Knowledge of Patients with Arrhythmia Undergoing Cardiac Electrophysiology Study

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Abstract:

Background: Electrophysiology study could be used to diagnose and treat a variety of arrhythmias effectively. However, little is known about level of knowledge of patients with arrhythmia undergoing cardiac electrophysiology study. **Aim of the study:** To assess knowledge of patients with arrhythmia undergoing cardiac electrophysiology study. **Research design:** A descriptive exploratory research design was used to conduct this study. **Sample:** Sixty-six adult males and females' patients with arrhythmia undergoing cardiac electrophysiology Study. **Setting:** This study was conducted in the cardiology department at Assuit University Heart Hospital. **Tools: Tool (I):** Patient's assessment structure interview questionnaire. **Tool (II):** knowledge assessment questionnaire. **Results:** More than eighty percentage of the studied patients had unsatisfactory level of knowledge about arrhythmia and electrophysiology study. **Conclusion:** Based on the present study findings, it could be concluded that patients with arrhythmia undergoing electrophysiology study had unsatisfactory level of knowledge regarding the disease process and electrophysiology study. **Recommendations:** Develop and implement nursing care standard for patients with arrhythmia undergoing cardiac electrophysiology study and its application of the current study with more participants in other locations around Egypt to generalize the findings.

Keywords: Arrhythmia, Cardiac electrophysiology study & Knowledge

Introduction:

Arrhythmias are conditions that could affect the production, conduction, or both electrical impulses that travel through the heart. Heart rhythm, heart rate, or both may be disturbed because of arrhythmias. There are different types of arrhythmias include sinus, atrial, junctional, and ventricular arrhythmias, with their various subcategories **(Smeltzer, et al., 2018).** Ventricular arrhythmias, which include single premature ventricular complexes, ventricular escape rhythm, ventricular flutter, prolonged ventricular tachycardia, and fibrillation, all are significant causes of morbidity and mortality **(Cronin, et al., 2020).**

Heart arrhythmias are frequent among people in developing countries. As arrhythmias are common among people of all ages and could happen either with the presence of underlying heart disease or among people with adequate structural function hearts. By 2050, more individuals with AF are expected to live in Africa than in China, the United States, or India, according to some estimates future studies **(Bonny, et al., 2019).**

Ventricular arrhythmias, such as ventricular tachycardia (VT), are – contribute to sudden cardiac death (SCD) (among 6.7 per 100,000 persons/years),

which accounts about 25% of fatalities per year **(Samuel, et al., 2022).** The most common cause of sudden cardiac death among young people is cardiac ventricular arrhythmias **(Offerhaus, et al., 2020).**

The Cardiac Electrophysiology (EP) procedures which involve both the diagnostic tests and the interventional treatment procedures. The diagnostic tests of EP are often performed to determine an arrhythmia diagnosis or the EP mechanism of an existing arrhythmia. Interventional or therapeutic EP studies include endocardial catheter ablation and surgical procedures for both the supraventricular and ventricular arrhythmias. Another interventional EP treatment are implanting the implantable cardioverter-defibrillators to treat ventricular tachycardia (VT) and/or ventricular fibrillation (VF) **(Morton & Fontaine., 2018).**

The main goals of EPS are to describe the electrophysiologic characteristics of the conduction system, trigger, investigate the causes of arrhythmias, and to assess the outcomes of therapeutic interventions. Invasive electrophysiology techniques and/or procedures are routinely used during the clinical management of patients who had supraventricular and/or ventricular arrhythmias **(Majeed & Sattar., 2022).**

Patient preparation for EP studies includes nursing assessment and teaching. Patient's nursing assessment includes measurement of patient's heart rate, rhythm, blood pressure, and peripheral pulses. The patient's emotional condition and attitude toward the EP studies are also assessed as part of the nursing assessment **(Sorajja, et al., 2021)**.

Preprocedural patient's education is best done before hospital admission; it must cover procedure's advantages and disadvantages as well as using the possible alternatives in a way that the patient could understand. The patients' abilities to tolerate discomfort after the procedure could be improved by educating them and their families about the procedure and outlining in detail what they can expected. Patient's written informed consent will be obtained by the nurse (**York, et al., 2019**).

Patient should know that the length of the procedure will be, approximately one hour for the diagnostic EP study and from 2 to 4 hours in case of EP study with ablation. Patient's history should be taken, and a physical examination should be done. All patients should have a baseline ECG and simple blood tests as (serum electrolyte and urea), while patients who using warfarin, need a complete blood count and an international normalized ratio (INR). Additionally, pregnancy test for female who is in childbearing age should be checked within 2 weeks prior to the procedure **(Glover, et al., 2021)**.

Patient preparation also should include an instructions for the patient to discontinue anticoagulation medications at least 3 days before the procedure. As well to stop using antiarrhythmic medications for at least five half-lives. Patient instructed also to fast for 6 hours before the procedure. Additionally, the nurse advised patients to bring clothes only (no jewelry), identification and insurance cards (no credit cards or cash), medications, and any documentation needed related to prior hospitalizations **(Glover, et al.,2021)**.

During the EP study, an intravenous line should be inserted to the patient. A local anesthetic should be given to numb the insertion site. Small, flexible sheaths should be placed to cover the blood vessels at the insertion sites. During the procedure, an X-Ray equipment produces images for the heart should be available to assist the physician in positioning the catheters correctly. An electrical "map" of the heart is created to identify the specific area of the heart where the arrhythmia is coming from. The patient instructed to report any chest discomfort or pressure during the procedure. The sheath and catheters are removed after the EP study is finished, and pressure is subsequently applied on the site of insertion to stop bleeding (**Gillingham., 2018**).

After procedure notify the patient to; lie flat on the back with the affected extremity straight and immobilized to avoid clot displacement and hematoma formation. The patient stays in flat position for 4 hours. Instruct patient to apply light pressure on the dressing when coughing, sneezing, or raising the head of the pillow. One hour after the procedure, the patient could be allowed to have something to eat and drink. Acknowledge the patient to assess insertion site for any signs of bleeding, edema, unusual pain, swelling, local erythema, numbness, tingling, or paresthesia and abnormal discoloration or temperature changes (**Gillingham., 2018**).

Also, the patient resumes their regular daily activities (such walking, bathing, and taking showers) up on discharge from the hospital usually the day after the procedure. The only limitation that patient should avoided is exerting strain or lifting objects weighing more than 10 pounds for five to seven days. Avoid vigorous activity such as playing football, basketball, and exercise for one week. The patient may have some discomfort and bruising in groin and upper leg. This is normal, but if the pain persists or is severe, the patient must seek medical attention. The patient could resume to work in three to four days. Notify patient to reduce fats, sodium, cholesterol in food. Reducing or eliminating intake of caffeine that cause vasoconstriction and increases heart rate **(Shoulders, et al., 2016)**.

Significance of the study:
During the researcher's two years of training at the Cardiology Department at Assuit University Hospital, it was noted that there is a new procedure used to diagnosed and treat cardiac arrhythmia which called (cardiac electrophysiology study) and because there were a limited number of studies on this topic it was necessary to extend the scope of the literature search. It is essential to have sufficient knowledge about what to anticipate prior to, during, and after the procedure. So, the aim of the present study was to assess patient's knowledge about the procedure.

Aim of the Study:
The aim of this study was to:
Assess knowledge of patients with arrhythmia undergoing cardiac electrophysiology study

Research question:
What is the level of knowledge for patients with arrhythmia undergoing cardiac electrophysiology study?

Method
Research design:
A descriptive exploratory research design was used to conduct the present study.

Setting:
The study conducted in the Cardiology Department at Assuit University Heart Hospital.

Sample:
All suggested patients undergoing cardiac electrophysiology studies who visited Assiut University Heart Hospital at the cardiology Department over the duration of six months were included. There were 66 adult male and female patients during this time, with ages ranging from 20 to less than or equal to 65 years old.

Sample size:
A power calculation estimated that in order to detect an effect size of the study group with a p-value < 0.05 and 80% power, confidence level 0.95, so a sample size of (66) patients was needed.

Tools of data collection:
Two tools were utilized to obtain pertinent data for the present study.

Tool (I): Patient's assessment interview questionnaire:
It was designed and developed by the researcher based on the current related national and international literatures it is divided into two parts:

Part I: Patient's Demographic Data: The purpose of this section was to evaluate the patient's demographic data, and consist of (7) items (age, gender, marital status, residence, level of education, occupation and onset of disease).

Part II: Patient's Medical Data:
This part constructed by the researcher, aimed to assess the following: risk factors for arrhythmia which consist of 11 items (family history, hypertension, diabetes mellitus, previous cardiac catheterization, thyroid dysfunction, coronary artery disease, anemia, body mass index, smoking index and duration). present medical history included symptoms and signs (chest pain, syncope, shortness of breath, palpitation, dizziness)

Tool II: Patient knowledge Assessment Questionnaire:
This questionnaire was designed and developed by the researcher based on the following literatures. **(Petra., 2021),** (**Majeed & Sattar., 2022),** **(Hariprasath., 2016), (Kupo, et al., 2020), (Amin, et al., 2020).** It amid to assess patient's knowledge about arrhythmia and electrophysiology study. It was concerned with the following two parts:

Part I: Assess patient's knowledge about arrhythmia which included (6) questions (from 1 to 6) (definition, signs and symptoms, risk factors, hazards, complications, and treatment).

Part II: Assess patient's knowledge about cardiac electrophysiology study which included (9) questions (from 7 to 15); (definition, indications, benefits, contraindications, preparations, time, complications, instructions immediately after, discharge instructions).

Scoring system for knowledge Questionnaire:
The total number of questions was 15, two grades awarded for the complete correct answer, one grade for the incomplete correct answer and zero for incorrect answer. The total knowledge scores were organized as the following.

  -<50%   Unsatisfactory level
  -50% to 60%   Fair level
  -$\geq$ 60%   Satisfactory level

Procedure:
Preparatory phase:
Tools development:
Data collection tools were developed based on reviewing the current, past, local, and international related literature in various aspects using books, articles, periodicals, magazines, and references.

Face validity:
Face validity was done by five specialists who evaluated the tools for clarity, relevance, comprehensiveness, and understanding, including four professors from the Medical-Surgical Nursing team and one professor from the Cardiovascular Medicine department. Minor modifications were made, the necessary correction was done, and the tools were then designed in their final version and reliability tests were conducted.

Reliability of the tool was measured by Cronbach's alpha coefficient (r-0.722).

Implementation phase:
Permission was granted to proceed with the proposed study, the researcher-initiated data collection.

▪ The collection of data lasted over the period from April 2022 to October 2022.
▪ Data were obtained in a single session from each patient undergoing cardiac electrophysiology study in the Cardiovascular Medicine Department during morning shifts, including the patients who were present at these times and were available.
▪ During the session, the researcher introduced herself, described the study's goals, and received the patient's verbal consent to take part in the study on a voluntary basis.
▪ Each patient who participated in the study **(66 patients)** was interviewed individually, the questionnaire was filled by the researcher who asked the patients and documented their answer. The sheet was filled & completed in 20 minutes.

Ethical approval:
Approval to conduct this study was given by the ethical committee (number 374) of the Assiut Faculty of Nursing at 24/3/2022. In order to obtain the required data, the Dean of the Faculty of Nursing sent a formal letter to the Head of the Cardiovascular Department. Oral consent was gained from participants who were willing to participate after being informed about the study's nature and goals.

The study sample was not in danger during the implementation of the research. The study adhered to standard ethical principles in clinical research. Anonymity and confidentiality were guaranteed. Patients had the right to decline from research participation at any time and/or withdraw from the study without giving a reason.

Pilot study:

The pilot study included 10% of the study sample (7 patients) they were used to determine the tools' applicability and clarity as well to estimate time needed to fill in the data collection tools. The data from the pilot study were analyzed; no changes were made to the tools utilized, so the sample selected for the pilot study were involved in the study.

Statistical analysis:

The researcher submitted the data using a personal computer. All data were analyzed using the statistical packages for the social sciences (SPSS) version 23.0 software, and Excel was used to produce the figures. The researcher analyzed, categorized, and then coded the content of each tool. Categorical variables were described as number and percentages, whereas continuous variables were described as the mean and standard deviation (Mean, SD). Chi-square test were used to compare between categorical variables, where comparison between continuous variables was done by t-test. P-value <0.05 was considered significant

Results

Table (1): Frequency and percentage distributions of studied patients' demographic characteristics (n=66).

Demographic Characteristics	n.	%
Age group:		
20<35years	29	43.9
35<50years	31	47.0
50≤65years	6	9.1
Age (means ±SD)	36.31± 9.51	
Gender		
Male	29	43.9
Female	37	56.1
Marital status		
Single	10	15.2
Married	52	78.8
Widow	4	6
Residence		
Rural	51	77.3
Urban	15	22.7
Level of education		
Illiterate	14	21.2
Read and write	28	42.4
Secondary school	15	22.8
High education	9	13.6
Occupation		
Professional work	9	13.6
Manual work	25	37.9
Not work	32	48.5
Onset of disease		
less than 1year	24	36.4
1:5years	34	51.5
>5 years	8	12.1

Table (2): Frequency and percentage distribution of risk factors and past medical history among the studied patients (n=66).

Items	n.	%
Family history of arrhythmia		
Yes	2	3.0
No	64	97.0
Hypertension		
Yes	14	21.2
No	52	78.8
Diabetes mellitus:		
Yes	9	13.6
No	57	86.4
Previous cardiac catheterization:		
Yes	8	12.1
No	58	87.9
Thyroid disturbance:		
Yes	6	9.1
No	60	90.9
Coronary artery disease:		
Yes	13	19.7
No	53	80.3
Anemia:		
Yes	11	16.7
No	55	83.3
Body mass index:		
Normal weight(18.5-24.9Kg)	10	15.2
Over weight(25-29.9Kg)	28	42.4
Obese(30-39.9Kg)	24	36.4
Morbid obesity(>40Kg)	4	6
Smoking:		
Yes	20	30.3
No	46	69.7
Smoking index:		
Mild (<199)	16	24.2
Moderate (200-399)	4	6.1
Duration of smoking:		
Mean ±SD	11.20 ±4.57	
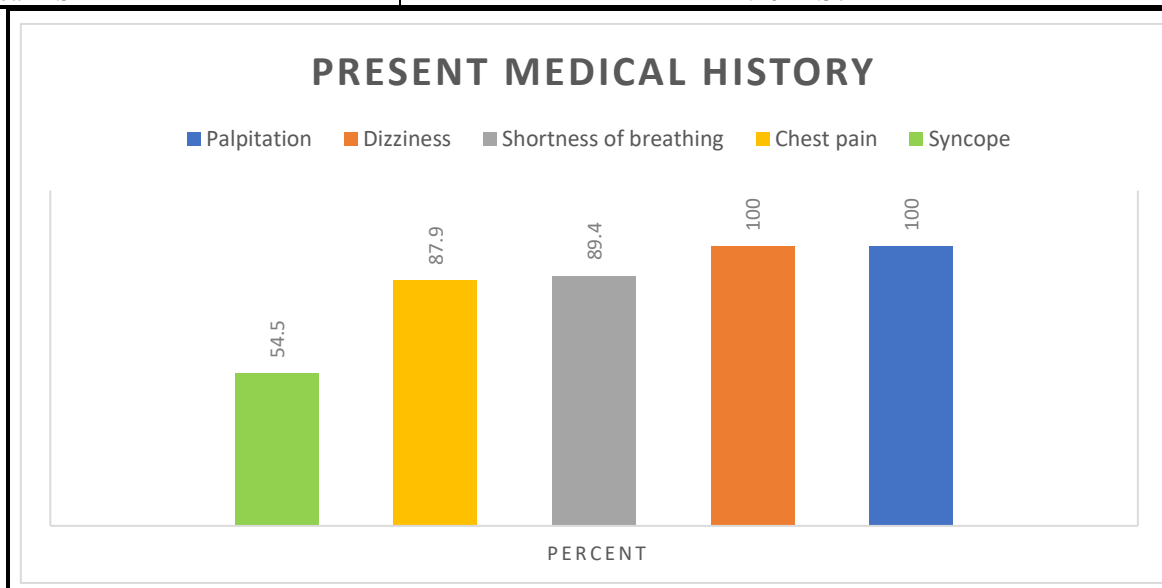
Fig. (1): Frequency distribution of arrhythmia symptoms and signs among the studied patients (n=66)

Table (3): Frequency and percentage distribution of patients' knowledge regarding cardiac arrhythmia (n=66).

Items	Complete correct		Incomplete correct		Incorrect	
	n.	%	n.	%	n.	%
1-Definition of arrhythmia.	15	22.7	40	60.6	11	16.7
2- Symptoms and signs of arrhythmia	33	50.0	31	47.0	2	3.0
3-Risk factors of arrhythmia.	0.00	0.00	16	24.2	50	75.8
4-Hazards of arrhythmia	0.00	0.00	3	4.5	63	95.5
5-Complications of untreated arrhythmia.	0.00	0.00	3	4.5	63	95.5
6-Treatment of arrhythmia.	3	4.5	47	71.2	16	24.3

Table (4): Frequency and percentage distribution of Patients' knowledge regarding cardiac electrophysiology study. (n=66).

Items	Complete correct		Incomplete correct		Incorrect	
	n.	%	n.	%	n.	%
1-Definition of cardiac electrophysiology study.	8	12.1	37	56.1	21	31.8
2-Indications of cardiac electrophysiology study.	1	1.5	43	65.2	22	33.3
3-Benefits cardiac electrophysiology study	0.00	0.00	15	22.7	51	77.3
4-Contraindications of cardiac electrophysiology study	0.00	0.00	0.00	0.00	66	100.0
5-Complications of cardiac electrophysiology study.	0.00	0.00	4	6.1	62	93.9
6-Duration of cardiac electrophysiology study	0.00	0.00	0.00	0.00	66	100.0
7-Preparations before cardiac electrophysiology study	0.00	0.00	65	98.5	1	1.5
8-Instructions followed immediately after cardiac electrophysiology study	6	9.1	2	3.0	58	87.9
9- Instructions followed after discharge.	0.00	0.00	8	12.1	58	87.9

Table (5): Frequency and percentage distribution of the studied sample as regarding to their total knowledge level (n=66)

Total knowledge	n	%
Fair knowledge	8	12.1
Poor knowledge	58	87.9
Mean±SD	6.75± 2.79	

Table (6): Relationship between total level of knowledge and demographic characteristics of the studied patients (n=66).

Variable of demographic data	Level of knowledge				Chi-Square
	Poor level		Fair level		
	n.	%	n.	%	PV
Age group					
20<35years	22	33.3	7	10.6	7.062
35<50years	30	45.5	1	1.5	0.029 *
50-65years	6	9.1	0	0.0	
Level of education					
Illiterate	14	21.2	0	0.0	42.634
Read and write	28	42.5	0	0.0	0.000***
Secondary school	14	21.2	1	1.5	
High education	2	3.0	7	10.6	
Occupation					
Professional work	5	7.6	4	6.1	10.602
Manual work	24	36.4	1	1.5	0.005**
Not working	29	43.9	3	4.5	
Onset of disease					
less than 1year	18	27.3	6	9.1	6.428
1:5years	33	50.0	1	1.5	0.040*
>5 years	7	10.6	1	1.5	

*Chi-Square Test NS= Not significant   P>0.05   *Significant p <0.05   ** significant p≤0.01*
*** high significant p≤0.000*

Table (1): Clarified that, one third (47.0%) of the studied sample, the range of their ages was thirty-five to fifty years old with mean ± SD (36.31± 9.51years), regarding gender it was found that more than half (56.1%)of the studied sample were females, more than three quarter (78.8%) of them were married and living in rural area (77.3%), regarding level of education; more than two-fifths (42.4%) of them were able to read and write, and more than one third (48.5 %) not working. As regarding onset of the disease, it was found that more than half (51.5%) of the studied sample had arrhythmia for period ranged from one to five years.

Table (2): Showed that the vast majority (97%) of the studied sample had no family history from other relatives. Less than one quarter of the studied sample had hypertension (21.2%) and coronary artery disease (19.7%). More than two fifth of the studied sample (42.4%) were overweight. More than two thirds of the studied sample (69.7%) never smoked, but more than one quarter of the studied sample were current smokers.

 Table (3): Revealed that; more than half of the studied patients had incomplete correct knowledge about definition and treatment of arrhythmia (60.6%, 71.2% respectively) while half of the studied patients (50%) had correct knowledge as regarding symptoms and signs of arrhythmia. About three quarter of the studied patients had incorrect knowledge as regarding to risk factors (75.8%). Most of the studied patients had incorrect knowledge regarding hazards of arrhythmia and complications of arrhythmia (95.5%, 95.5% respectively).

Table (4): Showed that; more than half of the studied patients had incomplete correct knowledge regarding definition and indications of cardiac electrophysiology study (56.1%, 65.2% respectively). More than three quarter had incorrect knowledge regarding benefits, instructions followed immediately after electrophysiology study and instructions followed discharge (77.3%, 87.9%, 87.9% respectively). The majority of the studied sample (93.9%) had incorrect knowledge regard complications, while vast majority (98.5) had incomplete correct knowledge regard preparations before the study. All studied patients had incorrect knowledge regarding contraindications and duration of cardiac electrophysiology study (100%).

Table (5): Mentioned that more than three quarters of the sample (87.9%) had unsatisfactory knowledge level with Mean±SD 6.75± 2.79.

Table (6): Showed that there was a statistically significant relation between levels of knowledge about arrhythmia and cardiac electrophysiology study and age of the studied patients with (p<0.02). Also, there was a statistically significant relation between

levels of knowledge about arrhythmia and cardiac electrophysiology study and level of education with (p≤0.000). There was a statistically significant relation between levels of knowledge about arrhythmia and cardiac electrophysiology study and occupation with (p<0.005). There was a statistically significant relation between levels of knowledge about arrhythmia and cardiac electrophysiology study and onset of disease with (p<0.04).

Figure (1): Illustrated that all studied patients complained from palpitation (100%), dizziness (100%), also the vast majority suffered from shortness of breathing (89.4%), chest pain (87.9) but more than half suffered from syncope (54.5%).

Discussion:
The field of cardiac electrophysiology study had rapidly evolved from a focus on diagnostic procedures to emphasis on interventions. Cardiac ablation is currently a common treatment for many cardiac arrhythmias that were previously managed with antiarrhythmic medications, cardio-version, or cardiac surgery **(Shoulders, et al., 2016).**

As regard to the patient's demographic data, the current study verified that the highest percentage of the studied patients their age group ranged from thirty-five to fifty years old and more than three quarter of them were married. This finding is confirmed with the study done by **(Seloma., 2019)** who found that, more than half of the studied patients their ages falling between thirty-five to fifty years old and all of the examined sample were married.

The current study revealed that more than half studied sample were females. This finding is reinforced by the finding in a study done by **(Wood et al., 2017) & (Vasheghani et al., 2018)** who found that, more than half of the studied patients were females.

Concerning the level of education and residency; the current study revealed that more than two-fifths of the studied patients can only read and write and more than three quarter lives in rural area, this finding contradicted a study done by **(Amin et al., 2020)** who found that, more than one third of them had secondary education and around three quarter were urban population.

Regarding occupation, the current study result reported that more than one third of the studied patients do not work. This finding on contrast with the study done by **(Bergtun et al., 2019)** who found that, the highest percentage of the studied patient work. From the resister point of view this difference was due to the difference in cultures because the highest percentage of patients in the current study who were female and uneducated and live in rural area, also the age of the patients plays a role, as there

was a small percentage of patients who were young and still studying.

Regarding onset of the disease, this result showed that more than half of the studied sample were arrhythmic for period ranged from one to five years, this finding was in accordance with the finding of study done by **(Xu et al., 2010)** who found that, more than half of patients discovered that they had arrhythmia since one to five years ago.

As regard to patient's comorbidities, about one fifth of the studied patients had hypertension and coronary artery disease. this finding congruently with a study done by **(Bergtun et al., 2019)** who found that, more than one fifth of the studied patients had hypertension and coronary artery disease. Also, according to a study done by **(Afzal et al., 2019)** who illustrated that, hypertension manifestations were in a form of variety cardiovascular disorders such as heart failure, coronary artery disease, and various arrhythmias involving atrial fibrillation and ventricular arrhythmias.

Regarding the body mass index, more than two fifth of the studied sample had over weight. In accordance with this finding, a study done by **(Glover et al., 2019)** showed that, more than two fifth of their studied sample had over weight. From the researcher point of view this might be due to inactive lifestyles and un health eating patterns. among the studied patients.

As regards to smoking; the current study founded that more than two thirds of the studied sample never smoked while 30.3% were current smoker. This finding similar to a study done by **(Amin et al., 2020)** who found that, about half of the studied sample never smoked and more than one third were quitter. Also in a study done by **(Lippi, et al., 2021)** they reported that, the role of cigarette smoking on cardiac arrhythmia is less clearly defined.

Regarding the present medical history; the finding of the present study illustrated that the highest percentage of the studied patients complained from palpitation, dizziness, shortness of breathing, and chest pain. This finding agrees with the finding of study done by **(De Luna & Baranchuk., 2017)** who reported that palpitations, shortness of breath, fainting spells, chest pain, and fluttering in the chest were all some of the most typical arrhythmia symptoms**.**

As regards to the patients' knowledge about arrhythmia; the present study showed that the majority of the studied patients had fair level of knowledge regarding definition, symptoms and signs of arrhythmia, while the majority of the studied patients had unsatisfactory level of knowledge regarding risk factors, hazards, complications, and treatment of arrhythmia. These findings are reinforced in a study done by **(Elsayed et al., 2015)**

who found that, the majority of the studied sample had unsatisfactory level of knowledge about atrial fibrillation as a most common type of arrhythmia. Also in the same direction, in research done by **(Xu et al., 2010)** who report that, the highest percentage of the studied patients had unsatisfactory level of knowledge about arrhythmia**.** While the current study result disagreed with a study done by **(Toscos et al., 2020)** Who revealed that, most participants (more than half) had a "medium" level of knowledge. From the researcher point of view, this result may be due to lowered educational level of the studied patients.

In relation to the patients' knowledge about cardiac electrophysiology study; the current study demonstrated that the highest percentage of studied patients had unsatisfactory level of knowledge regarding cardiac electrophysiology study (definition, indications, benefits, contraindications, complications, duration, preparations, instructions followed immediately after electrophysiology study and instructions followed discharge). This finding was consistent with the finding of a study done by **(Anderson, et al., 2019) who** report that more than half of the studied sample had unsatisfactory level of knowledge about cardiac electrophysiology study. And also in a study done by **(Chang et al.,2021)** who reported that, patients undergoing cardiac electrophysiology study had significant deficits regarding procedure-related knowledge and need comprehensive education. According to the researcher opinion, these results may be due to lowered educational level of the studied patient.

Regarding correlation between total level of knowledge and patients' demographic characteristics; in the current study, the results showed that there was a statistical significant relation between total level of knowledge and age of the studied patients with ($p<0.02$). similar to this result in a study done by **(Wu et al.,2017)** who report that, the health literacy was associated with age, and usually associated with old age with low health literacy. From the researcher point of view this finding may be due to the ability of young age to gain knowledge through using the internet.

The findings of this study reveal that; a statistically significant relation between total level of knowledge and level of education with ($p≤0.000$). In agreement with this result in a study done by **(Seef et al., 2013)** who mentioned that the total knowledge score was associated to with the educational level. At the same line result of a study done by **(Svendsen et al., 2021)** who reported that, other factors influence the level of health literacy including the educational background. From the researcher point of view this may be related to the ability to self-learning, to acquire, and understand the knowledge.

The current study results delineated that; there was a statistically significant relation between total level of knowledge and occupation with (p<0.005). similar to this result in a study done by **(Mottus et al., 2014)** who reported that, the individual's health literacy competencies may be generated from the educational or occupational experiences, emphasizing that people's social circumstances throughout life had an impact on the development of health literacy competencies. Also, in a study done by **(Furuya et al., 2015)** who found that, communicative/critical health literacy scores differed significantly depending on employment status, as the lowest scores obtained by unemployed people. Also, this result agreed with the result of a study done by **(Liu et al., 2015)** who showed that, considering the connection between educational level and employment status, higher level of former employment was associated with higher health literacy levels.

The result of the present study illustrated that; there was a statistically significant relation between total level of knowledge and onset of disease with (p<0.04). This result is in agreement with study done by **(Bruna et al., (2016)** who reported that, the education and disease duration were statistically significant with (p <0.01 and 0.02, respectively) for the acquisition of knowledge and readiness for self-care.

Conclusion:
According to the findings of the current study, it could be concluded that;
Patients with arrhythmia undergoing cardiac electrophysiology study had unsatisfactory knowledge level regarding disease and procedure.

Recommendations:
Based on the results of the present study the following recommendations could be suggested:
1. Develop and implement nursing care standard for patients with arrhythmia undergoing cardiac electrophysiology study.
2. Replication of the current study on larger probability sample is recommended to achieve generalizability.

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