Effectiveness of an Educational Program on Nurses Knowledge Concerning Prevent of Post-Thoracic Surgery Complications at AL-Najaf Teaching Hospitals

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Abstract: _Objectives: To assess nurses' knowledge working in thoracic surgery units and wards toward prevention complications of thoracic surgery and to find out the effectiveness of educational program on Intensive Care Unit and wards nurses knowledge regarding prevention complications of thoracic surgery and socio-demographic information._ _Methodology: A descriptive study was carried out from October 4th, 2016 to August 1st, 2017. A non-probability sample of (50) nurses. The tool of the study included a questionnaire. The data were analyzed through the application of frequencies, percentages, MS and the inferential statistical analysis._ _Results: Results of the study show that the effectiveness of educational program regarding nurses' knowledge about preventing post thoracic surgery complications are good._ _Conclusions: (1) Most of the study sample was females. (2)Mostly the ages of study sample were (21-25) Year. (3) There were highly significant differences between the two periods (pre and post tests) of study sample in all domains of questionnaire._ _Recommendations: The study recommends that nurses need to join special training courses in order to improve their knowledge so as to participate in educating patients with thoracic surgery._

Keywords: Effectiveness, educational program, Thoracic Surgeryt, Intensive Care Unit

1. Introduction

Thoracic surgery repairs diseased or injured organs and tissues in the thoracic cavity. General thoracic surgery deals specifically with disorders of the lungs and esophagus. Cardiothoracic surgery also encompasses disorders of the heart and pericardium. Blunt chest trauma, reflux esophagitis, esophageal cancer, lung transplantation, lung cancer, and emphysema are just a few of the many clinical indications for thoracic surgery [1]. The type of complications and the severity of complications depend on the type of thoracic surgery that has been performed as well as on the patient's pre-operative medical status. Risk stratification can help in predicting the possibility of the post-operative complications. Certain airway complications are more prone to develop with thoracic surgery. Vocal cord injuries, bronchopleural fistulae, pulmonary emboli and post-thoracic surgery non-cardiogenic pulmonary edema are some of the unique complications that occur in this subset of patients. The major pulmonary complications such as atelectasis, bronchospasm and pneumonia can lead to respiratory failure. Pulmonary complications are a major cause of morbidity and mortality during the post-operative period after thoracic surgery [2]. Post-operative complications following pulmonary resection can be categorized as occurring in either the immediate "early" postoperative period or can occur later. The definitions of "early" and "late" vary by complication, but generally refer to complications on post-operative day 0-3 and post-operative day > 3, respectively. Complications will differ depending on the surgical procedure performed [3]. Postoperative care of thoracic surgical patients is a very important part of patient recovery and can be very challenging. Pulmonary complications are responsible for significant numbers of deaths and morbidity of patients undergoing thoracotomy. Thoracic surgery impairs postoperative respiratory function resulting in a relatively high risk of developing postoperative pulmonary complications [4]. The major cause of perioperative morbidity and mortality in the thoracic surgical population is respiratory complications. The major respiratory complications are atelectasis, pneumonia and respiratory failure. These occur in 15–20% of the patients and also account for the majority of the expected 3–4% mortality [5]. The high incidence of preexisting pulmonary disease in the thoracic surgical patient population (eg, chronic obstructive pulmonary disease (COPD), interstitial lung disease), postoperative pulmonary complications (PPCs) after thoracic surgery are common and associated with significant morbidity and mortality. The reported incidence of PPC after thoracic surgery varies between 19% and 59%, contributing to or associated with 84% of deaths [6].

2. Objectives of the Study

1) Assess of nurses knowledge working in thoracic surgery units and wards toward prevention complications of thoracic surgery.
2) Construct an educational program for nurses working in thoracic surgery units and wards at AL - Najaf Teaching Hospitals.
3) Find out the effectiveness of educational program on thoracic surgery units and wards nurses knowledge regarding prevention complications of thoracic surgery.
4) Explore the relationship between certain variable such as age, gender, level of education, years of experience and participation in training course with nurse's knowledge.

3. Methodology

3.1 Administrative arrangement

After getting the approval of the council of Nursing College for the study, the researcher submitted a detailed description including the objectives and methodology of the study to the Ministry of Planning (Central Statistical Organization and to the Al-Najaf Health Directorate (Training and Development department) in order to obtain an official permission.

3.2 Setting of the study

To obtain a comprehensive data, the study was conducted in selected hospitals in The study was conducted at Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate / Al-Sadder Medical City and Al- Furat Hospital ICU and wards departments. Iraq. The study was carried out during the period from (October 4th, 2016 to August 1st, 2017).

3.3 Design of the study

A (quasi experimental) study was carried out to assess the Effectiveness of an Educational Program on nurses' knowledge concerning prevent of post-thoracic surgery complications at AL-Najaf Teaching Hospitals.

3.4 The sample of the study

A non-probability (purposive) sample of (50) nurses was chosen. All of them working in Intensive Care Units and wards of thoracic surgery at AL-Najaf Teaching Hospitals.

3.5 The study instruments

For the purpose of the present study, a questionnaire was conducted by the researcher, The questionnaire was used before and after conducting a special program designed to increase the knowledge of the sample, This knowledge test is composed of (20) multiple choice questions, (30) correct and incorrect questions. The test is covered with the relevant points from the major content area of educational program. For the purpose of this study, the number of correct responses of the knowledge questionnaire is used as the measure of the level of knowledge. Each question is scored as the correct answer get (2) point and the incorrect answer get (1) point. The study instrument consisted of (5) parts. Part I: Socio-demographic information of the nurses. Part II: Anatomy and physiology: It consists of (10) items. Part III: Nurses' knowledge about Thoracic surgery. It included (10) items. Part IV: Nurses' knowledge about the Complications of thoracic surgery. It included (15) items. V: Nurses' knowledge about the Nursing Intervention. It included (15) items.

3.6 Data collection

The data were collected after conducting a pretest questionnaire, applying the program then the posttest by the personal direct intervention of the researcher. The data collection process was performed for the period from the 4th January until the 2nd of April 2017.

3.7 Statistical analysis

The following statistical data were obtained by using the analysis approach (SPSS) to analyze and assess the data of the study Descriptive Data Analysis and Inferential statistical analysis that include F test, T test and ANOVA.

4. Results

Table 1: Distribution of the Study Sample According to their Sociodemographic Characteristic

Demographic data		Study		Control		C.S
		Freq.	%	Freq	%	
Ages (years)	21-25	11	44.0%	16	64.0%	t-test P=0.316 NS
	26-30	10	40.0%	7	28.0%	
	31-35	2	8.0%	0	0.0%	
	36 Up	2	8.0%	2	8.0%	
	Mean ± SD	27.7 ± 6.54		26.08 ± 4.74		
Gender	Male	7	28.0%	10	40.0%	FEPT P=0.37 NS
	Female	18	72.0%	15	60.0%	
Level of education	Preparatory Nursing	5	20.0%	1	4.0%	FEPT P=0.106 NS
	nursing Institute	8	32.0%	14	56.0%	
	Nursing College	12	48.0%	10	40.0%	
Years of service	<= 5	20	80.0%	23	92.0%	t-test P=0.157 NS
	6 - 9	4	16.0%	0	0.0%	
	10 Up	1	4.0%	2	8.0%	
	Mean ± SD	4.92 ± 5.92		3.08 ± 3.06		
years of experience in thoracic wards and ICU	<= 5	21	84.0%	25	100.0%	t-test P=0.004 HS
	6 - 8	3	12.0%	0	0.0%	
	9 Up	1	4.0%	0	0.0%	
	Mean ± SD	3.22 ± 2.59		1.56 ± 0.86		
Training course in thoracic surgery	Yes	9	30.4%	4	16.0%	FEPT P=0.23 NS
	No	16	69.6%	21	84.0%	

Freq= Frequancy, %= percentage

Table (1) reveals that the high percentage of participants in both groups are females (72%) at the study group and (60%) at the control group. In addition, the table shows that the high percentages of participant in both groups at age groups (21-25), (44%) in the study group and (64%) in the control group. Regarding the level of education, the highest percentage is (48%) of the sample in study group are graduated from college, and (56%) of the control group are Nursing Institute graduates. In regards to years of experience, the table shows that (80%) of the sample in study group and (92%) of the sample in control group have less than (5) years of experience in nursing. In regards to years of experience in thoracic units, the results show that the majority of study group (84%) and (100%) of sample in control group have less than (5) years of experience in thoracic units, while (69.6%) of the sample in the study group and (84%) of them in control group have (no) training session regarding thoracic surgery.

Table 2: Distribution of Nurses Responses to CPAP Knowledge Pre Test

No.	Study Group (Pre-Test)				Control Group (Pre-Test)			
	Freq.	%	M.S	Ass.	Freq.	%	M.S	Ass.
Anatomy and physiology								
1.1	3	12.0%	1.88	Good	1	4. %	1.96	Good
	22	88.0%			24	96%		
1.2	9	36.0%	1.64	Good	3	12.0%	1.88	Good
	16	64.0%			22	88.0%		
1.3	5	20.0%	1.80	Good	2	8.0%	1.92	Good
	20	80.0%			23	92.0%		
1.4	18	72.0%	1.28	Poor	16	64.0%	1.36	Good
	7	28.0%			9	36.0%		
1.5	13	52.0%	1.48	Poor	5	20.0%	1.80	Good
	12	48.0%			20	80.0%		
1.6	3	12.0%	1.88	Good	0	0.0%	2.00	Good
	22	88.0%			25	100.0%		
1.7	5	20.0%	1.80	Good	12	48.0%	1.52	Good
	20	80.0%			13	52.0%		
1.8	21	84.0%	1.16	Poor	10	40.0%	1.60	Good
	4	16.0%			15	60.0%		
1.9	7	28.0%	1.72	Good	1	4.0%	1.96	Good
	18	72.0%			24	96.0%		
1.10	6	24.0%	1.76	Good	0	0.0%	2.00	Good
	19	76.0%			25	100.0%		
Thoracic surgery								
2.1	1	4.0%	1.96	Good	0	0.0%	2.00	Good
	24	96.0%			25	100.0%		
2.2	15	60.0%	1.40	Poor	17	68.0%	1.32	Poor
	10	40.0%			8	32.0%		
2.3	16	64.0%	1.36	Poor	22	88.0%	1.12	Poor
	9	36.0%			3	12.0%		
2.4	12	48.0%	1.52	Good	10	40.0%	1.60	Good
	13	52.0%			15	60.0%		
2.5	15	60.0%	1.40	Poor	12	48.0%	1.52	Good
	10	40.0%			13	52.0%		
2.6	13	52.0%	1.48	Poor	14	56.0%	1.44	Poor
	12	48.0%			11	44.0%		
2.7	20	80.0%	1.20	Poor	25	100.0%	1.00	Poor
	5	20.0%			0	0.0%		
2.8	13	52.0%	1.48	Poor	13	52.0%	1.48	Poor
	12	48.0%			12	48.0%		
2.9	12	48.0%	1.52	Good	5	20.0%	1.80	Good
	13	52.0%			20	80.0%		
2.10	17	68.0%	1.32	Poor	22	88.0%	1.12	poor
	8	32.0%			3	12.0%		
Complications								
3.1	3	12.0%	1.88	Good	6	24.0%	1.76	Good
	22	88.0%			19	76.0%		
3.2	7	28.0%	1.72	Good	3	12.0%	1.88	Good
	18	72.0%			22	88.0%		
3.3	5	20.0%	1.80	Good	6	24.0%	1.76	Good
	20	80.0%			19	76.0%		
3.4	5	20.0%	1.80	Good	15	60.0%	1.40	Poor
	20	80.0%			10	40.0%		
3.5	2	8.0%	1.92	Good	0	0.0%	2.00	Good
	23	92.0%			25	100.0%		
3.6	6	24.0%	1.76	Good	2	8.0%	1.92	Good
	19	76.0%			23	92.0%		
3.7	12	48.0%	1.52	Good	15	60.0%	1.40	Poor
	13	52.0%			10	40.0%		
3.8	2	8.0%	1.92	Good	1	4.0%	1.96	Good
	23	92.0%			24	96.0%		
3.9	23	92.0%	1.08	Poor	19	76.0%	1.24	Poor
	2	8.0%			6	24.0%		
3.10	6	24.0%	1.76	Good	2	8.0%	1.92	Good
	19	76.0%			23	92.0%		
3.11	17	68.0%	1.32	Poor	13	52.0%	1.48	Poor
	8	32.0%			12	48.0%		
3.12	4	16.0%	1.84	Good	4	16.0%	1.84	Good
	21	84.0%			21	84.0%		
3.13	12	48.0%	1.52	Good	12	48.0%	1.52	Good
	13	52.0%			13	52.0%		
3.14	10	40.0%	1.60	Good	6	24.0%	1.76	Good
	15	60.0%			19	76.0%		
3.15	10	40.0%	1.60	Good	12	48.0%	1.52	Good
	15	60.0%			13	52.0%		
Nursing Intervention								
4.1	4	16.0%	1.84	Good	1	4.0%	1.96	Good
	21	84.0%			24	96.0%		
4.2	1	4.0%	1.96	Good	25	100.0%	1.00	poor
	24	96.0%			0	0.0%		
4.3	6	24.0%	1.76	Good	20	80.0%	1.20	poor
	19	76.0%			5	20.0%		
4.4	1	4.0%	1.96	Good	0	0.0%	2.00	Good
	24	96.0%			25	100.0%		
4.5	3	12.0%	1.88	Good	8	32.0%	1.68	Good
	22	88.0%			17	68.0%		
4.6	13	52.0%	1.48	Poor	19	76.0%	1.24	poor
	12	48.0%			6	24.0%		
4.7	2	8.0%	1.92	Good	2	8.0%	1.92	Good
	23	92.0%			23	92.0%		
4.8	0	0.0%	2.00	Good	0	0.0%	2.00	Good
	25	100.0%			25	100.0%		
4.9	4	16.0%	1.84	Good	19	76.0%	1.24	poor
	21	84.0%			6	24.0%		
4.10	2	8.0%	1.92	Good	2	8.0%	1.92	Good
	23	92.0%			23	92.0%		
4.11	5	20.0%	1.80	Good	3	12.0%	1.88	Good
	20	80.0%			22	88.0%		
4.12	1	4.0%	1.96	Good	0	0.0%	2.00	Good
	24	96.0%			25	100.0%		
4.13	3	12.0%	1.88	Poor	4	16.0%	1.84	Good
	22	88.0%			21	84.0%		
414	12	48.0%	1.52	Good	13	52.0%	1.48	Poor
	13	52.0%			12	48.0%		
4.15	13	52.0%	1.48	Poor	18	72.0%	1.28	Poor
	12	48.0%			7	28.0%		

f= frequency, %= percentage, M. S= mean of score, Ass. = assessment.

Table (2) reveals the assessment of the study and control group according to the level of knowledge pre-test. Based on statistical mean of scores (1.5), the study results indicate that the general nurses' knowledge at the pre-test is poor at all studied sub-domains in both groups except at anatomy and physiology of control group.

Total score of nurses' knowledge	Study Group (Pre-Test)					Control Group (Pre-Test)				
	Freq.	%	M.S	S.D	Ass.	Freq.	%	M.S	SD	Ass.
	23	92.0%	1.28	0.083	Poor	21	84.0%	1.40	0.097	Poor

f= frequency, %= percentage, M. S= mean of score, Ass.= assessment, SD= Std. Dev.

This table shows the distribution of the study and control groups at level of test (pre test) measurements. Study indicates that majority of the nurses' knowledge at pre-test is poor (mean of score less than 1.5).

Table 3: Distribution of the Study and control Groups according to their Knowledge of Education Program at post-test

No.	Study Group (Post-Test) Freq.	%	M.S	Ass.	Control Group (Post-Test) Freq.	%	M.S	Ass.
				Anatomy and physiology				
1.1	0	0.0%	2.00	Good	1	4.0%	1.96	Good
	25	100.0%			24	96.0%		
1.2	1	4.0%	1.96	Good	3	12.0%	1.88	Good
	24	96.0%			22	88.0%		
1.3	0	0.0%	2.00	Good	1	4.0%	1.96	Good
	25	100.0%			24	96.0%		
1.4	2	8.0%	1.92	Good	17	68.0%	1.32	Good
	23	92.0%			8	32.0%		
1.5	4	16.0%	1.84	Good	8	32.0%	1.68	Good
	21	84.0%			17	68.0%		
1.6	4	16.0%	1.84	Good	2	8.0%	1.92	Good
	21	84.0%			23	92.0%		
1.7	6	24.0%	1.76	Good	12	48.0%	1.52	Good
	19	76.0%			13	52.0%		
1.8	6	24.0%	1.76	Good	12	48.0%	1.52	Good
	19	76.0%			13	52.0%		
1.9	1	4.0%	1.96	Good	4	16.0%	1.84	Good
	24	96.0%			21	84.0%		
1.10	2	8.0%	1.92	Good	2	8.0%	1.92	Good
	23	92.0%			23	92.0%		
				Thoracic surgery				
2.1	1	4.0%	1.96	Good	0	0.0%	1.96	Good
	24	96.0%			25	100.0%		
2.2	10	40.0%	1.40	Poor	17	68.0%	1.28	Poor
	15	60.0%			8	32.0%		
2.3	12	48.0%	1.36	Poor	22	88.0%	1.28	Poor
	13	52.0%			3	12.0%		
2.4	6	24.0%	1.52	Good	10	40.0%	1.56	Good
	19	76.0%			15	60.0%		
2.5	8	32.0%	1.40	Poor	12	48.0%	1.64	Good
	17	68.0%			13	52.0%		
2.6	7	28.0%	1.48	Poor	14	56.0%	1.52	Good
	18	72.0%			11	44.0%		
2.7	10	40.0%	1.20	Poor	25	100.0%	1.04	Poor
	15	60.0%			0	0.0%		
2.8	5	20.0%	1.80	Good	11	44.0%	1.56	Good
	20	80.0%			14	56.0%		
2.9	5	20.0%	1.80	Good	3	12.0%	1.88	Good
	20	80.0%			22	88.0%		
2.10	11	44.0%	1.56	Good	20	80.0%	1.20	poor
	14	65.0%			5	20.0%		
				Complications				
3.1	3	12.0%	1.88	Good	6	24.0%	1.76	Good
	22	88.0%			19	76.0%		
3.2	1	4.0%	1.96	Good	3	12.0%	1.88	Good
	24	96.0%			22	88.0%		
3.3	4	16.0%	1.84	Good	6	24.0%	1.76	Good
	21	84.0%			19	76.0%		
3.4			2.00	Good			1.28	Poor
	0	0.0%			18	72.0%		
3.5	25	100.0%	1.96	Good	7	28.0%	1.96	Good
	1	4.0%			1	4.0%		
3.6	24	96.0%	1.96	Good	24	96.0%	1.88	Good
	1	4.0%			3	12.0%		
3.7	24	96.0%	1.40	Poor	22	88.0%	1.52	Good
	15	60.0%			12	48.0%		
3.8	10	40.0%	1.88	Good	13	52.0%	2.00	Good
	3	12.0%			0	0.0%		
3.9	23	92.0%	1.08	Poor	20	80.0%	1.20	Poor
	2	8.0%			5	20.0%		
3.10	6	24.0%	1.76	Good	3	12.0%	1.88	Good
	19	76.0%			22	88.0%		
3.11	9	36.0%	1.64	Good	18	72.0%	1.28	Poor
	16	64.0%			7	28.0%		
3.12	4	16.0%	1.84	Good	4	16.0%	1.84	Good
	21	84.0%			21	84.0%		
3.13	10	40.0%	1.60	Good	6	24.0%	1.76	Good
	15	60.0%			19	76.0%		
3.14	9	36.0%	1.64	Good	11	44.0%	1.56	Good
	16	64.0%			14	56.0%		
3.15	1	4.0%	1.96	Good	8	32.0%	1.68	Good
	24	96.0%			17	68.0%		
				Nursing Intervention				
4.1	4	16.0%	1.84	Good	1	4.0%	1.96	Good
	21	84.0%			24	96.0%		
4.2	1	4.0%	1.96	Good	25	100.0%	1.00	poor
	24	96.0%			0	0.0%		
4.3	6	24.0%	1.76	Good	20	80.0%	1.20	poor
	19	76.0%			5	20.0%		
4.4	1	4.0%	1.96	Good	0	0.0%	2.00	Good
	24	96.0%			25	100.0%		
4.5	3	12.0%	1.88	Good	8	32.0%	1.68	Good
	22	88.0%			17	68.0%		
4.6	13	52.0%	1.48	Poor	19	76.0%	1.24	poor
	12	48.0%			6	24.0%		
4.7	2	8.0%	1.92	Good	2	8.0%	1.92	Good
	23	92.0%			23	92.0%		
4.8	0	0.0%	2.00	Good	0	0.0%	2.00	Good
	25	100.0%			25	100.0%		
4.9	4	16.0%	1.84	Good	19	76.0%	1.24	poor
	21	84.0%			6	24.0%		
4.10	2	8.0%	1.92	Good	2	8.0%	1.92	Good
	23	92.0%			23	92.0%		
4.11	5	20.0%	1.80	Good	3	12.0%	1.88	Good
	20	80.0%			22	88.0%		
4.12	1	4.0%	1.96	Good	0	0.0%	2.00	Good
	24	96.0%			25	100.0%		
4.13	3	12.0%	1.88	Poor	4	16.0%	1.84	Good
	22	88.0%			21	84.0%		
414	12	48.0%	1.52	Good	13	52.0%	1.48	poor
	13	52.0%			12	48.0%		
4.15	13	52.0%	1.48	Poor	18	72.0%	1.28	poor
	12	48.0%			7	28.0%		

f= frequency, %= percentage, M. S= mean of score, Ass. = assessment.

This table reveals the assessment of the study and control group according to the level of knowledge post-test. Based on statistical mean of scores (1.5), the study results indicate that the general nurses' knowledge at the post-test is good at all studied sub-domains in study group. While at the post-test of the control group results indicate that nurses' knowledge in general is poor at all studied sub-domains except at anatomy and physiology.

Total score of nurses' knowledge	Study Group (Post-Test) Freq	%	M.S	S.D	Ass.	Control Group (Post-Test) Freq	%	M.S	SD	Ass.
	7	28.0%	1.77	0.091	Good	18	72.0%	1.49	0.067	Poor

f= frequency, %= percentage, M. S= mean of score, Ass.= assessment, SD= Std. Dev.

Table reveals the distribution of the study and control group at level of test (post-test) measurements. Study indicates that majority of the nurses' knowledge at post-test is good (mean of score more than 1.5) in study group, While at the post-test of the control group results indicate that nurses' knowledge is poor (mean of score less than 1.5).

Table 4: Statistical comparison of the knowledge between pre and post in both nurse and control group by using paired t test

		No.	Mean ± SD	t	df	Sig. (2-tailed)
Study	Pre	25	1.28 ± 0.22	6.597	24	0.000001
	Post	25	1.77 ± 0.28			(HS)
Control	Pre	25	1.40 ± 0.27	1.027	24	0.315
	Post	25	1.49 ± 0.30			(NS)
Total		50				

No = Number, SD= Std. Dev, df= degree of freedom, T-value (paired t-test value), NS (non-significant difference at p-value more than 0.05.

This table shows that there is a high significant difference between nurses' knowledge, at pre-test and post-test (p-value less than 0.05). In addition, the study results at control group indicate that there is a non-significant difference between nurses' knowledge at pre-test and post-test (p-value more than 0.05).

Table 5: Distribution and Association of Nurses' Knowledge with Their Age

Variables		Nurses' Knowledge	
Age (Years)	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
21-25	11	1.6129 ± 0.09349	1.7364 ± 0.07258
26-30	10	1.6175 ± 0.07227	1.7700 ± 0.10952
31-35	2	1.5417 ± 0.14142	1.6833 ± 0.09428
36 Up	2	1.5750 ± 0.01179	1.7292 ± 0.11196
Total	25	1.6060 ± 0.08332	1.7450 ± 0.09065
C.S.		(ANOVA) F=0.545 df= 3 P= 0.657 (NS)	(ANOVA) F=0.584 df= 3 P= 0.632 (NS)

$\overline{x} \mp S.D.$=**Arithmetic Mean ($\overline{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.**

Table shows that there is no statistical significant association between nurses' knowledge and their age at pre and post-test (p-value > 0.05). There are no differences between nurses' knowledge and their age when analyzed by ANOVA.

Table 6: Distribution and Association of Nurses' Knowledge with Their Gender

Variables		Nurses' Knowledge	
Gender	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
Male	7	1.5881 ± 0.10681	1.7405 ± 0.06132
Female	18	1.6130 ± 0.07477	1.7468 ± 0.10130
Total	25	1.6060 ± 0.08332	1.7450 ± 0.09065
C.S.		t-test (t-value) = - 0.662 df= 23 P= 0.514 (NS)	t-test (t-value) = - 0.152 df= 23 P= 0.88 (NS)

$\overline{x} \mp S.D.$=**Arithmetic Mean ($\overline{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.**

Table reveals the relationship between the nurses' knowledge (pre and post-test) and their gender. The results indicate no significant relationship between nurse's knowledge and gender (p-value > 0.05). There are no differences between nurse's knowledge and gender when analyzed by ANOVA.

Table 7: Distribution and Association of Nurses' Knowledge with Their Level of Education

Variables		Nurses' Knowledge	
Level of Education	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
Preparatory Nursing	5	1.5467 ± 0.06417	1.6883 ± 0.06578
nursing Institute	8	1.6563 ± 0.06573	1.7167 ± 0.06986
Nursing College	12	1.5972 ± 0.08589	1.7875 ± 0.09610
Total	25	1.6060 ± 0.08332	1.7450 ± 0.09065
C.S.		(ANOVA) F=3.33 df= 2 P= 0.04 (S)	(ANOVA) F=3.17 df= 2 P= 0.062 (NS)

$\overline{x} \mp S.D.$=**Arithmetic Mean ($\overline{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value.**

Table shows that there is statistical significant association between nurses' knowledge and their level of education at pre-test (p-value < 0.05), while there is no statistical significant association between nurses' knowledge and their level of education at post-test (p-value > 0.05).

Table 8: Distribution and Association of Nurses' Knowledge with Their years of service

Variables		Nurses' Knowledge	
years of service	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
<= 5	20	1.6146 ± 0.08545	1.7371 ± 0.09210
6 - 9	4	1.5729 ± 0.08260	1.8083 ± 0.05693
10 Up	1	1.5667 ± 0.0	1.6500 ± 0.0
Total	25	1.6060 ± 0.08332	1.7450 ± 0.09065
C.S.		(ANOVA) F=0.511 df= 2 P= 0.607 (NS)	(ANOVA) F=1.694 df= 2 P= 0.207 (NS)

$\overline{x} \mp S.D.$=**Arithmetic Mean ($\overline{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, < = Less than, ≥ = equal and more.**

Table shows that there is no statistical significant association between nurses' knowledge and their years of experience in nursing field at pre and post-test (p-value > 0.05). There are no differences between age mean of score of knowledge when analyzed by ANOVA.

Table 9: Distribution and Association of Nurses' Knowledge with Their years of service in thoracic unit and ICU (study group.

Variables	Nurses' Knowledge		
years of service in thoracic unit and ICU	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
<= 5	21	1.6123 ± 0.08394	1.7371 ± 0.09210
6 - 8	3	1.5750 ± 0.10104	1.8083 ± 0.05693
9 Up	1	1.5667 ± 0.0	1.6500 ± 0.0
Total	25	1.6060 ± 0.08332	1.7450 ± 0.09065
C.S.		(ANOVA) F=0.359 df= 2 P= 0.702 (NS)	(ANOVA) F=2.028 df= 2 P= 0.155 (NS)

$\bar{x} \mp S.D.$=Arithmetic Mean ($\bar{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, < = Less than, ≥ = equal and more.

Table shows that there is no statistical significant association between nurses' knowledge and their years of experience in nursing field at pre and post-test (p-value > 0.05). There are no differences between age mean of score of knowledge when analyzed by ANOVA.

Table 10: Distribution and Association of Nurses' Knowledge with Their Training course

Variables	Nurses' Knowledge		
Training course	No.	Pre-test Mean ± S.D.	Post Mean ± S.D.
yes	9	1.5810 ± 0.069	1.7976 ± 0.07371
no	16	1.6286 ± 0.084	1.7141 ± 0.08994
Total	25	1.6141 ± 0.081	1.7395 ± 0.09243
C.S.		t-test (t-value) = - 1.314 df= 21 P= 0.203 (NS)	t-test (t-value) = 2.154 df= 21 P= 0.043 (S)

$\bar{x} \mp S.D.$=Arithmetic Mean ($\bar{x}$) and Std. Dev. (S.D.), No. = Number of frequencies, F = Fisher test, d.f. = degree of freedom, P = probability value, ≥= equal and more.

Table shows that there is no statistical significant association between nurses' knowledge and their Training course in thoracic surgery at pre -test (p-value > 0.05), While there is statistical significant association between nurses' knowledge and their Training course in thoracic surgery at post-test (p-value < 0.05).

5. Discussion

The data analysis of the present study as shown in Table (1) of the sociodemographic variables reveal that the majority of the participants age that (44%) in the study group and (64%) in the control group were within (21-25) years, this results supported by Azer (2011) study who mentioned that most of his study sample were within (18-29) years [7]. Concerning to the nurses' gender, most of nurses in the study sample were female (72%) and (60%) at the control group these results supported by Hiba (2016) in her thesis "Effectiveness of an education program on nurses knowledge concerning complications prevention of mechanical ventilation at Intensive Care Unit in Al- Hussain Teaching Hospital at

Nassiryah City". who mentioned that the most of his study sample was female [8]. In regard to the level of education, (48%) of the sample in study group are graduated from college, and (56%) of the control group are Nursing Institute graduates, these results agree with Younis 2014 [9]. In relation to the number of years of experiences in nursing field (80%) of the sample in study group and (92%) of the sample in control group have less than (5) years of experience in nursing This result is supported by a study done by Hassan (2012) [10]. As for years of experience in Intensive Care Unit and Wards of thoracic surgery the majority of study group (84%) and (100%) of sample in control group have less than (5) years of experience in thoracic units, these results agree with Younis, (2014) and Hiba (2016) who pointed that most of the nurses in both study and control groups had (1-4) years of experience in cardiac care unit and ICU. the results of the study also reveals that nurses participants in session (69.6%) of the sample in the study group and (84%) of them in control group have (no) training session regarding thoracic surgery. This results supported by Mohammed and others (2015) [11]. The findings of the study sample showed that there is statistical significant association between nurses' level of education and nurses' training course and their knowledge. There is no statistical significant association between nurses' age, nurses' gender, and nurses' years of services years of service in nursing field, and their knowledge at (pre-test, post-test).

6. Conclusions

Most study sample were females, Mostly the ages of study sample were (21-25) Years, Most of the study sample had less than 5 years of experience at AL-Najaf Teaching Hospitals. There was statistical significant between nurses knowledge of educational program (pre and post tests). This result reflects that nurses' knowledge is affected by the educational program. The effectiveness of program was significant with level of nurses' education and training session for study group.

7. Recommendations

The nursing staff working in thoracic unit and ICU must be a least of Bachelorate degree of level of education to prevent thoracic surgery complications. Apply continous intensive training courses for nursing staff to increase there knowledge to prevent complcations. Great emphasis should be directed toward the educationl aspect at thoracic surgery unit by providing educational posters, guidelines, pamphlets and manuals. Policy should be initated to provid special education courses at thoracic surgery unit. Modern educational facilities for nursing team at thoracic surgery unit should be provided to enhance nurses' knowledge.Applying global education structure to promote nurses knowledge

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Author Profile

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