Effect of Self-Care Guidelines on Quality of Life for Patients with Hepatocellular Carcinoma Undergoing Radiofrequency Ablation

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ABSTRACT

Context: Hepatocellular carcinoma (HCC) is considered one of the most challenging tumors with high incidence, prevalence, and mortality rates. Radiofrequency Ablation (RFA) is one of the emerging therapeutic modalities used for the minimally invasive treatment in the management of early-stage HCC.
Aim: This study aimed to assess the effect of self-care guidelines on quality of life for patients with Hepatocellular Carcinoma undergoing Radio Frequency Ablation.
Methods: A quasi-experimental design was used to achieve the aim of this study. This study was conducted at the Interventional Radiology Unit, affiliated to Ain Shams University Hospital, on a purposive sample of 50 patients with hepatocellular carcinoma; 25 randomly allocated to the study group, and 25 allocated to the control group. A structured interview questionnaire for patients with hepatocellular carcinoma undergoing radiofrequency ablation was used to collect the study data. It comprises three parts: Sociodemographic characteristic, assessment of patients' medical health, and knowledge about HCC and RFA. The second tool was the quality of life of cancer survivors questionnaire (pre /posttest), and finally, a patient-reported self-care practices assessment checklist (pre /posttests).
Results: There were statistically significant differences between the study and control groups regarding their total knowledge about hepatocellular carcinoma and radiofrequency ablation therapy pre and post-implementation of self-care guidelines. There were highly statistically significant differences between both groups regarding the total quality of life, pre and post-implementation of self-care guidelines. In addition, there were highly statistically significant differences regarding total self-care practice, pre, and post-implementation of self-care guidelines. A positive correlation was revealed between total knowledge with total self-care practice and total quality of life (pre/posttest). Also, a significant correlation was revealed between the total quality of life and self-care practices post self-care guidelines implementation at (p<0.001).
Conclusion: Implementation of self-care guidelines were improved patients' knowledge, quality of life, and self-care practices for patients with hepatocellular carcinoma undergoing radiofrequency ablation. A simplified, illustrated, and comprehensive Arabic booklet including self-care guidelines should be available for patients with hepatocellular carcinoma undergoing radiofrequency ablation. Replication of the current study on a larger probability sample is recommended to achieve generalization of the results. Further studies are recommended to assess factors affecting the quality of life for patients with hepatocellular carcinoma undergoing radiofrequency ablation.

Keywords: Self-care guidelines, quality of life, hepatocellular carcinoma, radiofrequency ablation

1. Introduction

Hepatocellular carcinoma (HCC) is the second leading cause of cancer-related deaths globally and has an incidence of approximately 850,000 new cases per year. HCC represents approximately 90% of all cases of primary liver cancer. The incidence ranges from four cases per 100,000 populations in the USA to 150 cases per 100,000 populations in parts of Africa and Asia, where HCC is responsible for a large proportion of cancer deaths. A rise in the incidence of mortality from HCC has been observed in different countries. Approximately 77% of deaths from HCC occur in developing countries *(American Cancer Society, 2018).* Hospital-based studies reported the frequency of all liver-related cancers in Egypt as HCC, from approximately 4% in 1993 to7.3% in 2003 *(El-Serag, 2019).*

Hepatocellular carcinoma rapidly reduces the quality of life and typically causes death six months to one year from diagnosis *(American Cancer Society, 2019).* This cancer varies widely in incidence throughout the world, with rising incidence in Egypt. The primary risk factors for hepatocellular carcinoma (HCC) are hepatitis B virus (HBV), hepatitis C virus (HCV), dietary aflatoxin exposure, and chronic alcohol consumption *(Khattab et al., 2010).*

Radiofrequency Ablation (RFA) is a procedure that uses high-frequency radio waves directed at specific sites in the body. RFA is a form of electrical energy in the

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frequency range of 300 kilohertz (kHz) to 1 megahertz (MHz). A needle-like probe is inserted through the skin and into the organ containing the tumor being treated during these procedures; this probe generates heat within the tumor, producing 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 this *(Lau & Lai, 2009)*.

Radiofrequency Ablation (RFA) is one of the emerging therapeutic modalities used for the minimally invasive treatment in the management of early-stage HCC when liver transplantation or surgical resection are not suitable options. In addition, RFA is considered a viable alternative to surgery; for inoperable patients with limited hepatic metastatic disease, especially from colorectal cancer, and for patients deemed ineligible for surgical resection because of the extent and location of the disease or concurrent medical conditions *(Gardini et al., 2019)*.

Regarding nursing roles regarding RFA procedure, the nurses have a role in the pre, intra, and post-procedural care of patients undergoing RFA. The nurse facilitates and improves patient care, collaborates with medical, nursing, patients, and significant others. The outcomes include fewer delays, earlier discharge, decrease readmission, effective, efficient, consistent care, and improved communication *(Todd et al., 2015)*.

Self-care is the practice of activities that individuals initiate and perform on their behalf in maintenance life, health, and wellbeing. Self-care is purposeful and conducted to meet self-care requisites (need) of individuals themselves or others in need of care (dependent care). Self-care depends on knowledge, resources, and action *(Black & Hawks, 2016)*.

Numerous factors affect the quality of life for HCC patients, including culture, age, educational level, diagnosis, clinical stage of the disease, and treatment pattern. In addition, quality of life often deteriorates further due to treatment-related side effects. Therefore, early treatment of reduced quality of life could benefit some but probably not all patients. However, many factors may not be amenable to nursing intervention (e.g., diagnosis, family illness history, predisposing characteristics, and medical treatment) *(Aziz, 2011; Synder et al., 2011)*. Additionally, it is also influenced by factors over which nurses have some control, such as environment, the information provided to patients and family members, personal or social issues, symptoms management, and nursing intervention *(King & Hinds, 2014)*.

2. Significance of the study

There is an increased rate of patients with HCC who are undergoing Radiofrequency Ablation, in which 500 cases are admitted annually at the Radiological department in Ain Shams University Hospital according to the statistical research office at Ain shams University Hospital *(Annual statistical reports of Ain Shams University*

Hospitals, 2017). These patients complain of adverse effects that hinder their ability to resume normal activity, which led to subsequent financial load on the patients and their families and the healthcare system. In addition, patients with a new therapy may react with many fears and insecure feelings, which lead to increased patient anxiety and poor quality of life. Therefore, the nurses were responsible for explaining to patients and their families what to expect during and after the treatment session and allowing them to talk about their concerns before therapy begins.

All patients with Hepatocellular Carcinoma under Radiofrequency Ablation therapy need to understand and be aware of its treatment and its adverse effects. This study's findings may provide evidence-based data that can promote nursing practice and research.

3. Aim of the study

This study aimed to assess the effect of self-care guidelines on quality of life for patients with hepatocellular carcinoma undergoing radiofrequency ablation. It was achieved through:
- Assessment of quality-of-life dimension for patients with hepatocellular carcinoma undergoing radiofrequency ablation.
- Assessment of self-care practices for patients with hepatocellular carcinoma undergoing radio-frequency ablation.
- Assessment of patient's knowledge related to hepatocellular carcinoma and radiofrequency ablation.
- Development and implementing self-care guidelines based on patients' assessments.
- Evaluating the effect of implementing self-care guidelines on quality of life for patients with hepatocellular carcinoma undergoing radio-frequency ablation.

3.1. Research hypothesis

The current study hypothesized that the implementation of self-care guidelines would positively affect patients' quality of life with hepatocellular carcinoma undergoing radiofrequency ablation.

4. Subjects & Methods

4.1. Research design

This study was conducted utilizing a quasi-experimental design, an empirical intervention study used to estimate the causal impact of an intervention on target population with random assignment to compare between groups (study and control) *(Silverman, 2016)*. The dependent variable in this study is the implementation of self-care guidelines, and the independent variable is the quality of life of the studied patients.

4.2. Research setting

The study was conducted at the outpatients' clinics in the Interventional and Vascular Radiology Unit located next to ICU at Ain Shams University Hospitals. The

building consisted of two floors. The first floor consisted of a big hall for waiting patients, reception, one nursing room, administrative office, two physician rooms, two ultrasound rooms for RFA and Microwave coagulation therapy, two operating theatres for Trans Catheter Arterial Chemoembolization (TACE), Percutaneous Ethanol injection and Chemotherapy, three recovery rooms and three bathrooms. The second floor consists of a lecture hall for the multidisciplinary committee, usually on Monday. The radiofrequency room is supplied with the necessary devices, RF apparatus, ultrasound apparatus, anesthesia apparatus, monitor, and emergency car.

4.3. Subjects

A purposive sample of 50 patients with hepatocellular carcinoma was recruited in this study, randomly allocated to the study group (25) and control group (25). Random allocation was done by writing the patients' names on a small piece of paper and chose 25 pieces to be one of the two groups. The sample size was calculated by reviewing the admission rate of patients with HCC at the outpatients' clinic in the Interventional and Vascular Radiology Unit at Ain Shams University Hospital. The average patient flow was four to five cases weakly using Epi-info version 7 stat calc, Center for Disease Control (CDC) and was determined statistically by power analysis considering the total number of patients who had HCC during the year 2016, which was 500 patients.

The power analysis results were:
- Type I error (α) =5% with a confidence level of 95%.
- Study power 90 % (power of test) with type error II 10% (Beta).
- The significance level (α) at 0.05.

Inclusion criteria

Adult patients, from both genders, primarily diagnosed with hepatocellular carcinoma, undergoing radiofrequency ablation, able to respond to instructions and had not exposed to any previous self-care guidelines about the HCC and RFA, and free from other chronic diseases that may interfere with self-care abilities, were recruited for this study.

4.4. Tools of the study

The following tools were used for data collection:

4.4.1. Structured Interview Questionnaire

The researcher developed it for patients with hepatocellular carcinoma undergoing radiofrequency ablation in simple Arabic language based on reviewing the related literature *(Linton, 2014)*. It included the following two parts:

Part 1 concerns assessing the patients' sociodemographic characteristics, such as patients' age, gender, marital status, level of education, residence, occupation, number of family members, cost of treatment, monthly income.

Part 2 covered the assessment of patients' medical health history. It consisted of family history, past medical/surgical history as (previous surgery and comorbid diseases), and

present medical history (awareness with diagnosis, time since discovering the disease, admission causes, number of RFA sessions, and investigation). It is composed of eight yes/ no open-end questions.

Part 3 was designed to assess the patients' knowledge related to hepatocellular carcinoma and radiofrequency ablation. It included three main dimensions (Hepatocellular carcinoma, radiofrequency ablation, complications, and side effects of RFA. It was included (26) MCQ and yes or no questions. It was covered the following three sections. The questions were distributed as follows:

- Section 1 was concerned with assessing patients' knowledge regarding HCC, such as definition, risk factors, types, signs and symptoms, investigations, and complications. It was composed of six MCQs.
- Section 2 was concerned with assessing the patient's knowledge regarding radiofrequency ablation procedure such as definition, uses, purpose, instructions before the procedure, investigations, contraindications, and benefits. It was composed of seven MCQs.
- Section 3 was concerned with assessing the patient's knowledge regarding side effects and complications after radiofrequency ablation. It was composed of nine questions with two responses (true and false) such as nausea, vomiting, stomatitis, pneumothorax, liver abscess, and post-ablation syndrome. Besides, four multiple-choice questions about major complications after the RFA therapy as infection, bleeding, abscesses. This tool was used before and after the RFA therapy.

Scoring system

The correct answer score for each question was (1), and the incorrect answer was (0). The total score of patients' knowledge assessment was (26) marks. The total score was classified as follows:
- <70% was considered unsatisfactory (<20 marks).
- ≥ 70% was considered satisfactory (≥20 marks).

4.4.2. Quality of Life of Cancer Survivors Questionnaire

It was used to measure the quality of life for patients with Hepatocellular Carcinoma undergoing RFA. It was adapted from *Üstündag & Zencirci (2015)*. It consisted of (37) Likert-type scale formulated into five separate subscales: Physical (17 items), social and family (7 items), psychological and emotional (6 items), functional (3 items), and spiritual wellbeing (4 items). The researchers designed a modified version of this questionnaire. The modifications included adding items to the physical domain as side effects of radiofrequency, and some items were omitted from social and functional domains, and religious domains were added. The scoring system was modified from ten to five responses.

Scoring system

Each item had five responses ranging from 0-4 as the following: (0) very much, (1) quite a bite, (2) somewhat, (3) little a bite, and (4) not at all, when the response scored by four it was considered very high QoL, 3= high QoL, 2= moderate QoL, 1= low QoL, the response scored by 0= low

QoL. Therefore, the total marks for the scale were calculated as the following:
- Range from 112 to 148 was considered very high QoL.
- Range from 75 to 111 was considered high QoL.
- Range from 38 to 74 was considered moderate QoL.
- Range from 1 to 37 was considered low QoL.
- 0 was considered very low QoL.

4.4.3. Patient-Reported Self-care Practice Assessment Checklists

It was developed by the researchers for patients with hepatocellular carcinoma undergoing radiofrequency ablation in the Arabic language based on a recent literature review *(Bauer, 2014)* to assess the patient-reported self-care practice. This tool was divided into the following parts:

Part 1 was concerned with assessing patient's practices regarding physical self-care, as self-care regarding prevention of infection, bleeding, fever, difficult breathing, gastrointestinal problems, fatigue, pain, medication, and follow-up. It was composed of (60) items. The response of each item was yes or no.

Part 2 was concerned with the feeling of psychological wellness and confidence (Psychological self-care). It was composed of (10) items. The response of each item was yes or no.

Part 3 was concerned with interaction with family and maintaining the job (Social, family, and functional self-care). It was composed of 6 items. The response of each item was yes or no.

Part 4 was concerned with the practicing of religious rites (Spiritual self-care). It was composed of 4 items. The response of each item was yes or no.

Scoring system

The scoring for the reported self-care practice from parts 1-4 was composed of 80 marks. The response of each item was (1 mark) for yes and (zero) for no. The items were disturbed into physical self-care (60) marks, psychological self-care (10) marks, social, functional self-care (6) marks, and spiritual self-care (4) marks. The total score was classified as follows:
- < 75% was considered unsatisfactory (<60 marks).
- ≥ 75% was considered satisfactory (≥60 marks).

Part 5 was concerned with self-care regarding the patients' daily living activities. The activities of daily living included basic activities of daily living (ADLs) adopted from Katz Index *Leahy and Kizilay (1998)*. It included six activities such as feeding, bathing, toileting, transferring, walking, traveling, and dressing.

Scoring system

The score ranges from 0 (low function, dependent) to 1 (high function, independent). The total score for every patient was evaluated as:
- < 70% was considered dependent.
- ≥ 70% was considered independent.

4.5. Procedures

Content validity was ascertained by a group of seven experts, five from the Medical-Surgical Nursing department at the Faculty of Nursing at Ain Shams University and two medical consultants of the Interventional and Vascular Radiology unit at Ain Shams University Hospitals. Their opinion was elicited regarding format, accuracy, the relevance of the tools to the aim, and appropriateness to achieve the objectives. The aim was to determine the relevance, clarity, completeness, simplicity, and applicability of the study tools.

Testing the reliability was referred to the extent to which the same answer can be obtained by using the same instruments more than one time of the same tool *(Sharma, 2014)*, testing was done by using Alpha-Cronbach Test as follows: Patients` knowledge questionnaire was 0.886, quality of life scale, 0.872 and patient self-care reported practices was 0.867.

Ethical considerations: Before the initial interview, verbal consent was secured from each subject after being informed about 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 guidelines booklet at the end of the study.

Pilot Study: Before performing the actual study, a pilot study was carried out on five patients (10%) of total study subjects were included and chosen randomly from the previously mentioned setting to test clarity, the applicability of the tools, and time required to fill them, and the feasibility of the research process. No modifications were done to the tools. The patients who are involved in the pilot study were included in the main study group.

Fieldwork: The study was carried out through four phases, namely, assessment, planning, implementation, and evaluation. These phases were carried out from June 2018 to the end of May 2019, covering 12 months. Firstly, data were collected from the control group from June 2018 to December 2018, then from January 2019 to May 2019 for the study group. The researchers attended the previously mentioned settings three days/week (Sunday, Tuesday, and Thursday) to collect data from control and study groups.

Assessment phase: During the assessment phase, the researcher prepared the data collection tools, and translation and back translation was done. The researcher held the first meeting with each patient before presenting to the multidisciplinary committee at the outpatients' clinics in the Interventional and Vascular Radiology Unit, affiliated to Ain Shams University Hospitals, to introduce herself and briefly explain the nature the purpose of the study. The researcher took the telephone number at the first contact to determine the next appointment to complete the data collection process.

The researcher provided an overview and clarification about the tools. Then, the structured questionnaire was distributed to each patient in the study group to assess sociodemographic characteristics, medical health history, knowledge, quality of life, and reported self-care practices. At the same time, the researcher aided the patients who could not read or write to fill the tools. The patients filled the tools in a time ranged from 60 to 70 minutes distributed as the following: Patients' sociodemographic characteristics took about 5 minutes, patients' medical health took about 5 minutes, knowledge took about 10 minutes, patients' self-care practices took about 30 minutes, and quality of life took about 20 minutes. The data obtained during this phase constituted the baseline for further comparisons to evaluate the effect of the self-care guidelines.

Regarding the control group, the pre-assessment was also done as a study group and took approximately the same time for all data collection tools.

Planning phase: Based on the needs identified in the assessment phase from the participated patients and reviewing relevant literature. Next, the researcher determined the teaching strategy (timetable of sessions, teaching methods, media used). The content met patients' needs [pre, during, and after procedure]. Finally, the researcher developed the Self-care guidelines in the form of a printed Arabic booklet to satisfy the patients' knowledge deficit and self-care practices.

Implementation phase (Conducting self-care guidelines) after patients in the study group filling in the study tool with an orientation about the content and purpose of the study. Self-care guidelines were implemented for the study group according to patients' learning needs. The teaching session was conducted in the Interventional and Vascular Radiology Unit in the lecture hall, prepared for medical students' sessions. These classrooms were equipped with an air conditioner, quiet, well ventilated, well-furnished, and had adequate lighting.

Implementation of self-care guidelines lasted over three months for all patients in the study group. Each session had taken about 45-60 minutes/day for three days per week. These sessions were conducted for small groups ranging from 1-3 patients. Thus, the self-care guidelines involved four scheduled sessions.

- The first session covered the liver anatomy, definition of HCC, types, clinical manifestation, risk factors, and treatment methods.
- The second session has covered the definition of radiofrequency ablation therapy, the technique of RFA, indications, investigations for RFA, benefits of RFA, contraindications, and complications.
- The third session was concerned with physical self-care guidelines regarding preparation for RFA, prevention, and management of complications after radiofrequency ablation.
- The fourth session was included the self-care guidelines regarding follow-up, psychological, social, and spiritual self-care aspects.

These sessions were repeated to each group of studied patients until all groups were completed. Feedback was given at the beginning of each session about the previous one. The teaching methods used were small group discussions. Suitable teaching media were used, including posters, videos, and booklet distributed to all patients that were able to read and write. Also, the researcher communicated with patients via telephone call for instruction and reinforcement.

Evaluation phase: Evaluation determined the effect of self-care guidelines on quality-of-life dimensions for patients with HCC undergoing radiofrequency ablation by comparing the result pre and post-implementation of self-care guidelines implementation using the same data collection tools done to study and control groups.

4.6. Data analysis

All data were collected, tabulated, and subjected to statistical analysis. Statistical analysis is performed by the computer Statistical Package for Social Science (SPSS), version 21. It is used for data handling and graphical presentation. Quantitative variables are described by the mean, standard deviation (SD), while proportions and percentages describe qualitative categorical variables. In addition, the chi-square test of independence is used for categorical variables, the r test to test the correlation between variables, and the alpha Cronbach test to examine tool reliability. Regarding the significance of the result, the observed difference and association were considered as follows:
- Non-significance (NS) P >0.05.
- Significant (S) P ≤0.05.
- Highly significant (HS) P ≤0.001.

5. Results

Table 1 shows the mean age of the study group was 44.57±5.12, while the mean age of the control group was 45.3±4.87, regarding gender 60% and 48% were females in the study and control group, respectively. Also, 60% and 40% of the study and control groups were married, 40% and 36% had Diploma education. Besides, 52% and 40% of the study and control groups was resident in an urban area. 68% and 64% of the study and control groups were not working, 60% and 56% of them having four family members, respectively. There were no statistically significant differences between the two groups regarding all their sociodemographic characteristics (p >0.05).

Table 2 shows that 76% and 72% of their families did not suffer from hepatitis C in the study and control groups. Moreover, 64% and 56% of them were performed previous surgeries in the study and control groups. Also, 60% and 52% of the study and control groups had not comorbid diseases, respectively. There were no statistically significant differences between the two groups regarding their family and past medical history (p >0.05).

Table 3 demonstrates that 72% and 84% of the study and control groups were aware of their disease. 44% and 48% of them discovered their disease from one month to less than one year. Also, 60% and 64% of study and control groups were admitted for abdominal pain, 52% and 60% of

study and control groups respectively suffered from jaundice. Also, 68% and 60% of study and control groups respectively had not the previous session of RFA. 100% of them have performed an investigation before the session of RFA. There were no statistically significant differences between the two groups regarding all their present history at (p >0.05).

Table 4 shows that 56% of patients in the study group and 52% of patients in the control group had a satisfactory level of total knowledge about HCC, RFA with no statistically significant differences in pre-self-care guidelines implementation (p>0.05) regarding the three knowledge domains and the total. In contrast, post-self-care guidelines implementation, 84% of patients in the study group and 56% of patients in the control group had a satisfactory level of total knowledge about these items with statistically significant differences between the three knowledge domains and the total (p<0.05).

Table 5 reveals that 0% of the patients in the study and control groups had high total QoL pre-implementation, with a non-significant difference between both groups pre-implementation of the self-care guidelines. However, there was a highly statistically significant difference between study and control groups' QoL post-implementation of self-care guidelines at (p-<0.001).

Table 6 shows that 60% and 56% of the patients in the study and control groups had a satisfactory level of total self-care practices pre-implementation of self-care guidelines with a non-statistically significant difference between the two groups, which improved to 88% in the study group compared to 64% post-implementation of self-care guidelines with statistically significant differences at (p=0.047).

Table 7 demonstrates a highly statistically significant positive correlation between total reported self-care practices and total knowledge. Also, a statistically significant positive correlation between total QoL with their total knowledge of the study group pre and post-self-care guidelines implementation at (p<0.001).

Table 8 reveals a highly statistically significant positive correlation between patients' total self-care practices and total quality of life in the study group post-self-care guidelines implementation (p<0.001).

Table (1): Comparison of sociodemographic characteristics of the patients in the study and control groups (n=50).

sociodemographic characteristics	Study No.25		Control No.25		X^2	P-value
	No.	%	No.	%		
Age						
30 < 40	6	24	4	16		
40 < 50	11	44	12	48	0.502	0.778
50 and more	8	32	9	36		
Mean ±SD	44.57±5.12		45.3±4.87			
Gender						
Male	10	40	13	52	0.725	0.395
Female	15	60	12	48		
Marital status						
Single	2	8	4	16		
Married	15	60	10	40	2.410	0.492
Widowed / Divorced	8	32	11	44		
Educational level						
Cannot read and write	6	24	5	20		
Reads and writes	1	4	4	16	2.010	0.570
Diploma education	10	40	9	36		
High qualified	8	32	7	28		
Residence						
Rural	12	48	15	60	0.725	0.395
Urban	13	52	10	40		
Occupation						
Work	8	32	9	36	0.089	0.765
Not work	17	68	16	64		
Number of family members						
Three	10	40	11	44	0.082	0.774
Four and more	15	60	14	56		
The costs of treatment						
Governmental	13	52	11	44		
Health insurance	10	40	12	48	0.348	0.840
Private	2	8	2	8		
Monthly income						
Not enough for treatment	19	76	16	64	0.857	0.355
Enough to cover the cost of treatment	6	24	9	36		

Table (2): Comparison of patients' family and past medical history in the study and control groups (n= 50).

Family and past medical history	Study No.25		Control No.25		X^2	P-value
	No.	%	No.	%		
Family history of hepatitis C						
No	19	76	18	72	0.104	0.747
Yes	6	24	7	28		
Previous operation						
No	9	36	11	44	0.333	0.564
Yes	16	64	14	56		
Comorbid diseases						
Yes	10	40	12	48	0.325	0.569
No	15	60	13	52		

Table (3): Comparison of patients' present medical history in the study and control groups (n=50).

Present medical history	Study No.25		Control No.25		X^2	P-value
	No.	%	No.	%		
Awareness of diagnosis						
No	7	28	4	16	1.049	0.306
Yes	18	72	21	84		
Discovering disease						
1 month <1 year	11	44	12	48		
1year <2years	10	40	8	32	0.767	0.682
Two years and more	4	16	5	20		
Admission causes						
Jaundice	13	52	15	60	0.325	0.569
Abdominal swelling	13	52	12	48	0.725	0.395
Dark urine	11	44	10	40	0.082	0.774
Weight loss	12	48	11	44	0.081	0.777
Abdominal pain	15	60	16	64	0.739	0.390
Discoloration stool	6	24	7	28	0.104	0.747
Anorexia	8	32	9	36	0.089	0.765
Nausea	6	24	7	28	0.104	0.747
Fatigue	6	24	9	36	0.857	0.355
Session (N) of RFA						
None	17	68	15	60		
One	6	24	8	32	0.411	0.814
Two	2	8	2	8		
Investigation						
Yes	25	100.0	25	100.0	0.000	1.000

Table (4): Comparison between study and control groups regarding the satisfactory level of total knowledge about RFA pre and post-implementation of self-care guidelines (n=50).

Knowledge domains	Pre				Post				Chi-square*			
	Study		Control		Study		Control		Pre		Post	
	N	%	N	%	N	%	N	%	$X^2 1$	P-value	$X^2 2$	P-value
knowledge about the HCC	13	52	12	48	20	80	12	48	0.080	0.777	5.556	0.018
Knowledge about Radiofrequency ablation	14	56	12	48	21	84	14	56	0.321	0.571	4.667	0.031
knowledge about complication & side effects of RFA	14	56	15	60	22	88	16	64	0.082	0.774	3.947	0.047
Total knowledge	14	56	13	52	21	84	14	56	0.081	0.777	4.667	0.031

$X^2 1$ denotes the comparison between study and control group pre-implementation of self-care guidelines. $X^2 2$ denotes the comparison between the study and control group post-implementation of self-care guidelines.

Table (5): Comparison between study and control groups regarding the total quality of life, pre and post-implementation of self-care guidelines (n=50).

Total QoL	Pre				X^2	P-value	Post				X2	P-value
	Study (n=25)		Control (n=25)				Study (n=25)		Control (n=25)			
	No	%	No	%			No	%	No	%		
Very low	12	48	9	36			0	0	5	20		
Low	9	36	9	36			1	4	13	52		
Moderate	4	16	7	28	1.247	0.536	2	8	6	24	36.496	<0.001
High	0	0	0	0			18	72	1	4		
Very high	0	0	0	0			4	16	0	0		

Table (6): Comparison between study and control groups regarding the satisfactory level of total self-care reported practices pre-and post-implementation of self-care guidelines (n=50).

Self-care dimensions	Pre				Post				Chi-square*			
	Study		Control		Study		Control		Pre		Post	
	N	%	N	%	N	%	N	%	X^21	P-value	X^22	P-value
Physical self-care	17	68	16	64	24	96	16	64	0.089	0.765	8.000	0.005
Psychological self-care	15	60	15	60	22	88	17	68	0.089	0.765	8.000	0.005
Social, family, and functional self-care	13	52	12	48	21	84	14	56	0.080	0.777	4.667	0.031
Spiritual self-care	16	64	15	60	23	92	17	68	0.085	0.771	4.500	0.034
Self-care of daily living activities	11	44	10	40	22	88	14	56	0.082	0.774	6.349	0.012
Total self-care	15	60	14	56	22	88	16	64	0.082	0.774	3.947	0.047

$*X^21$ denotes the comparison between study and control group pre-implementation of self-care guidelines. X^22 denotes the comparison between the study and control group post-implementation of self-care guidelines.

Table (7): Correlation between total reported self-care practices and total QoL with the patients' total knowledge of the study group pre and post-implementation of self-care guidelines (n=25 patients).

Variables	Total knowledge			
	Pre		Post	
	r	P-value	r	P-value
Total self–care practices	0.234	0.003	0.401	<0.001
Total QOL	0.169	0.035	0.372	<0.001

Table (8): Correlation between total self-care practices and total quality of life of the study group pre and post-implementation of self-care guidelines (n=25 patients).

Items	Total QOL			
	Pre		Post	
	r	P-value	r	P-value
Total self-care practice	0.103	0.199	0.482	<0.001

6. Discussion

The research found that more than half of the liver tumors treated by ablation have not recurred. Radiofrequency can be an effective treatment for primary liver cancer, for cancers that have spread to the liver, also used in selected patients whose liver tumors are unsuitable for surgical resection. *(Sherman, 2014)*. Patients with HCC face many physical, psychological, and functional problems that affect their life span and daily activities. The side effects of RFA can often impact patients' health and quality of life, so these patients are needed for self-care guidelines to improve their quality of life *(Izumi, 2011)*. This study aimed to assess the effect of self-care guidelines on quality of life for patients with hepatocellular carcinoma undergoing radiofrequency ablation.

According to the sociodemographic characteristics in the study and control groups, the present study reveals non-statistically significant differences between them. This finding was important to ensure comparability of the two groups and indicate successful randomization of the two groups before intervention.

The present study results reveal that the mean age of the study group was 44.57±5.12, while the mean age in the control group was 45.3±4.87. This finding is consistent with *Kew (2002)* in a study entitled **"**Epidemiology of hepatocellular carcinoma," which founded that the incidence of HCC generally increases with increasing age.

Also, this finding is supported by *Shaker et al. (2013)* in this study entitled "Epidemiological characteristics of hepatocellular carcinoma in Egypt: A retrospective analysis of 1313 cases". They stated that the mean age of HCC patients was 56.2±8.6 years, with a median age of 56 years. The highest rates were observed at ages between 41 to 60 years. In comparison with current study findings, it was observed that the current sample was younger, which might be indicated to the spread of HCC at a younger age that might need further exploration and investigation.

Concerning the patient family history of the study and control groups, more than two-thirds of them had no family history of or hepatitis C. This result clarifies that the HCC cause is an infection, not genetic. However, this finding conflicted with *Li et al. (2016)* in a study entitled "Increased risk of nonalcoholic fatty liver diseases with occupational stress in Chinese," and reported that more than two-thirds of the study had a family history of hepatitis C.

This finding was in the same line with *Abdelaziz et al. (2014)* in the research article entitled "Survival and prognostic factors for hepatocellular carcinoma: An Egyptian multidisciplinary clinic experience." They mentioned that the minority of the patients had no positive family history of HCC.

Regarding present history, the current study reveals that less than one-half of the patients in the study and control groups were discovered their disease from month to less than one year. This result could be because, in the early stages, HCC may not cause any symptoms, which makes early diagnosis difficult. The earlier HCC is diagnosed, the more effective treatment will be and the better the long-term outcome. This finding was supported by *Mustafa et al. (2013)* in a study entitled "Biomarker discovery for early detection of hepatocellular carcinoma in hepatitis C-infected patients," who stated that the poor survival rate is largely due to late-stage diagnosis. Also, it could be due to the follow-up culture being rare among Egyptians, which is consistent with *Frank et al. (2000),* who recommended that it is necessary to raise awareness of people about the importance of regular medical checkups for early detection of cancer.

Concerning hospital admission causes, nearly two-thirds of patients in the study and control groups were admitted to the hospital due to abdominal pain, and more than one-half of them had jaundice. This result indicates the most apparent, important symptoms, causing problems to the patient and forcing him to seek medical help. These findings follow *Abdel-Wahab et al. (2010),* who showed that most cases complained of right hypochondria pain.

Regarding the laboratory investigation, the current study shows that all the patients in the study and control groups performed relevant investigations, which are routine investigations requested by the physician in the current study setting. *American Cancer Society (2017)* assured that the oncology doctor should pay special attention to some investigations to diagnose HCC patients correctly, like CBC, Blood alpha-fetoprotein, Chest X-ray, Ultrasound, CT scan, and MRI scan.

Concerning patients' level of total knowledge regarding HCC, RFA, and complications, the current study shows that around half of both groups had a satisfactory level of total knowledge with a non-statistically significant difference between the two groups pre-intervention. Most of the study group had a satisfactory level of knowledge compared to the control with a statistically significant difference at (P< 0.05) post-implementation self-care guidelines. This finding may be due to a lack of knowledge about RFA and the absence of an Arabic guidelines book in the unit to guide patients. This finding assures the importance of patients'

active participation in self-care to acquire knowledge about RFA and improve patient satisfaction.

This finding agrees with *Awad (2013)* in research entitled *"Effect of nursing instructions for patients with liver cancer undergoing radiofrequency ablation,"* who reported that nearly two-thirds of the patients at two groups (study and control) had inadequate knowledge regarding (RFA) therapy at pre guidelines with no statistically significant differences. However, the majority of the study group had satisfactory knowledge of RFA therapy post-implementation nursing instructions compared to the controls.

Concerning the total quality of life, the current study shows that no one of the patients in the study and control groups had a high score of total dimensions of QoL with no statistically significant differences between the two groups pre-implementation of self-care guidelines. In comparison, less than three quarters in the study group compared with the controls with a highly significant difference post-implementation of self-care guidelines at (P≤ 0.001). This result could be due to healthy practices taught to the studied patients, which led to improving their health and QoL.

This result is agreed with *Marzuk (2017)* in the study entitled **"**Educational program on quality of life for patients with cancer under oral chemotherapy," who reported that there were three-quarters of the patients in the study group have a good quality of life regarding the total dimension of QoL post-implementation of self-care guidelines.

Regarding the satisfactory level of total self-care reported practices regarding physical, psychological, emotional, social, functional, spiritual, and self-care of daily living activities, the current study reveals that less than two-thirds of study and control groups had a satisfactory level of total self-care practices with no statistically significant differences between both groups pre self -care guidelines implementation at (p>0.05), which improved to the majority of patients in the study group compared to the controls with a statistically significant difference between both groups post-implementation self-care guidelines at (P< 0.047). This finding might be attributed to the influence of self-care guidelines on improving patients' self-care practices. On the other hand, this result may be due to the positive influence of self-care guidelines which improved their knowledge, added to that practicing the self-care practices helped patients to deal with her/his adverse effects at home.

This finding is supported by the finding of *Loerzel (2018)*, who found a positive influence of self-management strategies on symptom management and patient outcomes, in an article entitled "Symptom self-management strategies used by older adults receiving treatment for Cancer."

Concerning correlations between patients' level of knowledge, self-care practice, and quality of life of patients in the study group pre and post-implementation of self-care guidelines. The current study finds a highly statistically significant positive correlation between total self-care practices and total QoL with their total knowledge of the study group pre/post-implementation of self-care guidelines at (p<0.001). Although this result might reflect the

association between the three variables, it might affect the other when one variable changed.

These findings are in harmony with the study about "Symptom self-management: Strategies used by older adults receiving treatment for cancer" by *Loerzel (2018)*, who found a statistically significant relationship between using self-management strategies by the studied patients and associated symptoms cancer treatment.

Concerning correlations, total self-care practices with their total quality of life of patients in the study group pre and post-implementation of self-care guidelines, the current study finds a highly statistically significant positive correlation between patients' total self-care practices with their total quality of life in the study group post-self-care guidelines implementation at (p<0.001). It could be due to practicing the relevant self-care practices that improve the health and decrease the burden of symptoms added to that the follow up by the researcher and answering the patients' questions lead to improvement of their QoL.

Finally, the study results support the research hypothesis that the implementation of self-care guidelines significantly positively affects the quality of life for patients with hepatocellular carcinoma undergoing radiofrequency ablation.

7. Conclusion

Based on the present study's findings, it can be concluded that the implementation of self-care guidelines for patients with hepatocellular carcinoma undergoing radiofrequency ablation has a statistically significant positive effect on study group quality of life, which supports the stated hypothesis.

8. Recommendations

- A simplified, illustrated, and comprehensive Arabic booklet including self-care guidelines should be available for patients with hepatocellular carcinoma undergoing radiofrequency ablation.
- Replication of the current study on a larger probability sample is recommended to achieve generalization of the results.
- Further studies to assess factors affecting the quality of life for patients with hepatocellular carcinoma undergoing radiofrequency ablation.

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