

Effect of a construction educational protocol on nurses' knowledge, performance and its effect on patient satisfaction undergoing cardiac catheterization

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Abstract

Cardiac Catheterization is a life-threatening health problem, which needs standardized intervention policies, as well as it requires health provider to be skillful and high quality to attain highest effect of management. This study aimed to investigate the effect of a construction educational protocol on nurses' knowledge, performance and its effect on patient satisfaction undergoing cardiac catheterization.

Methods: This quasi-experimental study was conducting in catheterization, intensive care and cardiac care unit at general Port Said hospital in Port Said city – Egypt including all nurses were worked at those units (51) and all patients admitted to cardiac catheterization unit within 6 month. Data was collected through Socio -Demographic data sheet, structured questionnaire to assess knowledge, observational checklist to assess nurses' performance and tools to assess patient sociodemographic data and patient satisfaction.

Results: There was increase nurses knowledge and performance in the post educational protocol in all domains of care regarding cardiac catheterization. While, majority of patients were satisfied for the nursing care before, during and post cardiac catheterization procedure that rendered by nurses that have educational protocol. Also, strong positive correlation between nurses' knowledge and patient satisfaction at post educational protocol with statistical significant differences.

Recommendation: updating knowledge and performance of nurses through implementation continuing educational protocol about cardiac catheterization; strict observation of nurses' performance when caring for cardiac catheterization patients and provision of guidance to improve of satisfaction.

Keywords: Educational Protocol; Knowledge; Performance; Satisfaction; Cardiac Catheterization.

1. Introduction

Cardiac Catheterization (CC) is that procedure that considered golden method for the decision, diagnosis, and dealing with cardiac diseases. Cardiac catheterization procedure is a further important process for assessing and gaining more data about the anatomy and physiology of the cardiac cavities, valves and coronary arteries. This procedure too include studies of the left and right sides of the heart and coronary arteries (Mohammed et al., 2013, Ahmed, 2015). Coronary Angiography (CA) is one of the most common and the best method for diagnosis of coronary artery diseases (Moradi & Adib-Hajbaghery, 2015). Recently cardiac catheterization procedure takes a wide range because of its advantages at little time for patients with heart disease such as Ischemic Heart Disease (IHD), Coronary Artery Disease (CAD), congenital heart disease and valvular heart diseases. So assessing Quality of health care services will determine the degree to which health services for patients with cardiac catheterization and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (Kern, 2011).

The ability to satisfy patients is vital for many reasons. It is mainly helpful for hospitals to establish a patient who is oriented towards

quality health services rather than focusing only on the patient's disease. Improvement in the service quality involuntarily uplifts the reputation gained by the health care institution. Patients' satisfaction is also a valuable competitive tool, to increase staff motivation. (Dayasiri, 2010, Mahdi & Mohammad 2016).

Satisfaction is achieved when the patient's perception of the quality of care and services that they receive in healthcare setting has been positive, satisfying, and meets their expectations. A satisfied patient will recommend center's services to friends and family. While a satisfied patient may express that satisfaction to four or five people, a dissatisfied one on the other hand will complain to twenty or more. Also, satisfied patients are more likely to co-operate with treatment. Measures of patient satisfaction are used to compare health care educational protocols, to evaluate quality of care, and to identify which aspects of a service need improvement. In addition, patient evaluations can help to educate medical staff about their achievements as well as their failure, assisting them to be more responsive to their patients' needs (Al Sharif, 2008).

So, Nurses role is an important in advancement of the patient's information before invasive the procedure (Jamshidi et al., 2009). As a result of information, patients experience stress, apprehension and accordingly hemo-dynamic unsteadiness in response to an insertion of catheter procedures. Besides, as a result of lengthy bed

ridden in one position after cardiac catheterization, report the patient's feelings of altered comfort and intolerance (Ruffinengo, 2009). Also, the information of the patient's may low their psychological disturbance significantly reduce the nursing effort, decrease the hospital length stay, and help the nurses and patients satisfaction, well-being and tolerance related to an percutaneous procedure (Chair et al., 2004). There are numerous approaches of patients' teaching as oral knowledge, written information, audiotapes, booklets and video information (Phillipe et al., 2006). But is a method to be used for patients' teaching is still unidentified. In spite of these procedure or method of cardiac catheterization, the verbal knowledge by nurses and physicians is the mutual routine for patient's information before coronary angioplasty in almost hospitals (Steffenino et al 2007).

1.1 Significance of the study

Coronary vascular diseases (CVDs) are the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.7 million people died from CVDs in 2015, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. Over three quarters of CVD deaths take place in low- and middle-income countries. Out of the 17 million premature deaths (under the age of 70) due to non-communicable diseases in 2015, 82% are in low- and middle-income countries, and 37% are caused by CVDs (WHO, 2017).

So that, cardiac catheterization and coronary artery procedure (angioplasty) are two phenomena of medical technology, which have enhanced the lives of millions of patients. The nurse helps the patient undergoing a cardiac catheterization or interventional procedures do not be overwhelmed or frightened by these treatment. They are strongly and comfortably accomplished in thousands on a daily basis in hospitals. So most patients waiting for cardiac catheterization needed adequate data about the technique and this made them worried and anxious.

1.2. Aim of the study

Aim of the study was to evaluate the effect of a construction educational protocol on nurses' knowledge, performance and its effect on patient satisfaction undergoing cardiac catheterization.

1.3. Hypothesis of the study

- 1) There are improvements of nurses' knowledge post educational protocol than pre educational protocol.
- 2) There are improvements of nurses' performance post educational protocol than pre educational protocol.
- 3) There are high levels of patients' satisfaction after implementation of the educational protocol.

2. Subjects and methods

2.1. Research design a quasi-experimental research design was used to conduct this study

2.2. Setting

This study was conducted at cardiac catheterization, intensive care, cardiac care and emergency units at general Port Said hospital in Port Said city - Egypt.

2.3. Subject

The researchers used a purposive sample to select nurse's participants; 51 nurses were worked in those departments included in the study and all patients admitted to cardiac catheterization for 6

month. Patients with serious conditions and mental health problems, less than 18 years of age or over 70 years of age were excluded.

2.4. Tool of data collection

2.4.1. The study instruments

For the purpose of the present study, the questionnaire was used before and after conducting a special educational protocol designed. Two tools were utilized by the researchers to collect the necessary data. These tools were as following:

2.4.2. Tool I

For nurses. It consists of three parts as the following:

Part I: Socio-demographic data of the nurses was comprised of items related to nurse age, educational qualification, training courses and duration of experience.

Part II: Nurses' knowledge about cardiac catheterization (Safwat, et al 1993). It was used to determine the nurse knowledge regarding cardiac catheterization patients care that composed of 46 questions. It was concerned with items in order to assess patients cardiac catheterization related knowledge that includes items such as definition of catheterization, causes, sites of catheter entry, number of fasting hours before the procedure, medication, investigation before the procedure, type of anesthesia and time of the procedure, position after the procedure, movement after the procedure, frequency of measuring vital signs, nutrition, health education, prevention of complication methods of urination, post procedure complication and management of the complications. Scoring system: - multiple choice (18 questions) and true and false were 28 question with each right answer was given one score and the wrong answer code was (0) this to assess nurses knowledge. While those who obtained score <60% were considered having unsatisfactory nurse in knowledge and satisfactory score of ≥ 60 percentage.

Part III: Observation Checklist for Nurses Caring for patients undergoing cardiac catheterization.

This tool adapted from (Safwat et al., 1993) that used to assess nurses performance. It consists of 31 items for three domains to investigate performance of nurse before, during and after cardiac catheterization procedure that explain the purpose of procedure, identify allergies, obtain consent, vital signs, take weight, preparation for procedure, dressing to puncture, peripheral pulses and signs and symptoms of clot. Scoring system: each items have three point Likert scale used to assess nurses' performance, 1 indicate done correctly, 0 indicate done incorrectly and not done. While, adequate performance level was considered at score of $\geq 60\%$ and inadequate performance level at <60%.

Tool II: For patient (It composed of two parts as following):

Part I: patient socio demographic data. It consists of age, gender, occupation and social status

Part II: patient satisfaction survey was adopted by (Salah et al., 2006) and modified by the researchers. It composes of statements (items) about patient satisfaction related to care before, during and post cardiac catheterization procedure. It includes communication, procedure explanation, patients are asked to provide a response to this statement.

Scoring system: a 5-point Likert scale include completely satisfaction, somewhat satisfied, neutral, somewhat un-satisfaction, and completely un-satisfaction. These will respectively score 5,4,3,2 and 1. While, higher scores indicate greater satisfaction with the procedure is ≥ 60 percentage and the lower scores <60% indicate un-satisfaction with the procedure. Reliability was assessed by Cronbach's alpha coefficient (0.75).

2.5. Pilot study

Was performed on 10% of patients for testing applicability, feasibility and clarity of tools. No presence changes were done, so the 10% of study sample were included in the study.

2.6. Construction educational protocol about cardiac catheterization

It was consist of knowledge and performance regarding nursing role for caring patients undergoing cardiac catheterization. The researchers requested nurses to answer the pre/post questionnaire (tool I) to assess sociodemographic data, knowledge (part II) and performance of nurses through observational checklist (part III) before apply educational protocol.

2.6.1. Educational protocol

It consists of one session every week for 4 weeks to nurses. Each session took 30-45 minute in addition to 15-20 minutes to discuss any questions for nurses. Nurses were allocated into small groups (each group contained [3-5] nurses) to ensure assembly of patients` care. After there, the contents of the educational protocol was given to the nurses after assessment knowledge and observe their performance and explain any queries with them through booklet. Then nurses` knowledge and performance were assessed immediately after educational protocol. Finally assess for patient satisfaction after educational protocol implementation for nurses to investigate the level of patient satisfaction before, during and after cardiac catheterization procedure.

2.7. Ethical consideration

An officially letter from the faculty of nursing was send to accountable authorities of the hospital and approval was attained to conduct this study after explanation of the aim of the study.

Formal consent was taken from the nurses and patients to participate in the study. The researchers firstly introduced themselves to all potential subjects, then explaining the purpose of the study and they were assured that all data collected would be very confidential and only will be used for the study` aim. The researchers stressed that contribution in the study is entirely volunteer and anonymity of the nurse and patients were sure through coding data. Subjects were also knowledgeable that rejection to participate in the study would not disturb their care.

2.8. Statistical analysis

The raw data were coded and entered into SPSS system files (SPSS package version 20, Chicago, USA). Analysis and interpretation of data were conducted. The following statistical measures were used: Descriptive statistics including frequency, distribution, mean and standard deviation were used to describe different characteristics.

Univariate analyses including: Mc Nemar test was used to test the significance of results of paired qualitative variables. Moreover, correlation between knowledge and performance scores of nurses with the score of patient satisfaction post educational protocol. The correlation was done using Pearson correlation coefficient. The significance of the results was at the 5% level of significance.

3. Results

Table (1) Shows that the majority of the age sample was 30<40 years and most of them were diploma nurse. Regarding years of experience 45.1 % of them having 10 \geq years of experience. While 84.32 % of them did not receive any training courses.

Table (2) this table illustrates knowledge score of nurses` regarding management of patients with cardiac catheterization patient's pre and post educational protocol. It shows that there is only statistical significant difference between nurses` knowledge regarding heath education and prevention of complication. Also, the table indicates that satisfactory nurses` knowledge in all domains of care at post than pre implementation educational protocol.

Table (3) Indicates that the majority of the nurses have adequate performance level in post than pre implementation educational protocol in all domains of care. In addition, the table reflects that statistical significant differences of performance score of nurses` regarding management of patients with cardiac catheterization pre and post educational protocol.

Table (4): Says that positive correlation between nurse's performance during, after cardiac catheterization and knowledge score regarding management of patients with cardiac catheterization pre and post educational protocol. In addition, there is a negative correlation between total performance score and knowledge score with no statistical significant differences at pre and post educational protocol.

Table (5) Shows that 50% of the patients age between (30 <40) years, and 89.6% were females, 52.9% of them married. Also it views that most of patients are employed.

Table (6): Represents the level of patient satisfaction regarding cardiac catheterization procedure. This table reveals that the majority of patients were highly satisfaction toward nursing care before, during and after cardiac catheterization procedure.

Table (7): this table illustrates strong positive correlation between nurses` knowledge and patient satisfaction at post educational protocol with statistical significant differences. In addition, the table shows that negative correlation between nurses` performance and patient satisfaction at post educational protocol with no statistical significant difference. Significance: P-vale for Mc Nemar test *significant at P \leq 0.05

R: Pearson correlation coefficient Satisfaction (\geq 60percentage) Unsatisfaction (<60%)

Table 1: Socio-Demographic Characteristics of the Studied Nurses

Socio-demographic characteristics	Studied nurses (n=51)	
	No.	%
Age (years)		
20<30	22	43.1
30<40	23	45.1
40<50	6	11.8
Min-Max	24.0-47.0	
Mean \pm SD	31.6 \pm 5.7	
Educational qualifications		
Diploma nurse	42	82.33
Bachelor	9	17.67
Training courses		
Yes	8	15.68
No	43	84.32
Duration of experience (years)		
1<5	8	15.7
5<10	20	39.2
\geq 10	23	45.1
Min-Max	1.0-22.0	
Mean \pm SD	5.4 \pm 3.8	

Table 2: Number &Percentage of the Knowledge Score of Nurses' Regarding Management of Patients with Cardiac Catheterization Pre and Post Educational Protocol (N= 51)

Knowledge of nurses about cardiac catheterization	Studied nurses (n=51)				p- value
	Pre		Post		
	No.	%	No.	%	
Total knowledge score					
Unsatisfactory	3	5.9	0	0.0	0.250
Satisfactory	48	94.1	50	98.0	
Domains of knowledge					
1) Pre procedure care					
Unsatisfactory	3	5.9	1	2.0	0.625
Satisfactory	48	94.1	48	94.1	
2) During procedure care					
Unsatisfactory	5	9.8	3	5.9	0.687
Satisfactory	46	90.2	48	94.1	
3) Post procedure care					
Unsatisfactory	4	7.8	2	3.9	0.625
Satisfactory	47	92.2	49	96.1	
4) Prevention complications					
Unsatisfactory	9	17.6	1	2.0	0.021*
Satisfactory	42	82.4	50	98.0	
5) Health education					
Unsatisfactory	19	37.3	9	17.6	0.021*
Satisfactory	32	62.7	42	82.4	

Table 3: Performance Score of Nurses' Regarding Management of Patients with Cardiac Catheterization Pre and Post Educational Protocol (N= 51)

Performance of nurses about cardiac catheterization	Studied nurses (n=51)				P- value
	Pre		Post		
	No.	%	No.	%	
Total performance score					
Inadequate	47	92.2	2	3.9	P<0.0001*
Adequate	4	7.8	49	96.1	
Domains					
Total score before cardiac catheterization					
Inadequate	29	56.9	2	3.9	P<0.0001*
Adequate	22	43.1	49	96.1	
Total score during cardiac catheter					
Inadequate	46	90.2	5	9.8	P<0.0001*
Adequate	5	9.8	46	90.2	
Total score after cardiac catheter					
Inadequate	29	56.9	2	3.9	P<0.0001*
Adequate	22	43.1	49	96.1	

Table 4: Correlation between Nurse's Knowledge and Performance Scores Regarding Nurses' Role in Dealing with Cardiac Catheterization Patient's Pre and Post Educational Protocol

Performance of nurses about cardiac catheterization	Knowledge score of studied nurses (n=51)			
	pre r	P	Post r	P
Domain score				
1) Before cardiac catheter	-0.233	0.100	-0.248	0.079
2) During cardiac catheter	0.030	0.836	-0.120	0.402
3) After cardiac catheter	0.042	0.769	0.024	0.869
Total performance score	-0.053	0.714	-0.184	0.197

Table 5: Socio-Demographic Characteristics of the Studied Cardiac Catheterization Patients

Socio-demographic characteristics	Studied patients (n=48)	
	No.	%
Age (years)		
Less than 30	13	27.1
30 <40	24	50.0
40 <50	8	16.7
50 <60	3	6.3
Min-Max	18.0-56.0	
Mean±SD	34.1±7.7	
Gender		
Male	5	10.4
Female	43	89.6
Occupation		
Not employed	23	47.9
Retired	1	2.1
Employed	24	50.0
Social status:		
married	25	52.9
single	19	39.58
widow	4	8.33

Table 6: Number and Percent of Patient Satisfaction Level Regarding Cardiac Catheterization Procedure

Patient satisfaction	Studied patients (n=48)	
	No.	%
Before procedure		
Un-satisfaction	1	2.1
Satisfaction	47	97.9
During procedure		
Un-satisfaction	1	2.1
Satisfaction	47	97.9
After procedure		
Un-satisfaction	2	4.2
Satisfaction	46	95.8
Total satisfaction score		
Un-satisfaction	2	4.2
Satisfaction	46	95.8

Table 7: Correlation between Total Scores of Nurses' Knowledge and Performance Regarding Management of Patients with Cardiac Catheterization and Total Score of Patient Satisfaction at Post Education Protocol

	Score post educational protocol			
	Knowledge score		performance score	
	r	P	r	P
Satisfaction patients score	0.366	0.011*	-0.103	0.487

R: Pearson correlation coefficient *significant at $P \leq 0.05$

4. Discussion

Nursing role is essential in resolve and prevents the patients from post cardiac catheterization problems. Therefore, the capability of nurses about performance and knowledge regarding patient care after cardiac catheterization is very crucial. The current study is strength to evaluate the effect of a construction educational protocol on nurses' knowledge and performance and its effect on patient satisfaction undergoing cardiac catheterization.

This study presented that most of nurses were 30<40 years. This result of view" may be related to that age can be reflected as an age of equilibrium in which the person have profession in decision and develops more adaptation and alert to challenges. In addition to performance during providing of medical treatment, they become high aware of the effect of medical care on the patients; sensitive to their anxious honestly interpret medical actions and predictable outcomes (Maville & Huerta, 2012).

While, concerning educational qualification of the studied sample the results reflected that the majority of the nurses had diploma. These findings were disagreement with that of a study conducted by (Hassan & Aburaghif (2016), Rushdy et al., (2016) found that most level of education were institute of nursing and bachelor nursing degree. While the majority of the study sample having $10 \geq$ years of experience and most of them have not training educational protocol courses (84.32%). This findings consistent with the results of many studies by Abdel Halim (2006), Zaki (2010), Hassan & Aburaghif (2016) who showed that the highest percentage of years' experience were between one to ten years.

Also, the study illustrated that the nurses' satisfactory knowledge in all domains of care at post than pre implementation educational protocol. This findings were supported by (Shini et al., 2018) who reported that the mean score of knowledge after educational protocol higher than mean score before educational protocol in total knowledge regarding the management of patients with coronary angioplasty . It was anecdotal that the implementation of the teaching had effect on knowledge of staff nurses. Also, Abdel-Mowla et al., 2017 found that all nurses post application of the nursing educational brochure were having satisfactory level of knowledge (100%) with statistically significant difference after one month of the intervention. The reasons for lack of knowledge before catheterization may be correlated with lack of persistent teaching educational protocols or discuss about this therapeutic management, direction, continuous assessment of nurses' performance , and collaboration between all health care team members (nurses – physicians) Rushdy et al.,(2010). In the same line, Ishertha (2013) reported that the mean knowledge score was 14.75 in the pre educational protocol while after educational protocol the score was improved to 16.80%

with statistical significant difference between the pre and post educational protocol.

Also, the study result reflected the majority of the nurses have adequate performance level in post than pre implementation educational protocol in all domains of care. This finding was supported by Shini et al., (2018), Abdelmowla et al., (2017) who identified that the nursing care protocol was establish to be good influence in improving the performance amongst nurses regarding the management of patients undergoing coronary angioplasty. In addition the majority of nurses having satisfactory level of performance following application of the nursing educational protocol were statistically significant differences before and after educational protocol in all items. In the same line (Elewa et al., 2017, Abdelmowla et al., 2017) indicated that the majority of the staff nurses were having improve performance in post than pre educational protocol .

The study result indicated that positive correlation between nurses performance during, after cardiac catheterization and nurse's knowledge score regarding management of patients with cardiac catheterization pre and post educational protocol. This result agreed with (Feroze et al., 2017) reported that there was positive correlation between knowledge and practice post cardiac catheterization. Regarding patient sample the finding indicated that the majority of patients are employed. This result disagreement with Shinde and Kapurkar (2014) revealed that most study subjects are unemployed. Also, the result reflected that half of the patients sample age are between (30<40) years. This result contradicted with (Sahib & Mohammad, 2016, Oliveira-Filho et al., 2012, Jung et al., 2009, Rastogi et al., 2004) found that the majority of the study patients within age group (55-65) years old. They indicated that the reason due to alterations of the blood vessels and heart that occur with elderly such as the reduction in elasticity of the blood vessels and the capability to respond to variations in compliance of artery wall that excess the effort needed to drive the blood to the many organs of the body due to subsequent rise in the fight to the pumping action of the heart.

Concerning to the study subjects gender, the results indicate, that the higher percentage of the study sample are female. This result disagreement with (Sahib & Mohammad 2016, Saleem et. al., 2011, Akhtari-Zavare et. al., 2010, Mehta et. al., 2004) found that the highest percentage are male gender differences in the wide possibility of health and illness have been the subject of broad investigation, and are also currently acquisition more attention in nursing.

The current study revealed that half of the studied sampled were married. This is agreement with (Basuny, 2009, Mahgoub et al., 2013) who showed that the highest percentage of the studied sample was married. This may due to the higher level of activities daily life strain on married than single one and that pressure is one of the greatest aggravating features for Coronary artery disease. Together moderate and strong physical and mental events were linked with ischemic.

While, the result showed the level of patient satisfaction regarding the quality of nursing to cardiac catheterization the majority of patients were satisfied for the care before, during and post cardiac catheterization after the educational protocol. In the same line (Arendts, et al., 2006, Basuny, 2009, Abd Elgaphar (2015) who found that patient satisfaction enhancement after educational protocol. Moreover, (Keifi et al., 2016) mentioned that patient education is one core part of nursing role when its implementation lead to low costs, length of hospital stay, and patient's worry and rises patients' satisfaction with the provided healthcare services. Bastable, 2003 added that patient education can increase patients' satisfaction, improve service quality, reduce patients' anxiety, reduce complications, increase participation in healthcare educational protocols, and increase patients' independence in daily activities. While, Habich et al., 2012 assessed relationship between patients' satisfaction and following clinical guidelines had a positive effect on satisfaction of the patients.

Finally, the study reflected that strong positive correlation between nurses' knowledge and patient satisfaction at post educational protocol with statistical significant differences. So, nurses highly satisfied knowledge lead to increase patient teaching and patients' satisfaction, advance quality service, decrease patients' anxiety, decrease complications, improve participation in healthcare educational protocols, and increase patients' independence in activities of daily. These findings consistent with those of others who have recommended that education and communication are among the greatest necessary concerns influencing on patient satisfaction (Arendts et al., 2006, Bastable, 2003). In addition, many studies consistent for this results have shown that teaching can effectively improve patient knowledge and satisfaction.

Mohammed et al., (2016) added that, patient had no data and knowledge regarding cardiac catheterization and the nursing staff member and medical did not offer them. This cause anxiety and distress from procedure. Many studied mention that the effect of providing information to patients on their anxiety and satisfaction level by (Reed et al, 2008 & Elsaid, 2010) lead to decreasing patient anxiety and decrease discomfort before cardiac catheterization by education.

5. Conclusion

Study findings revealed that there was increase nurses knowledge and performance in the post educational protocol in all domains of care regarding cardiac catheterization. While, majority of patients were satisfied for the nursing care before, during and post cardiac catheterization procedure that rendered by nurses that have educational. Finally, concluded that strong positive correlation between nurses' knowledge and patient satisfaction at post educational protocol with statistical significant differences. Therefore, it can be concluded educational protocol construction plays an important role in increasing nurse's level of performance and effective in patient satisfaction.

6. Recommendation

Nurses functioning in cardiac catheterization department should be qualified with augmented knowledge base and hold both interpersonal and technical skills to ensure harmless care. Nurse staff should specifically qualified in the management of cardiac patients along with a subspecialty physician staff to recover the quality care in cardiac catheterization and improve patients' satisfaction with care delivered. Plan for constant educational and training educational protocols occasionally and repeatedly for all health care workers is important.

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