Results

Results of the study will be presented in the following parts :

Part I :- Characteristics of the studied nurses .

Part II :- Nurse's knowledge working with cardiac patients pre / post program implementation .

Part III :- Nurse's attitude toward the patients pre / post program implementation .

Part IV :- Actual nursing practice in medical cardiac units pre / post program implementation .

Part V :- The relation between nurses knowledge , attitude , and practice in relation to their characteristics .

Part VI :- Correlation between nurses knowledge scores , attitude scores and practice scores regarding to their characteristics

Part I :- Characteristics of the studied nurses

Table (1) Number and percentage distribution of the studied nurses according to their characteristics

Nurse's characteristics	Number (70)	Percentage %
Age in year		
20 - 30	60	85.7
30 - 40	10	14.3
40 - 60	0	0
Level of education		
Diploma in Nursing	59	84.3
Diploma in Nursing with specialty	4	5.7
B.Sc. (Bachelor degree)	7	10
B.Sc. Plus higher education	0	0
Marital status		
Single	25	35.7
Married	45	64.3
Years of experience		
<1	3	4.3
1 -	3	4.3
3 -	15	21.4
$5 \leq 7$	49	70
Attending previous training program		
Yes	15	21.4
No	55	78.6

This table shows that , regarding nurse's age , finding of the present study revealed that the majority of them (85.7 %) were in the age group (20 - 30 years) . As regard their level of education it was found that the majority of them (84.3 %) were having diploma in nursing . As regard their marital status it was found that two third of them (64.3 %) were married . It is clear that the years of experience for (70 %) were $5 \leq 7$ years . The majority of studied nurses (78.6 %) did not receive previous training program .

Figure (1) : The percentage distribution of the studied nurses according to their ages
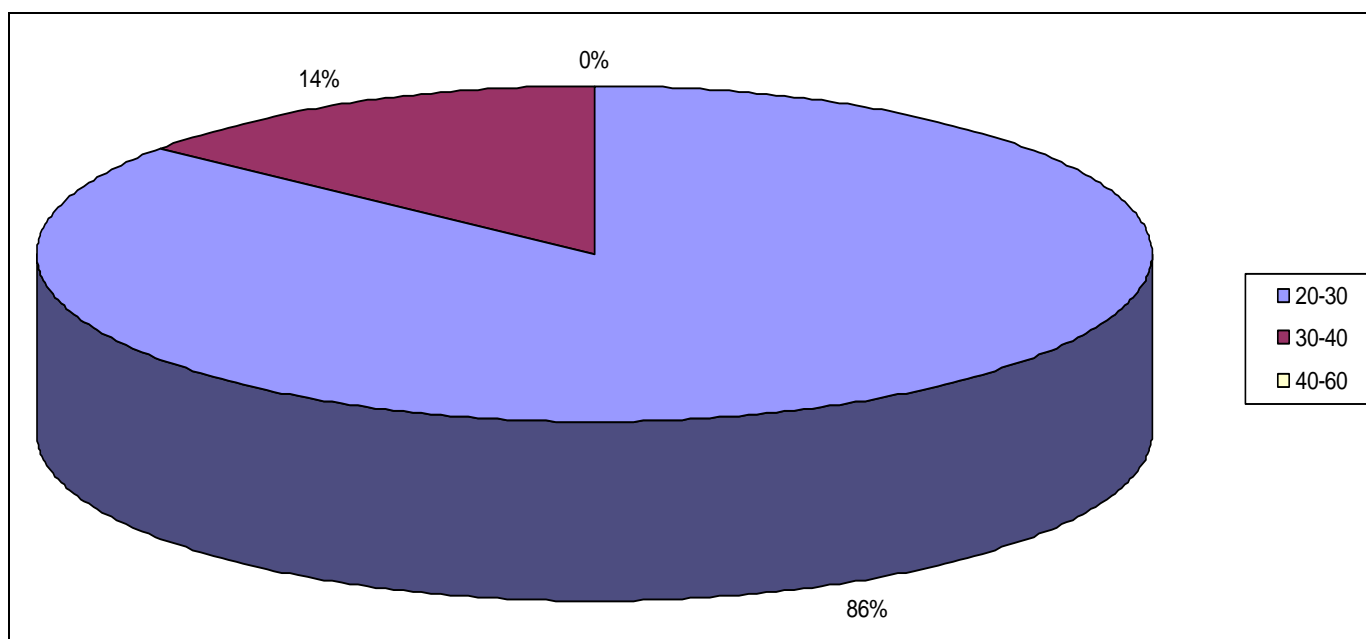

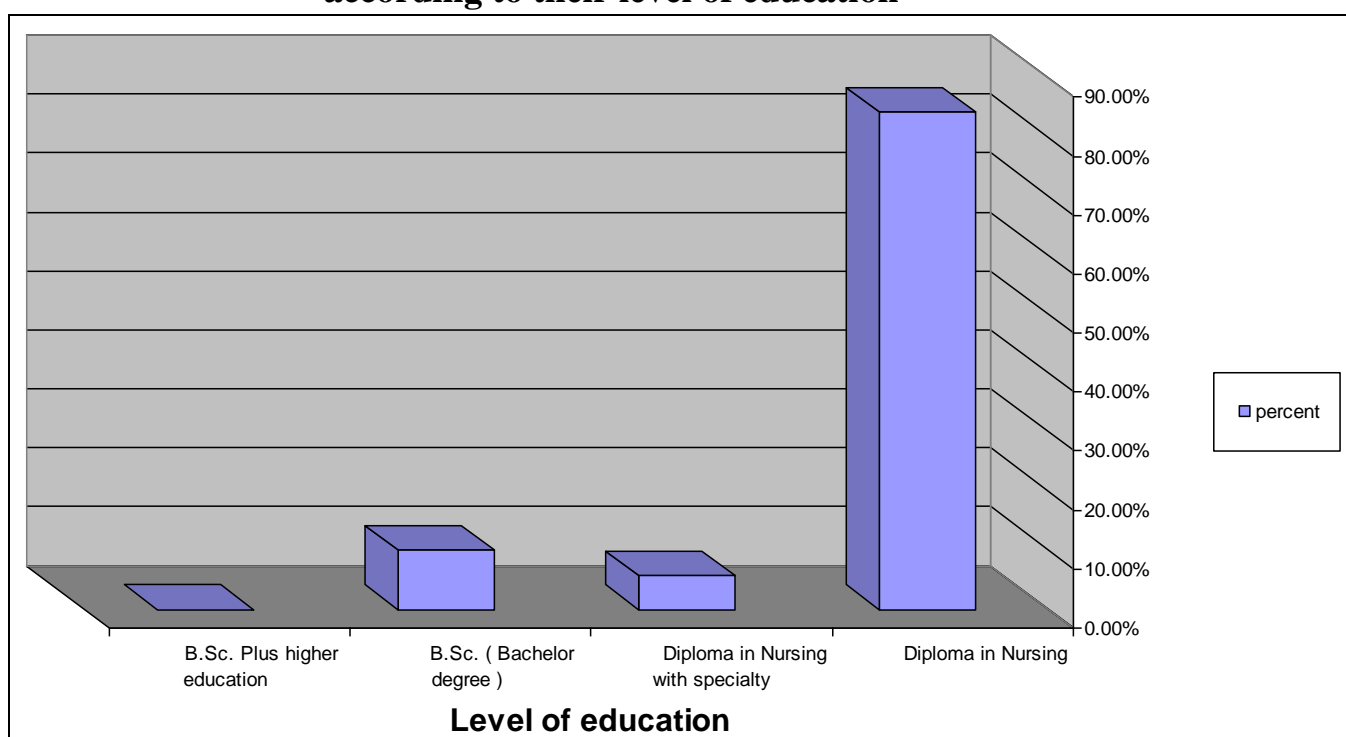**Figure (2) : The percentage distribution of the studied nurses according to their level of education**

Figure (3) : The percentage distribution of the studied nurses

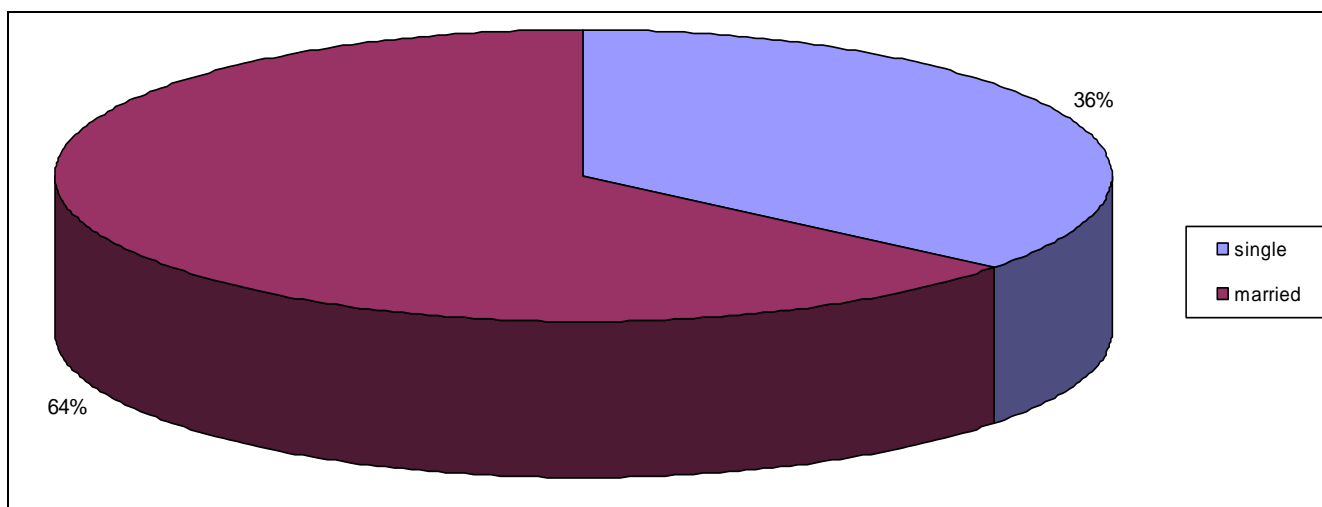**according to their Marital status**

Figure (4) : The percentage distribution of the studied nurses according to their years of experience
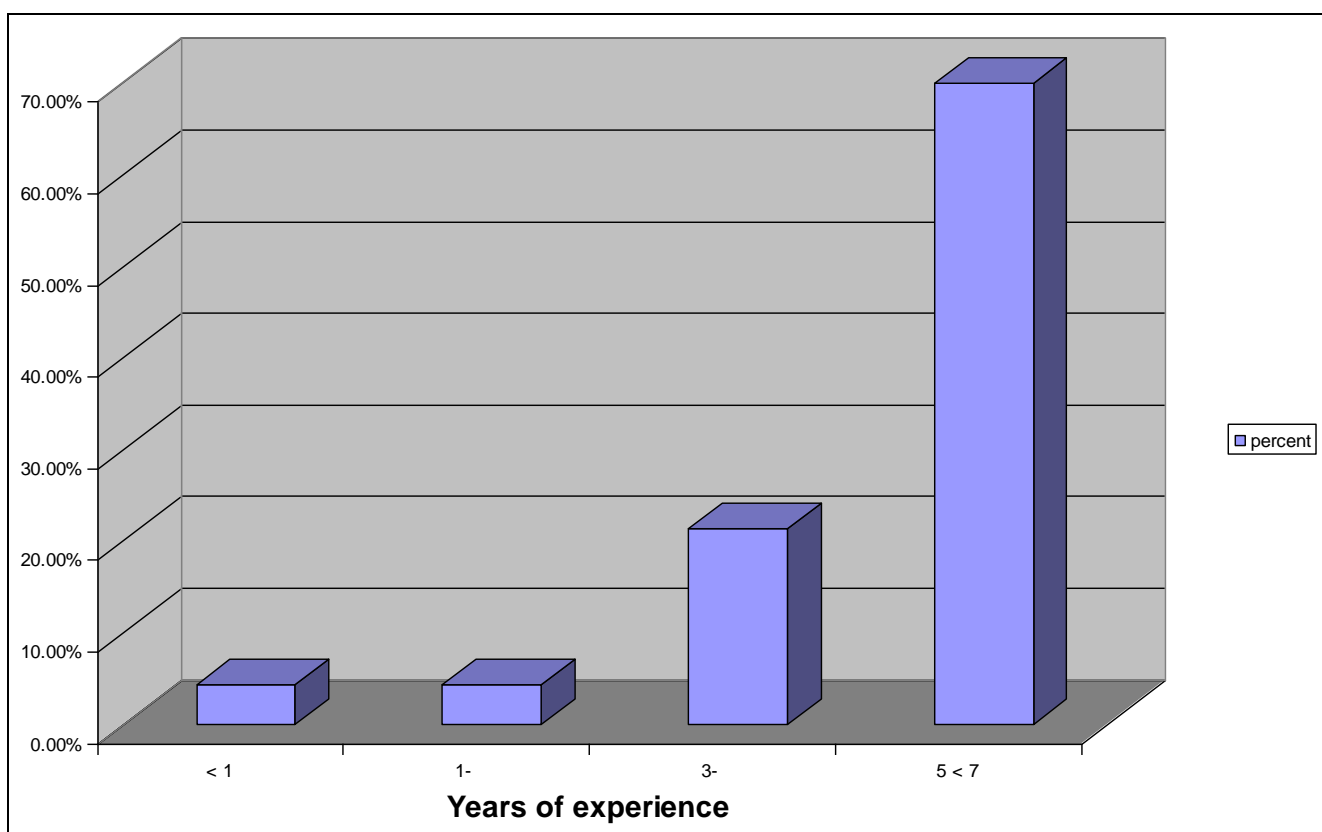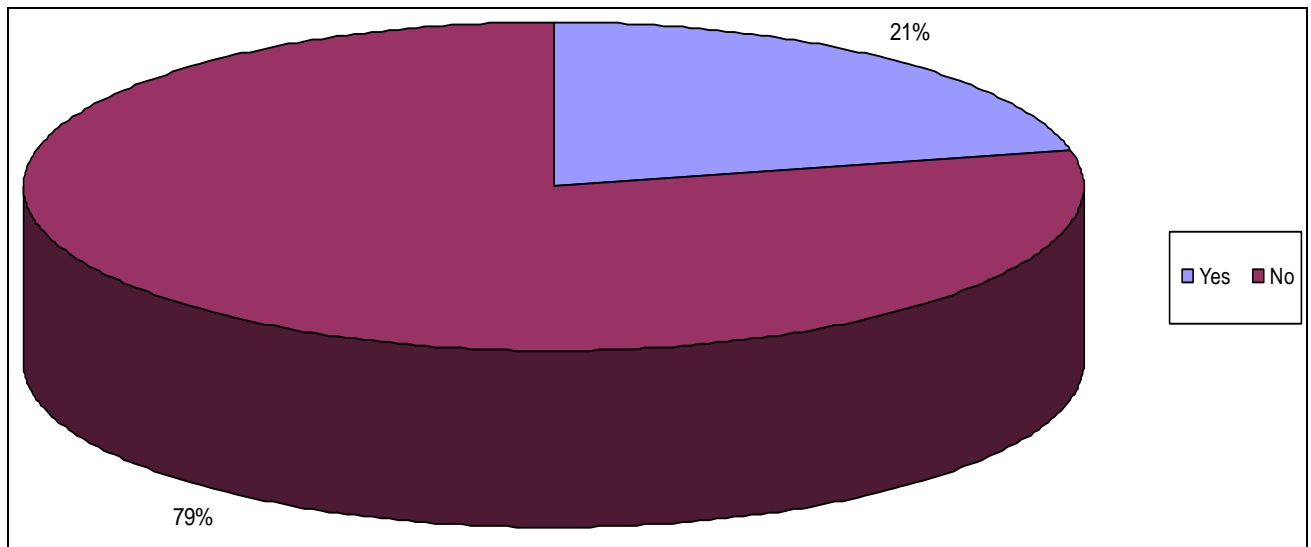

Figure (5) : The percentage distribution of the studied nurses

according to their attending to previous training program

21%

79%

Yes No

Part II :- Nurse's knowledge working with cardiac patients

Table (2) :- Mean score of the nurse's knowledge about nursing care for CAD patients pre/post program implementation

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Patient admission to ICU	5	4.1 ± 0.9	4.7 ± 0.2	0.6 ± 2.7	1.85	> 0.05
Causes of CAD	1	0.6 ± 0.2	0.9 ± 0.05	0.3 ± 1.3	1.93	> 0.05
Signs & symptoms of MI	1	0.8 ± 0.3	0.9 ± 0.01	0.1 ± 0.5	1.67	> 0.05
Chest pain	5	2.9 ± 1.1	4.3 ± 0.6	1.4 ± 0.8	14.6	< 0.001
Nursing care of MI	1	0.5 ± 0.6	0.9 ± 0.03	0.4 ± 0.3	11.1	< 0.001
Patient teaching before discharge from ICU	5	3.2 ± 1.4	4.6 ± 0.1	0.6 ± 1.1	4.56	< 0.001

This table shows that , there were no statistically significant differences between pre and post program implementation in relation to nurse's knowledge about pt. admission to ICU , causes of CAD and signs and symptomsof MI while there were highly statistically significant differences between pre and post program implementation in relation to the nurse's knowledge about chest pain , patient teaching before discharge from ICU and nursing care of MI .

Table (3) :- Mean score of the nurse's knowledge about care of patients

on ventilator pre / post program implementation

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Definition of ventilator	5	3.9 ± 1.4	4.2 ± 0.2	0.3 ± 1.4	1.79	> 0.05
Role of nurse in caring the patients on ventilator	6	3.1 ± 2.3	5.8 ± 0.3	2.7 ± 1.2	18.8	< 0.001
Complications for the patients on ventilator	5	2 ± 0.16	3.4 ± 0.22	1.4 ± 1.1	10.6	< 0.001
Standards for weaning the patient's from the ventilator	4	2.1 ± 0.9	3.8 ± 0.08	1.7 ± 0.8	17.8	< 0.001

This table illustrates that , there were highly statistically significant differences between pre and post program implementation in relation to care of patients on ventilator , except the knowledge related to definition of ventilator , there was no statistical significant difference between pre and post program implementation .

Table (4) :- Mean score of the nurse's knowledge related to care of

patients with central venous pressure pre / post program implementation .

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Definition of C.V.P.	1	0.3 ± 0.4	0.8 ± 0.04	0.5 ± 0.3	13.9	< 0.001
Normal C.V.P.	1	0.5 ± 0.4	0.8 ± 0.09	0.3 ± 0.2	12.9	< 0.001
Increase in C.V.P. refers to.	1	0.2 ± 0.4	0.9 ± 0.1	0.7 ± 0.5	11.7	< 0.001
Decrease in CVP refers to	1	0.5 ± 0.6	0.9 ± 0.03	0.4 ± 0.3	11.1	< 0.001
Complications that occur to cardiac patients from C.V.P.	4	2.1 ± 0.9	3.8 ± 0.07	1.7 ± 0.8	17.8	< 0.001

This table shows that , there were statistically significant differences between pre and post program implementation in relation to nurse's knowledge related to care of patients with central venous pressure .

Table (5) :- Mean score of the studied nurse's knowledge related to care

**of patients with pacemaker pre/ post program
implementation .**

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Definition of pacemaker	5	2.9 ± 0.07	3.7 ± 0.09	0.8 ± 0.4	16.7	< 0.001
Indication	2	0.9 ± 0.08	1.8 ± 0.3	0.9 ± 0.5	15	< 0.001
Teaching	1	0.2 ± 0.3	0.8 ± 0.08	0.6 ± 0.3	16.7	< 0.001

This table shows that , there were statistically significant differences between pre and post program implementation in relation to nurse's knowledge related to care of patients with pacemaker .

Table (6) :- Mean score of the nurse's knowledge about nursing care

during cardio – pulmonary resuscitation pre / post program implementation .

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Role of nurse during C.P.R.	1	0.6 ± 0.1	0.8 ± 0.09	0.2 ± 0.1	16.7	< 0.001
Position of the patient during mouth to mouth breathing	1	0.3 ± 0.6	0.9 ± 0.01	0.6 ± 0.4	12.5	< 0.001
Rate of pressure to rate of breath for adult person when making C.P.R.by one person	1	0.3 ± 0.2	0.9 ± 0.01	0.6 ± 0.3	16.7	< 0.001
Management of dyspnea	1	0.2 ± 0.4	0.9 ± 0.03	0.7 ± 0.5	11.7	< 0.001

This table reveals that , there were highly statistically significant differences between pre and post program implementation in relation to nurse's knowledge about nursing care during cardio – pulmonary resuscitation .

Table (7) :- Mean score of the nurse's knowledge related to care of

patients undergoing cardiac catheterization pre / post program implementation .

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Indication for cardiac catheterization	5	3.4 ± 0.08	3.8 ± 0.09	0.4 ± 1.7	1.97	> 0.05
Care before and after procedure	10	3.9 ± 1.9	8.9 ± 0.9	5 ± 2.3	18.2	< 0.001
Teaching before discharge	5	3.04 ± 0.08	3.9 ± 0.11	0.86 ± 1.1	6.54	< 0.001

This table illustrates that , there were statistically significant differences between pre and post program implementation in relation to nurse's knowledge related to care of patients undergoing cardiac catheterization except the knowledge related to indication for cardiac catheterization there was no statistical significant difference between pre and post program implementation .

Table (8) :- Mean score of the nurse's knowledge related to care of

patients with oxygen therapy pre / post program implementation .

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Indication for O2 therapy	1	0.8 ± 0.3	0.9 ± 0.01	0.1 ± 0.5	1.67	> 0.05
Methods of giving O2 therapy	3	2.7 ± 0.8	2.8 ± 0.09	0.1 ± 0.6	1.39	> 0.05
Complications , safety and precaution	1	0.2 ± 0.4	0.9 ± 0.03	0.7 ± 0.5	11.7	< 0.001

This table shows that , there were no statistically significant differences between pre and post program implementation in relation to nurse's knowledge related to care of patients with oxygen therapy except the knowledge related to complications , safety and precaution there was highly statistical significant difference between pre and post program implementation .

Table (9) :- Number and percentage distribution of the nurses with

satisfactory knowledge regarding pre and post program implementation .

Items	pre - program		post - program		z - test	p - value
	number 70	percentage %	number 70	percentage %		
Nursing management for CAD patients.	15	21.4	55	78.6	4.78	< 0.001
Anatomy , physiology of the heart	30	42.9	44	62.9	1.63	> 0.05
Care of PT. on ventilator	15	21.4	49	70	4.25	< 0.001
Management of patient with C.V.P.	22	31.4	58	82.9	4.02	< 0.001
Care of patient using pacemaker	11	15.7	46	65.7	4.64	< 0.001
Management of patient with C.P.R.	20	28.6	59	84.3	4.39	< 0.001
Nursing management for patient under going cardiac catheterization	10	14.3	38	54.3	4.04	< 0.001
Management of patient with O2 therapy	25	35.7	68	97.1	4.46	< 0.001
Action and side effects of medications	21	30	28	40	1	> 0.05

N.B. Numbers are not mutually exclusive .

This table reveals that , there were highly statistically significant differences between pre and post program implementation in relation to the nurses with satisfactory knowledge , except the knowledge related to anatomy and physiology of the heart and the action and side effects of medications there were no statistically significant differences between pre and post program implementation .

Table (10) :- Common nurses unsatisfactory knowledge pre / post

program implementation

Items	Unsatisfactory knowledge				No. = 70	
	Pre- program		Post- program		z - test	p- value
	No.	%	No.	%		
Causes of chest pain	54	77.2	16	22.8	4.54	< 0.001
Nursing care of MI	55	78.6	15	21.4	4.78	< 0.001
Causes of CAD	60	85.7	12	17.1	8.12	< 0.001
Role of nurse in caring the patients on ventilator	68	97.1	25	35.7	4.46	< 0.001
Complications for the patients on ventilator	66	94.3	15	21.4	8.73	< 0.001
Complications that occur to cardiac patients from C.V.P.	50	71.4	22	31.4	4.74	< 0.001
Role of nurse during CPR	49	70	21	30	3.35	< 0.01
Management of dyspnea	53	75.7	18	25.7	5.92	< 0.001
Indication for cardiac catheterization	48	68.8	23	32.8	4.26	< 0.001
Care before and after cardiac catheterization	56	80	19	27.1	6.28	< 0.001

N.B. Numbers are not mutually exclusive .

This table shows that , there were highly statistically significant differences between pre and post program implementation regarding common nurses unsatisfactory knowledge .

Table (11) :- Mean score of the nurse's level of knowledge regarding pre /

post program implementation .

Items	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Nursing management for CAD patients	26	19.3 ± 3.4	24.1 ± 4.3	4.8 ± 2.3	17.4	< 0.001
Anatomy & physiology of the heart	26	20.5 ± 2.9	21.8 ± 3.7	1.3 ± 5.9	1.84	> 0.05
Care of patient on ventilator	20	11.9 ± 2.3	18.7 ± 1.1	6.8 ± 2.4	23.7	< 0.001
Management of PT. with C.V.P.	18	11.3 ± 1.9	16.9 ± 0.9	5.6 ± 1.9	24.6	< 0.001
Care of PT. using pacemaker	12	9.7 ± 1.8	11.3 ± 2.1	1.6 ± 0.5	26.8	< 0.001
Management of PT. with C.P.R.	11	8.9 ± 1.2	10.7 ± 1.4	1.8 ± 0.8	18.8	< 0.001
Nursing management for PT. under going cardiac catheterization	20	12.1 ± 3.2	18.9 ± 1.2	6.8 ± 2.9	19.6	< 0.001
Management of PT. with O2 therapy	5	3.6 ± 1.4	4.8 ± 1.3	1.2 ± 0.5	20.1	< 0.001
Action and side effects of medications	22	19.9 ± 3.1	21.4 ± 2.9	1.5 ± 6.4	1.95	> 0.05

This table reveals that , there were highly statistically significant differences between pre and post program implementation in relation to the nurse's level of knowledge , except the knowledge related to anatomy and physiology of the heart and the action and side effects of medications there were no statistically significant differences between pre and post program implementation .

Part III :- Nurse's attitude toward the patients care pre / post

program implementation .

Table (12) :- Mean score of the studied nurse's attitude toward the patients pre / post program implementation in medical cardiac units .

Items	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Nursing care have not a direct impact in cardiac patients .	2.3 ± 0.9	4.6 ± 0.3	2.3 ± 0.7	27.5	< 0.001
Providing comfortable & quiet environment has effective role in the progress of the patient	3.1 ± 0.8	4.9 ± 0.1	1.8 ± 0.5	30.1	< 0.001
Prevent interruption during sleep when applying of nursing care plan for the patient .	2.9 ± 0.9	4.3 ± 0.1	1.4 ± 0.6	19.5	< 0.001
Heart disease causes the patient to die in short time	4.32 ± 0.11	4.5 ± 0.08	0.18 ± 0.8	1.88	> 0.05
I think that it is important not to leave the PT. alone during period of pain	2.9 ± 0.9	4.5 ± 0.09	1.6 ± 0.7	19.1	< 0.001
Psychological disturbance of the patient affects the psychological conditions of the persons deal with him	3.2 ± 0.9	4.9 ± 0.01	1.7 ± 0.5	28.4	< 0.001
Explanation to the patient about environment in the hospital around him decreases his troubles	2.9 ± 1.1	4.3 ± 0.05	1.4 ± 0.3	39	< 0.001
The ignorance of patient about his disease is comfortable to deal with him .	3.9 ± 0.2	3.6 ± 0.14	0.3 ± 1.3	1.93	> 0.05
Encourage patient to verbalize his fearing .	2.1 ± 1.4	4.7 ± 0.09	2.6 ± 0.9	24.2	< 0.001
Explaning the case of patient to his family may improve patient psychological condition .	2.3 ± 0.9	4.1 ± 0.03	1.8 ± 0.5	30.1	< 0.001
It is important to help the patient to identify the defence mechanism that helps him to adapt with his disease .	3.4 ± 0.2	4 ± 0.15	0.6 ± 2.6	1.93	> 0.05
Cardiac patients feeling very fear from the connecting apparatus with them in ICU .	4 ± 0.2	4.1 ± 0.14	0.1 ± 0.5	1.67	> 0.05
It is important to help the patient to reassure and trust to nurse .	2.3 ± 1.1	4.4 ± 0.9	1.1 ± 0.7	13.1	< 0.001

N.B. the total score for each question equal 5

Table 12: (contin.)

Items	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	paired- t test	p- value
Staying long periods in the hospital affect the patient's psychological state	2.4 ± 1.1	4.3 ± 0.9	1.9 ± 0.3	21.2	< 0.001
It is important to offer written instructions to the patient when discharging	2.6 ± 0.9	4.5 ± 0.2	1.9 ± 0.7	25.2	< 0.001
The rest of the patient's body increases his feeling's comfortable and decreases the trouble	4.5 ± 0.11	4.8 ± 0.06	0.3 ± 0.05	1.8	> 0.05
The economic status of the patient affects the communication between the nurse , the patient and the nursing care offering	2.6 ± 1.3	4.5 ± 0.8	1.9 ± 0.5	20.4	< 0.001
Explaination nursing procedures increase the patient's tolerance to pain	2.3 ± 1.6	4.8 ± 0.09	2.5 ± 1.5	18.1	< 0.001
It is very difficult to deal with cardiac patient.	4.5 ± 0.12	4.7 ± 0.08	0.2 ± 0.04	1.26	> 0.05
All nurses must have spirit of one team to increase their performance level .	2.8 ± 1.1	4.6 ± 0.09	1.8 ± 1.01	15.6	< 0.001
Feeling of boring when PT. repeat the same complain and the same questions .	3.2 ± 0.19	3.4 ± 0.21	0.2 ± 0.02	1.78	> 0.05
It is important to guide the patient to medical centres to follow up .	2.3 ± 1.2	4.5 ± 0.3	2.2 ± 0.9	19.9	< 0.001
It is important to advise the patient and his family to identify the changes in the life system and how to adapt with this change	2.7 ± 1.1	4.6 ± 0.1	1.9 ± 1	19.4	< 0.001
The psychological status of the patient is affected by his first admission to the ICU , more than those who admissioned before.	2.1 ± 1.2	4.3 ± 0.9	2.2 ± 0.3	18.3	< 0.001
The nurse in ICU must be qualified both theoretically and practically	2.3 ± 0.9	4.4 ± 0.08	2.1 ± 0.8	19.4	< 0.001

N.B. the total score for each question equal 5

Part IV :- Actual nursing practice in medical cardiac units pre / post

program implementation .

Table (13) :- Mean score of the studied nurses actual practice pre / post program implementation .

Nurse's Action	Total score	pre - program $\overline{X} \pm SD$	post - program $\overline{X} \pm SD$	$X \pm SD$ of the difference	paired-t test	p- value
Assessment phase for patients in cardiac units	6	4.5 ± 1.9	5.1 ± 0.8	0.6 ± 2.4	2.09	< 0.05
On going care : A- Maintain effective ventilation	3	2.1 ± 0.8	2.7 ± 0.6	0.6 ± 2.1	2.39	< 0.05
B- Monitor cardiovascular status	5	3.6 ± 1.2	4.1 ± 1.9	0.5 ±1.9	2.2	< 0.05
C- Maintain fluid and electrolyte balance	3	2.3 ± 0.7	2.8 ±0.9	0.5 ± 1.7	2.46	< 0.05
D- Relieve patient's pain	3	2.2 ± 0.6	2.9 ± 0.7	0.7 ± 2.3	2.54	< 0.05
E- Stability of neurologic status	3	2.4 ± 0.5	2.9 ± 0.6	0.5 ± 1.8	2.32	< 0.05
Managing patients on ventilator	21	16.7 ± 3.2	20.1 ± 2.9	3.4 ± 2.8	10.15	< 0.001
Management with oxygen therapy	11	9.4 ±2.1	10.6 ± 3.1	1.2 ± 3.9	2.57	< 0.05
Cardio pulmonary resuscitation	21	17.3 ± 2.9	20.3 ± 2.8	3 ± 3.2	7.84	< 0.001
Care of patient with pacemaker: A- pre - operative	8	5.6 ± 1.9	6.3 ± 2.3	0.7 ± 2.3	2.54	< 0.05
B- post - operative	12	10.3 ± 2.3	11.2 + 2.1	0.9 ± 2.9	2.59	< 0.05
Care of patient under going cardiac catheterization :- pre - operative care :	9	7.1 ± 2.9	8.5 ± 1.8	1.4 ± 0.7	16.7	< 0.001
post - operative cardiac catheterization care	6	3.5 ± 1.9	5.4 ± 0.9	1.9 ± 2.1	7.57	< 0.001
Reading centeral venous pressure	12	10.9 ± 2.3	11.5 ± 2.9	0.6 ± 2.1	2.39	< 0.05
Patient teaching before discharge	14	9.3 ± 2.9	12.8 ± 2.1	3.5 ± 2.4	12.19	< 0.001

This table shows that , there were statistically significant differences between pre and post program implementation in all nurses' actual practice in medical cardiac units .

Table (14) :- Number and percentage distribution of the studied

nurse's practice in relation to care of patient under going cardiac catheterization pre / post program implementation .

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
pre - operative care :						
1- Reinforce the physician's explanation of the procedure and the reason for it						
pre	30	42.9	—	—	40	57.1
post	60	85.7	—	—	10	14.3
z	3.16		—		4.24	
p	< 0.01		—		< 0.001	
2- Prepare of catheter insertion site and draping						
pre	15	21.4	45	64.3	10	14.3
post	50	71.4	10	14.3	10	14.3
z	4.34		4.72		—	
p	< 0.001		< 0.001		—	
3- Instruct the client on how he or she can assist with the procedure following physician's instruction e.g. coughing , deep breathing , moving legs , hold breath , lying still						
pre	16	22.9	23	32.9	31	44.3
post	45	64.3	—	—	25	35.7
z	3.71		—		0.8	
p	< 0.001		—		> 0.05	
4- Explain the post procedural routine .						
pre	20	28.6	40	57.1	10	14.3
post	62	88.6	2	2.9	6	8.6
z	4.64		5.86		1	
p	< 0.001		< 0.001		> 0.05	

N.B. Numbers are not mutually exclusive .

Table 14 : (contin.)

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
5- Instruct the client to report the following A) Chest pain						
pre	5	7.14	30	42.9	35	50
post	50	71.4	—	—	20	28.6
z	6.07		—		2.02	
p	< 0.001		—		< 0.05	
B) Pain in the limb used for catheter insertion						
pre	20	28.6	30	42.9	20	28.6
post	57	81.4	—	—	13	18.6
z	4.22		—		1.22	
p	< 0.001		—		> 0.05	
C) Palpitations						
pre	5	7.14	20	28.6	45	64.3
post	58	82.9	2	2.9	10	14.3
z	6.8		3.84		4.72	
p	< 0.001		< 0.001		< 0.001	
D) Nausea and vomiting						
pre	7	10	30	42.9	33	47.1
post	51	72.9	—	—	19	27.1
z	5.78		—		1.94	
p	< 0.001		—		< 0.05	
Post - operative cardiac catheterization care : 1- Assess peripheral pulse in all extremities						
pre	10	14.3	—	—	60	85.7
post	52	74.3	—	—	18	25.7
z	5.33		—		4.76	
p	< 0.001		—		< 0.001	

N.B. Numbers are not mutually exclusive .

Table 14 : (contin.)

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
3- Notify the physician about warning signs and symptoms.						
pre	50	71.4	—	—	20	28.6
post	65	92.9	—	—	5	7.14
z	1.4		—		3	
p	> 0.05		—		< 0.01	
4) Monitor the catheter insertion site						
pre	2	2.9	25	35.7	43	61.4
post	56	80	9	12.9	5	7.14
z	7.09		2.74		5.48	
p	< 0.001		< 0.01		< 0.001	
5- Monitor the circulatory status in the distal area nearest the insertion site .						
pre	10	14.3	40	57.1	20	28.6
post	61	87.1	5	7.14	4	5.71
z	6.05		5.22		3.27	
p	< 0.001		< 0.001		< 0.01	
6- Assess occurrence of bleeding:						
pre	5	7.14	30	42.9	35	50
post	63	90	—	—	7	10
z	7.03		—		4.32	
p	< 0.001		—		< 0.001	

N.B. Numbers are not mutually exclusive .

This table shows that , there were statistically significant differences between pre and post program implementation in relation to care of the patient under going cardiac catheterization , except when notifying the physician about warning signs & symptoms , there were no statistically significant differences between pre / post (71.4 %) pre program as compared with (92.9 %) post program respectively.

Table (15) :- Number and percentage distribution of the studied

**nurse's practice in relation to care of patient on
ventilator pre / post program implementation .**

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
1- Check all connections of ventilator						
pre	10	14.3	30	42.9	30	42.9
post	38	54.3	16	22.9	16	22.9
z	4.04		2.06		2.06	
p	< 0.001		< 0.05		< 0.05	
2- Observe endotracheal tube for : Cuff well sealed						
pre	15	21.4	35	50	20	28.6
post	40	57.1	20	28.6	10	14.3
z	3.37		2.02		1.83	
p	< 0.01		< 0.05		< 0.05	
Tube unkinked						
pre	20	28.6	5	7.1	45	64.3
post	42	60	3	4.3	25	35.7
z	2.79		0.71		2.39	
p	< 0.01		> 0.05		< 0.05	
3- Note tidal volume / hour						
pre	5	7.1	10	14.3	55	78.6
post	40	57.1	9	12.9	21	30
z	5.22		0.23		3.9	
p	< 0.001		> 0.05		< 0.001	
4- Check oxygen lines and flow meters hourly						
pre	5	7.1	5	7.1	60	85.7
post	37	52.9	11	15.7	22	31.4
z	4.94		1.5		4.2	
p	< 0.001		> 0.05		< 0.001	

N.B. Numbers are not mutually exclusive .

Table 15 : (contin.)

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
5- Record humidifier volume and refill / 8 hours						
pre	20	28.6	10	14.3	40	57.1
post	45	64.3	5	7.1	20	28.6
z	3.1		1.29		2.58	
p	< 0.01		> 0.05		< 0.01	
6- Check temperature of inspired air						
pre	10	14.3	30	42.9	30	42.9
post	49	70	10	14.3	11	15.7
z	5.08		3.16		2.97	
p	< 0.001		< 0.001		< 0.01	
7- Measure vital signs / 15 minutes						
pre	5	7.1	5	7.1	60	85.7
post	44	62.9	2	2.9	24	34.3
z	5.57		1.13		3.93	
p	< 0.001		> 0.05		< 0.001	
8- Ascultate chest frequently /15 min						
pre	—	—	5	7.1	65	92.9
post	33	47.1	2	2.9	35	50
z	—		1.13		3	
p	—		> 0.05		< 0.01	
9- Note any changes in breath sound						
pre	5	7.1	10	14.3	55	78.6
post	39	55.7	4	5.7	27	38.6
z	5.13		1.6		3.09	
p	< 0.001		> 0.05		< 0.01	
10- Aspirate tracheobronchial tree for 15 seconds						
pre	5	7.1	35	50	30	42.9
post	55	78.6	10	14.3	5	7.1
z	6.45		3.73		4.23	
p	< 0.001		< 0.001		< 0.001	
11- Maintain aseptic technique						
pre	—	—	10	14.3	60	85.7
post	30	42.9	8	11.4	32	45.7
z	—		o.47		2.92	
p	—		> 0.05		< 0.01	

N.B. Numbers are not mutually exclusive .
Table 15 : (contin.)

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
12- Introduce catheter gently during suction						
pre	30	42.9	40	57.1	—	—
post	59	84.3	11	15.7	—	—
z	3.07		4.06		—	
p	< 0.01		< 0.001		—	
13- Manual hyperinflation of lungs with 100% O2 for 2-3 minutes before and after suction .						
pre	—	—	10	14.3	60	85.7
post	40	57.1	6	8.6	24	34.3
z	—		1		3.93	
p	—		> 0.05		< 0.001	
14- Record consistency , color , quantity of sputum suction						
pre	5	7.1	5	7.1	60	85.7
post	52	74.3	2	2.9	16	22.9
z	6.23		1.13		5.05	
p	< 0.001		> 0.5		< 0.001	
15- Mouth care / 4 hourly						
pre	—	—	5	7.1	65	92.9
post	35	50	3	4.3	32	45.7
z	—		0.71		3.35	
p	—		> 0.05		< 0.01	
16- Change respiratory therapy equipment						
pre	5	7.1	10	14.3	55	78.6
post	47	67.1	1	1.4	22	31.4
z	5.85		2.71		3.76	
p	< 0.001		< 0.01		< 0.001	
17- Measure arterial blood gases						
pre	2	2.9	3	4.3	65	92.9
post	52	74.3	1	1.4	17	24.3
z	6.8		1		5.3	
p	< 0.001		> 0.05		< 0.001	

N.B. Numbers are not mutually exclusive .

Table 15 : (contin.)

Nurse's practice	Nurse's number = 70					
	Done correct		Done incorrect		Not done	
	No.	%	No.	%	No.	%
18- Monitor oxygen saturation , through oximeters						
pre	10	14.3	10	14.3	50	71.4
post	57	81.4	4	5.7	9	12.9
z	5.74		1.6		5.34	
p	< 0.001		> 0.05		< 0.001	
19- Changes patient's position / 2 hourly						
pre	10	14.3	20	28.6	40	57.1
post	48	68.6	5	7.1	17	24.3
z	4.99		3		3.05	
p	< 0.001		< 0.01		< 0.01	
20- Help patient to do breathing exercises						
pre	2	2.9	5	7.1	63	90
post	50	71.4	3	4.3	17	24.3
z	6.66		0.71		5.14	
p	< 0.001		> 0.05		< 0.001	
21- Help patient to ambulate as soon as possible						
pre	33	47.1	—	—	37	52.9
post	43	61.3	—	—	27	38.6
z	1.15		—		1.25	
p	> 0.05		—		> 0.05	

N.B. Numbers are not mutually exclusive .

This table illustrates that there were statistically significant differences between pre and post program implementation about nurses care of patient on ventilator , except when helping patient to ambulate as soon as possible , there were no statistically significant differences between pre and post program implementation .

Table (16) :- common nurses neglected practice pre / post program

implementation .

Items	Neglected Practice				No. = 70	
	Pre- program		Post- program		z - test	p- value
	No.	%	No.	%		
Measure vital signs / 15 min.	55	78.6	18	25.7	6.27	< 0.001
Hand washing	66	94.2	20	28.5	7.98	< 0.001
Maintain aseptic technique	62	88.5	10	14.3	8.78	< 0.001
Maintain fluid & electrolyte balance	53	75.7	18	25.7	5.92	< 0.001
Suction tracheobronchial secretions carefully	50	71.4	25	35.7	4.24	< 0.001
Lubricate the tip of the catheter before introduced	56	80	14	20	5.02	< 0.001
Apply post suctioning hyperoxygenation	65	92.8	6	8.6	9.96	< 0.001
Check temperature of inspired air	64	91.4	9	12.8	9.31	< 0.001
Check central venous pressure	52	74.2	18	25.7	4.06	< 0.001
Help patient to do breathing exercises	68	97.1	20	28.5	8.4	< 0.001
Note any changes in breath sound	64	91.4	25	35.7	6.85	< 0.001
Changes patient's position / 2 hour	51	72.8	19	27.1	3.82	< 0.001
Provide pre-operative emotional support	62	88.5	11	15.7	8.62	< 0.001
Post-operative teaching	67	95.7	10	14.3	9.68	< 0.001

N.B. Numbers are not mutually exclusive .

This table illustrates that , there were highly statistically Significant differences between pre and post program implementation regarding the most common neglected practice among nurses .

Part V :- The relation between nurses knowledge , attitude and

practice in relation to their characteristics

Table (17) : **Mean score of nurse's knowledge , attitude and practice in relation to their ages pre / post program implementation .**

Aspect of comparison	Age	Pre-program $\overline{X} \pm SD$	Post-program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	t-value	p-value
Knowledge						
	20 - 30 years	149.3 ±15.3	151.1 ±16.4	1.8 ± 8.1	1.71	> 0.05
	30 - 40 years	152.4 ± 6.3	153.1 ± 8.3	0.7 ± 1.2	1.84	
Attitude						
	20 - 30 years	112.3 ± 6.1	113.1 ± 4.3	0.8 ± 3.2	1.93	> 0.05
	30 - 40 years	113.9 ± 8.4	114.5 ± 9.4	0.6 ± 1.2	1.58	
Practice						
	20 - 30 years	121.5 ± 9.3	122.4 ± 8.5	0.9 ± 3.6	1.93	> 0.05
	30 - 40 years	125.7 ± 8.3	126.2 ± 9.4	0.5 ±0.9	1.76	

This table indicates that , no statistically significant difference was observed between pre and post program implementation between studied nurses' knowledge , attitude and practice regarding their ages .

Figure (6) : The relation between the studied nurses knowledge ,

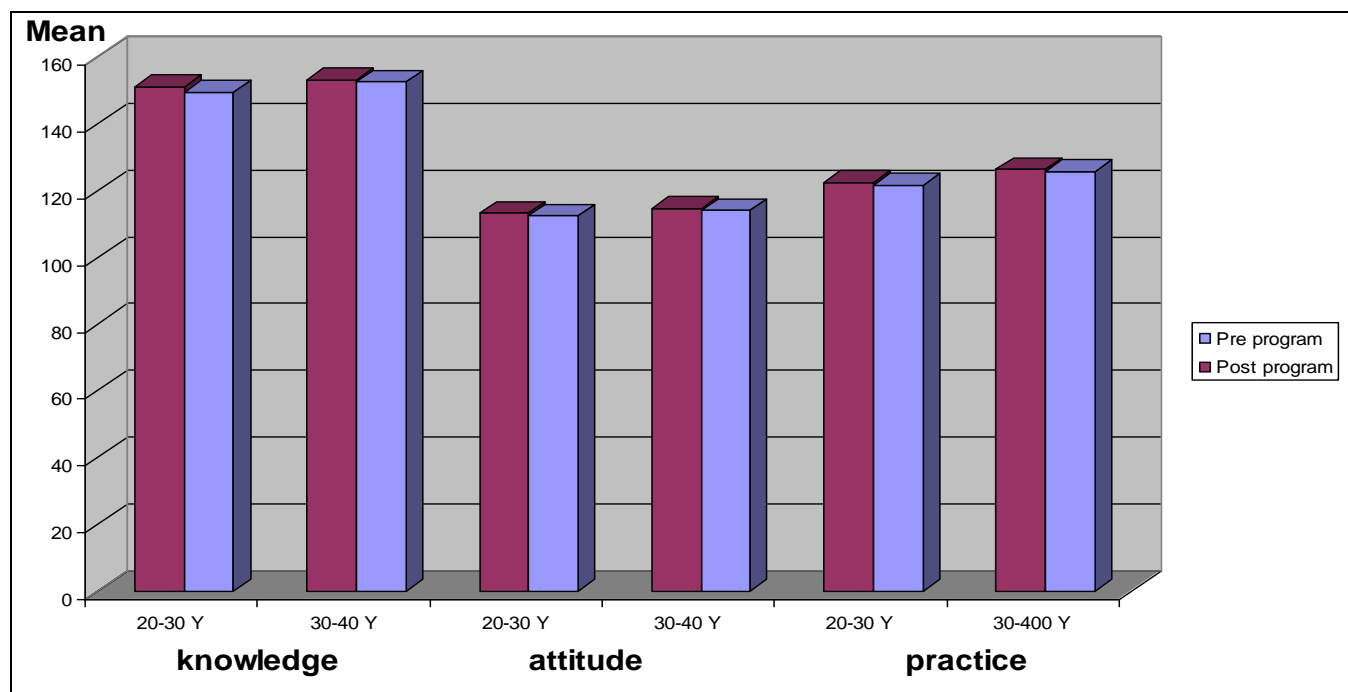**attitude and practice in relation to their ages pre / post program implementation**

Table (18) :- Mean score of the nurse's knowledge , attitude and practice in relation to their level of education pre / post program implementation .

Aspect of comparison	Level of education	Pre-program $\overline{X} \pm SD$	Post-program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	f-value	p-value
Knowledge						
	Diploma in nursing	145.4 ± 20.3	146.1 ±19.3	0.7 ± 1.3	1.83	
	Diploma in nursing with specialty	149.3 ± 18.2	149.9 ±15.4	0.6 ± 1.2	1.33	> 0.05
	Bachelor degree	152.4 ± 8.1	153.1 ± 9.4	0.7 ± 1.2	1.65	
Attitude						
	Diploma in nursing	112.3 ±9.1	113.1 ± 8.1	0.8 ± 3.2	1.96	
	Diploma in nursing with specialty	115.1 ± 8.3	116.2 ± 9.3	1.1 ± 0.7	1.69	> 0.05
	Bachelor degree	118.1 ±4.9	118.9 ± 5.3	0.8 ± 2.2	1.89	
Practice						
	Diploma in nursing	121.2 ± 9.1	121.9 ± 8.3	0.7 ± 3.1	1.9	
	Diploma in nursing with specialty	124.3 ± 8.3	125.1 ± 9.1	0.8 ± 2.1	1.78	> 0.05
	Bachelor degree	127.8 ± 5.6	128.3 ± 8.7	0.5 ± 0.8	1.86	

This table indicates that , there were no statistically significant differences between pre and post program implementation between studied nurses' knowledge , attitude and practice regarding their level of education .

**Figure (7) : The relation between the studied nurses knowledge ,
attitude and practice in relation to their level of
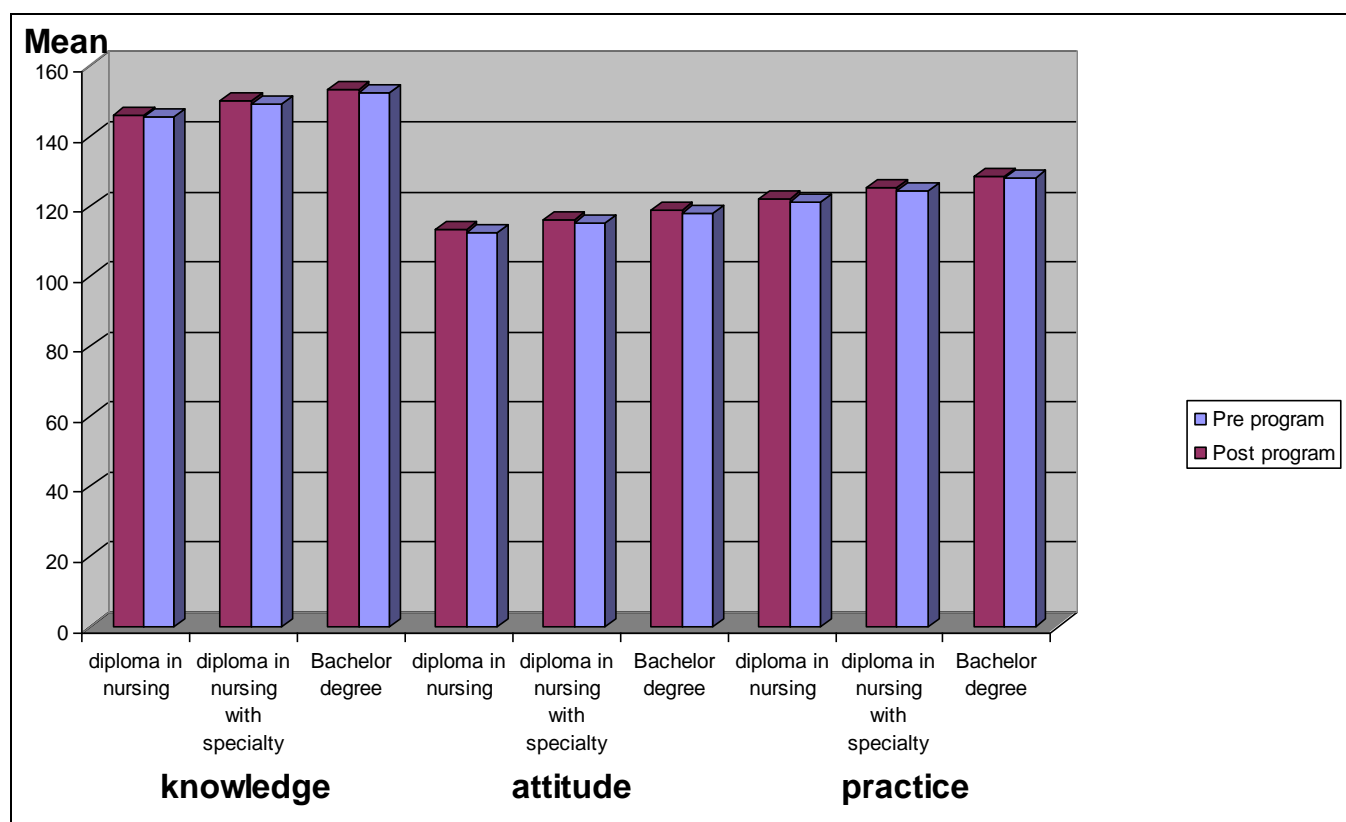education pre / post program implementation**

Table (19) :- Mean score of the nurse's knowledge , attitude and practice in relation to their years of experience pre / post program implementation .

Aspect of comparison	Years of experience	Pre-program $\overline{X} \pm SD$	Post-program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	f-value	p-value
Knowledge						
	< 1	135.5 ± 20.1	136.2 ± 20.5	0.7 ± 3.1	1.9	
	1 -	145.7 ± 19.3	146.3 ± 18.3	0.6 ± 2.6	1.93	> 0.05
	3 -	149.5 ± 22.3	150.1 ± 22.3	0.6 ± 2.7	1.86	
	5 ≤ 7	151.1 ± 18.1	151.9 ± 21.1	0.8 ± 3.5	1.91	
Attitude						
	< 1	112.1 ± 10.3	112.9 ± 9.2	0.8 ± 3.4	1.96	
	1 -	115.2 ± 9.3	116.1 ± 8.1	0.9 ± 3.9	1.93	> 0.05
	3 -	117.1 ± 8.1	117.8 ± 6.3	0.7 ± 3.2	1.83	
	5 ≤ 7	119.3 ± 6.3	120.1 ± 8.1	0.8 ± 3.4	1.96	
Practice						
	< 1	109.1 ± 10.3	109.8 ± 11.9	0.7 ± 3.1	1.89	
	1 -	112.3 ± 9.4	112.9 ± 12.1	0.6 ± 2.7	1.86	> 0.05
	3 -	115.4 ± 10.5	116.1 ± 15.1	0.7 ± 3.1	1.89	
	5 ≤ 7	120.3 ± 15.4	121.1 ± 18.3	0.8 ± 3.5	1.91	

This table shows that , there were no statistically significant differences between pre and post program implementation between studied nurses' knowledge , attitude and practice regarding their years of experience .

Figure (8) : The relation between the studied nurses knowledge , attitude and practice in relation to their years of experience pre / post program implementation
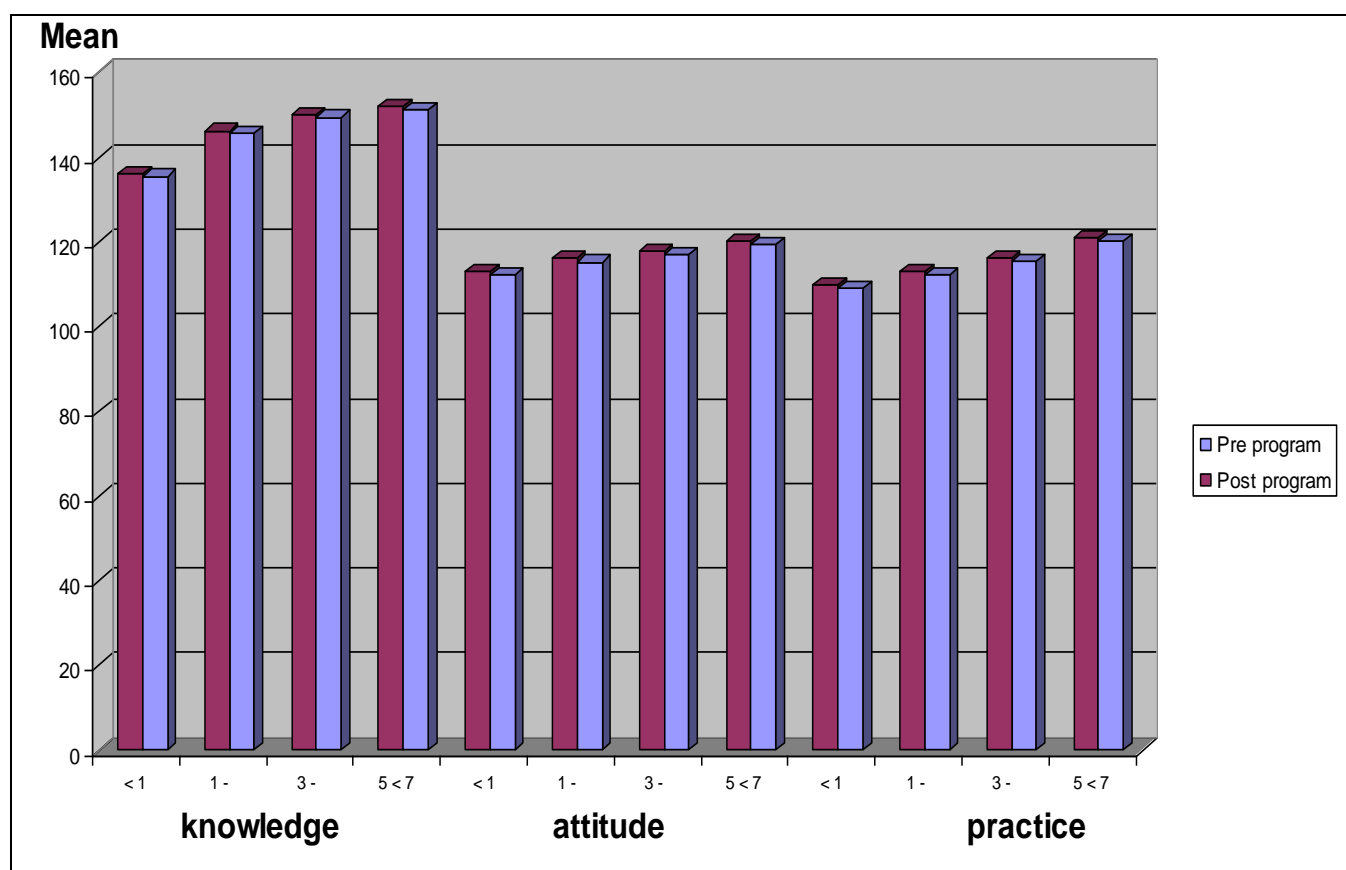

**Table (20) :-   Mean score of the nurse's knowledge , attitude and**

practice in relation to attending previous training program pre / post program implementation .

Aspect of comparison	Attending previous training program	Pre-program $\overline{X} \pm SD$	Post-program $\overline{X} \pm SD$	$\overline{X} \pm SD$ of the difference	t-value	p-value
Knowledge						
	Yes	141.3 ± 11.8	149.4 ± 12.1	8.1 ± 3.9	17.4	< 0.001
	No	121.2 ± 12.8	132.9 ± 10.1	11.7 ± 4.2	23.3	
Attitude						
	Yes	112.3 ± 10.5	112.9 ± 11.6	0.6 ± 2.9	1.73	> 0.05
	No	110.2 ± 8.9	110.7 ± 10.3	0.5 ± 2.4	1.74	
Practice						
	Yes	121.4 ± 10.8	121.9 ± 12.6	0.5 ± 2.2	1.9	> 0.05
	No	114.9 ± 11.9	115.3 ± 12.9	0.4 ± 2.1	1.59	

This table shows that , there were statistically significant differences between studied nurse's knowledge and attending a previous training program, while no statistical significant difference was observed between studied nurse's attitude and practice and attending previous training program pre and post program implementation .

Figure (9) : The relation between the studied nurses knowledge ,

attitude and practice in relation to their attending previous training program pre / post program implementation
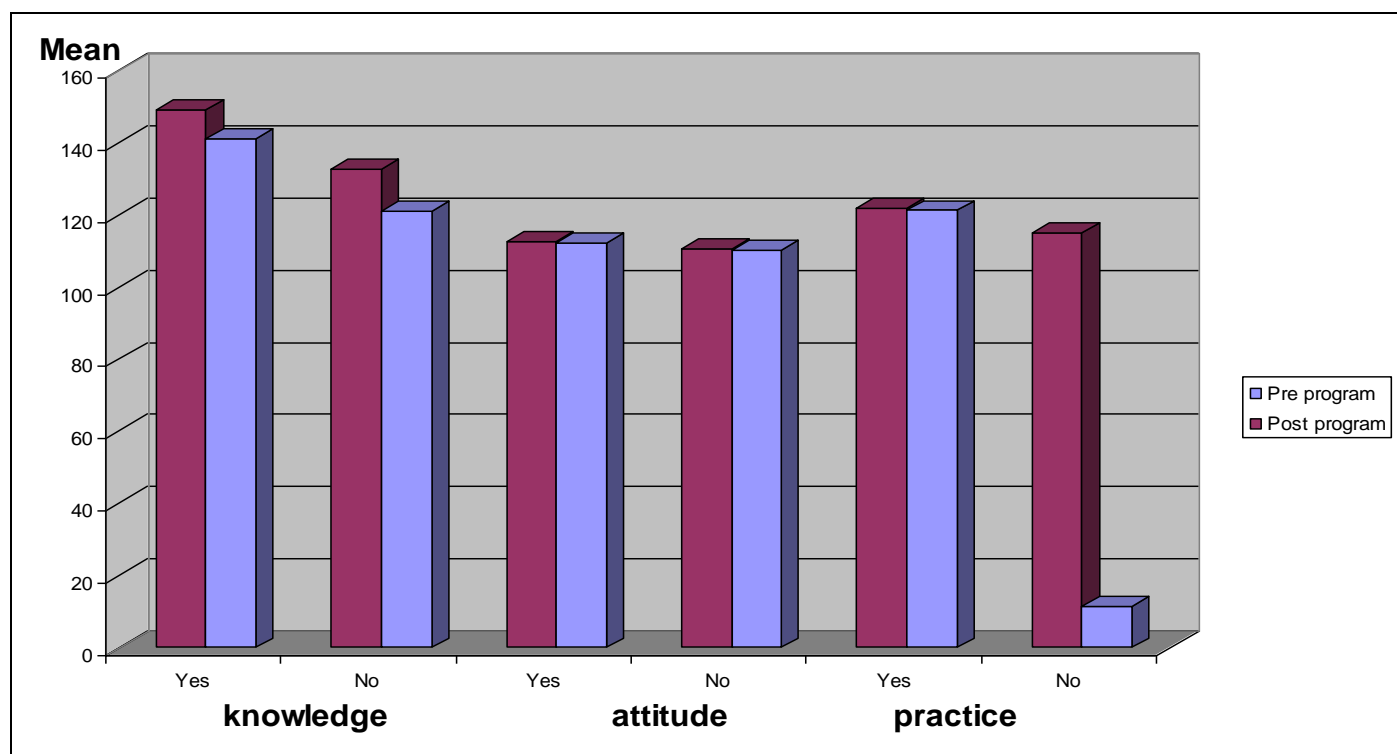
Part VI : Correlation between nurses knowledge scores ,

attitude scores and practice scores regarding to their characteristics .

Table (21) :- Correlation between knowledge scores , attitude scores and practice scores of nurses and their ages pre / post program implementation .

	Age	Pre-program		Post-program	
		r	p	r	p
Knowledge					
	20 - 30 years	0.1893	> 0.05	0.2103	> 0.05
	30 - 40 years	0.1938	> 0.05	0.2119	> 0.05
Attitude					
	20 - 30 years	0.2134	> 0.05	0.2219	> 0.05
	30 - 40 years	0.2093	> 0.05	0.2134	> 0.05
Practice					
	20 - 30 years	0.1917	> 0.05	0.2019	> 0.05
	30 - 40 years	0.1832	> 0.05	0.2139	> 0.05

This table illustrates that , there were no significant correlation coefficients between studied nurses' knowledge , attitude and practice regarding their ages pre and post program implementation .

Table (22) :- Correlation between knowledge scores , attitude

scores and practice scores of nurses and their level of education pre / post program implementation .

	Level of education	Pre-program		Post-program	
		r	p	r	p
Knowledge					
	Diploma in nursing	0.1734	> 0.05	0.1893	> 0.05
	Diploma in nursing with specialty	0.1993	> 0.05	0.201	> 0.05
	Bachelor degree	0.2009	> 0.05	0.2123	> 0.05
Attitude					
	Diploma in nursing	0.1834	> 0.05	0.1934	> 0.05
	Diploma in nursing with specialty	0.1918	> 0.05	0.1899	> 0.05
	Bachelor degree	0.1973	> 0.05	0.2013	> 0.05
Practice					
	Diploma in nursing	0.1877	> 0.05	0.2114	> 0.05
	Diploma in nursing with specialty	0.1734	> 0.05	0.1933	> 0.05
	Bachelor degree	0.1934	> 0.05	0.2033	> 0.05

This table showes that , there were no significant correlation coefficients between knowledge scores , attitude scores and practice scores of nurses regarding their level of education pre and post program implementation .

Table (23) :- Correlation between knowledge scores , attitude

scores and practice scores of nurses and their years of experience pre / post program implementation .

	Years of experience	Pre-program		Post-program	
		r	p	r	p
Knowledge					
	< 1	0.1304	> 0.05	0.1599	> 0.05
	1 -	0.1566	> 0.05	0.1601	> 0.05
	3 -	0.1789	> 0.05	0.1899	> 0.05
	5 ≤ 7	0.1899	> 0.05	0.1901	> 0.05
Attitude					
	< 1	0.1591	> 0.05	0.1655	> 0.05
	1 -	0.1698	> 0.05	0.1691	> 0.05
	3 -	0.1778	> 0.05	0.1818	> 0.05
	5 ≤ 7	0.1811	> 0.05	0.1919	> 0.05
Practice					
	< 1	0.1721	> 0.05	0.1812	> 0.05
	1 -	0.1833	> 0.05	0.1913	> 0.05
	3 -	0.1844	> 0.05	0.1998	> 0.05
	5 ≤ 7	0.1933	> 0.05	0.1938	> 0.05

This table shows that , there were no significant correlation coefficients between knowledge scores , attitude scores and practice scores of nurses in relation to their years of experience pre and post program implementation .

Table (24) :- Correlation between knowledge scores , attitude scores and practice scores of nurses and attending previous training program pre / post program implementation .

	Attending previous training program	Pre-program		Post-program	
		r	p	r	p
Knowledge					
	Yes	0.2193	< 0.05	0.3634	< 0.05
	No	0.1831	< 0.05	0.2234	< 0.05
Attitude					
	Yes	0.2081	> 0.05	0.2456	> 0.05
	No	0.1703	> 0.05	0.1934	> 0.05
Practice					
	Yes	0.1934	> 0.05	0.2019	> 0.05
	No	0.1793	> 0.05	0.1893	> 0.05

This table reveals that , there were significant correlation coefficients between studied nurse's knowledge scores and attending previous training program , while there were no significant correlation coefficients between nurse's attitude scores and practice scores and attending previous training program pre and post program implementation .