vomiting and retching and total level of anxiety, the current study revealed that there was a positive correlation coefficient was founded between total nausea, vomiting and retching and total level of anxiety. Researchers have indicated that nausea and vomiting could be one of the main causes of anxiety in cancer patients. In other words, the presence of nausea and vomiting might lead to several mental problems, such as anxiety and depression among these patients *(So et al., 2010).* Also, this view was supported by *Flank et al. (2017)* in the study entitled" The burden of chemotherapy-induced nausea and vomiting in children receiving hematopoietic stem cell transplantation conditioning: a prospective study" they stated that controlling nausea and vomiting during and after the Hematopoietic Stem Cell Transplantation "HSCT" could significantly prevent or reduce the physical and psychological effects of transplantation, such as fatigue and anxiety. It could improve the patients' quality of life, as well.

Conclusion

Based on the results of the present study, it can be concluded that the implementation of nursing care instructions for patients with hepatocellular carcinoma undergoing radiofrequency ablation therapy had a statistically significant positive effect on improving outcomes of patients in the study group, including physical conditions, pain, anxiety, retching, nausea, vomiting, and complications compared to the control group, which supported the stated hypothesis.

Recommendations

- Radiofrequency ablation care instructions should be in a simplified format, illustrated and available Comprehensive booklet in Arabic with

color images for all patients with hepatocellular carcinoma undergoing radiofrequency ablation.

- Further training programs on radiofrequency ablation therapy should be implemented for patients.
- Further studies should be conducted on a large number of subjects to demonstrate results and generalizability.

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