



Aim of the study



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The aim of this study was to determine the effect of implementing triage training competencies on newly graduated nurses (NGNs) working in ED at emergency hospital.

Research hypothesis

To fulfill the aim of this study the following research hypothesis were formulated:

1. Competency scores level of NGNs post educational training program implementation will be higher than their pre program implementation.
2. Implementing Triage training program will assist in successful transition from general nurse to qualified triage nurse.
3. Competency assessment will assist nurses to improving knowledge, practice and communication skills by identifying strength and areas that may need to be further developed.

Operational definition of newly graduated nurses

Newly graduated nurses refers nurses to be newly graduated up to two years after graduation (*Manias and Bullock, 2002; Davis, 2012*).



Materials and Methods



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Design:

Quasi experimental research design was used to conduct this study.

Setting:

The study was conducted in the emergency departments (ED) of Emergency Hospital at Mansoura University and Talkha Hospital (Ministry of Health). The ED of Emergency Hospital receives patients with acute injuries and illnesses as well as patients with life threatening conditions, such as (cardiac arrest, airway obstruction, shock) on Sunday, Tuesday and Thursday/week. Also the ED of Talkha Hospital receives traumatic patients, acute hepatic diseases, and acute respiratory diseases on Monday, and Friday/ week.

Subjects:

All newly graduated nurses NGNs (50 nurses) who have a bachelor degree in nursing and are involved in providing direct care for emergency patients in the Emergency Hospital at Mansoura University and who are willing to participate in the study constituted the study sample (study group). While control group included 25 nurses who have a bachelor degree in nursing and are involved in providing direct care for emergency patients in Talkha Hospital.

Tools: Three tools were used for this study.

Tool one: This tool consists of two parts:

Part (I): "Socio-Demographic Data

This part consist of nurse's age, marital status, educational level, job title, years of working experience, working hours/week.

Part (II): "Nurse's Knowledge Assessment Questionnaire"

This Questionnaire adopted from *Salem (2006)* and modified by the researcher based on the reviewing of the literature; *Carlson and Almond (2009)*, *Johansen and Forberg (2011)*, *Pollak et al (2011)*, *Atzema (2012)*, *Davis (2012)*, *Vankipuram (2012)*, *Dewit and Kumagai (2013)*, *Sole and Mosely (2013)*, *Veenema (2013)*. This tool was used to assess and evaluate NGNs' knowledge about triage process in the ED and it was used pre, immediately and post program implementation.

This tool included 35 multiple-choice questions divided into triage safety (3 questions), triage process (6 questions), across the room assessment (2 questions), primary assessment (14 questions), secondary and focused assessment (10 questions). Concerning ***Triage safety questions***, it consist of assessment of the environmental hazard at the ED, and maintaining patients and families safety. ***Triage process questions***: concerning with triage process for emergency patients and triage category according to the urgency of the patient's condition (*immediately life threatening, imminently life threatening, potentially life threatening, potentially serious and less urgent categories*). ***Across the room assessment questions***: concerning with identifying obvious life threatening conditions and it include a critical look of the patient's general appearance and assessment of the patient's airway, circulation and work of breathing. ***Primary assessment questions***: it include assessment of the patient's airway, breathing, circulation, neurological disability and expose all areas of the body to identifying life threatening injuries. Finally, ***Secondary and focused assessment questions*** include a detailed assessment (head to toe examination).

Scoring system of nurse's knowledge was done as follows, each question had a group of answer points, each *correct answer* had (**one grade**), while, *no or wrong answer* had (**zero**). Total score for all questions was 35 scores. The total score was classified into three categories as follow: poor knowledge 20.9 (<60%), good knowledge 21-26.21 (60%-74.9%), and very good knowledge 26.25- 35 (75%-100%).

Tool II: "Nurse's Practice Observational checklist"

This tool was developed by the researcher based on the reviewing of the literature; Hurme (2007), Juan(2009), Kriengsoontornkij et al., (2010), Agarwal et al., (2011), El-Zalabany et al., (2011), Kamel and Fakhry (2011), Vankipuram (2012), It was used to assess and evaluate the competency level of NGNs' performance in triage process.

Total competencies for the checklist was (70). It was distributed as the following: triage safety (10), triage process (7), across the room assessment (1), primary assessment (21), secondary and focused assessment (31). The checklist covering the following: Concerning ***Triage safety competencies***, it consist of assessment of nurses competencies in performing triage safety. It include (*infection control measure, emergency equipment, environmental hazard, safety measure of the staff members*). ***Triage process competencies*** concerning with assessment of nurses competencies in performing triage process and triage category according to the urgency of the patient's condition (*immediately life threatening, imminently life threatening, potentially life threatening, potentially serious and less urgent categories*). ***Across the room assessment competencies*** consisting of assessment of nurses competencies in identifying obvious life threatening conditions through observation of the patient's (*general appearance, assessment of breathing and circulation*).

Also, ***primary assessment competencies*** concerning with assessment of nurses competencies in performing primary assessment. It include *assessment of the patient's airway patency and maintain cervical spine stability, assess breathing, circulation, assess the patient's disability by using AVPU scale* (Alert, Verbal stimuli, Painful stimuli, Unresponsive). and expose all areas of the body to identity life threatening injuries. ***Secondary and focused assessment competencies*** concerning with assessment of nurses competencies in performing a detailed assessment (*head to toe examination*).

Scoring system: each item of nurse's performance scored on the bases of "Not done": (zero) or "Done" {Incompetent (incomplete and incorrect): (1 point) and Competent (done complete and correct): (2 point)}. The total competencies for the observation checklist was (70), it was scored out of 140 (100%). It was classified into the following categories: poor competency <70 (<50%), quiet good competency 70-<91

(50- <65%), good competency 91-<105 (65- <75%), and scores ≥ 105 ($\geq 75\%$) a very good competence.

Tool III: "Nurse's Communication and interpersonal relationships Observational checklist"

This tool adopted from *Salem (2006)* , *Hurme (2007)* and modified by the researcher based on the reviewing of the literature; *Gerdtz and Palmer, (2009)*, *Hegazy et al., (2010)*, *Petruniak (2013)*. This tool was used to assess and evaluate NGNs interpersonal and communication skills when performing triage process.

Scoring system: each item of nurse's performance scored on the bases of "Not done": (zero) and "Done" {Incompetent (incomplete and incorrect): (1 point) and Competent (complete and correct): (2 point)}. The total competencies for the observation checklist was (20), it was scored out of 40 was classified into the following categories: It was classified into the following categories: poor competency <20 (<50%), very low competency 20-<26 (50-<65%), good competency 26-<30 (65-<75%), and scores ≥ 30 ($\geq 75\%$) a very good competence.

Methods

Ethical considerations

- Permission to conduct the study was obtained from the hospital administrative authority of (*Emergency Hospital of Mansoura University and Talkha hospital*) after explanation of the aim of the study.
- Informed oral consent was obtained from the NGNs before the beginning of the study after explanation of the purpose of the study, privacy and confidentiality of the collected data was assured. At any time of the study the NGNs has the right to withdrawal from the study.
- Ethical consideration approval was obtained from the research ethics committee of the Faculty of Nursing, Mansoura University.

Validity& reliability

- The overall reliability of the tools was tested using (α) Cronbach test on a sample of 10 nurses and results were (0.91, 0.98&0.98) for *tool I,II,III* respectively.
- Tools were tested for content- related validity by 5 experts in the field of Critical Care& Emergency Nursing and Critical Care Medicine.
- A pilot study was carried out before starting data collection on 10 nurses to test clarity, feasibility, objectivity and consistency of the tools. Based on the findings of the pilot study, the necessary modifications were done accordingly.

Study procedure

The current study was conducted on four phases; assessment phase, program preparation phase, implementation phase and evaluation phase.

Phase one " Assessment phase"

During this phase, the researcher assessed NGNs knowledge and skills for the study& control regarding triage process.

a) The researcher assessed NGNs *knowledge* about triage process in ED. It was performed for the study and control groups in pre program implementation by using *tool I* and lasted about 35 minutes according to their working shifts to assess their knowledge. b) the researcher assessed NGNs *practice* about triage process by direct observation of nurses' competent performance and NGNs were observed according to their working shifts to assess their performance. It was done for the study and control groups in preprogram implementation by using *tool II*. c) the researcher assessed NGNs *communication and interpersonal relationship* by using *tool III*. It was done in pre program implementation for the study and control groups.

Phase two " program preparation phase "

- The researcher designed triage training program based on review of the related literature; *Safari (2012), Veenema (2013), Atzema (2012), El-Zalabany et al., (2011), Pollak et al., (2011)*.
- The teaching triage training program was composed of 10 sessions (Theoretical and practical training sessions). *Theoretical sessions* focused on: importance, principles of triage, triage safety, triage process and systems, importance of communication, and role of triage nurse. *Practical sessions* focused on: triage categories, communication skills, critical look, primary assessment, and secondary assessment.
- Designed triage training program were tested for content- related validity by 5 experts in the field of Critical Care& Emergency Nursing and Critical Care Medicine.
- A booklet containing the content of the program was designed and translated into a simple Arabic language by the researcher.
- Triage tag was designed by researcher and it was distributed for NGNs to be used during triage process according to the urgency of the patient's condition.

Teaching sessions for NGNs'

Vision: Providing a highest level of triage teaching and training .

Mission: Apply and integrate triage knowledge and skills for NGNs to provide competent emergency care for emergency patients and their family members. Provides the opportunity to develop technical skills in performing primary and secondary assessment, and clinical decision making abilities in the field of emergency nursing.

Overall aim of the program

At the end of this program, the NGNs will be able to triage emergency patients based on assessment findings of the patient's condition and severity of illness or injury.

Intended learning outcomes (ILOs):

Knowledge and Understanding

- Identify the meaning of triage in emergency department.
- List the importance of triage.
- Discuss basic principles of triage.
- Describe categories of triage.
- List the qualifications of triage nurse.

Intellectual Skills (*ability to*)

- Classify life threatening condition in emergency department.
- Prioritize emergency patients according to severity of illness or injury.

Professional and practical skills

- Assess the patient's condition and identify all incoming patients with obvious life threatening condition.
- Perform prompt and effective resuscitation for seriously ill patients.
- Demonstrate technical skills in performing primary and secondary assessment.

General and transferable skills

- Demonstrate decision-making skills in emergency situations.
- Develop leadership skills.
- Maintain confidentiality in all interaction.
- Maintain flow of interaction between triage personnel and patients in waiting area.
- Communicate effectively with the colleagues, patient and families member.

Theoretical and practical training sessions were carried out in 10 sessions and included the following:

1st session: (Triage overview)

In this session, the researcher explained vision and mission from this program emphasized on the main objectives of the program and introduced overview of the principle of triage process in ED.

2st session: (Triage process)

This session was given to cover data related to triage process and triage systems. Also, NGNs were trained to prioritize patients according to severity of injury and allocate the patient to the most appropriate treatment area in the ED.

3rd session: (Communication)

This session was planned to cover data related to the importance of communication process at triage. Also, NGNs were trained to apply communication skills, and demonstrated strategies for improving communication during triage process.

4th session: (Across the room assessment)

In this session the researcher was focusing on the role of triage nurse, triage nurse qualifications and the important of across the room assessment. During this session the NGNs demonstrated to identify life threatening condition.

5th session: (Primary assessment, airway, breathing)

This session was conducted to provide the NGNs with information related methods of airway, breathing assessment and signs and symptoms of spine injury. During this session the NGNs demonstrated the technique of opening the airway and assess airway and breathing.

6th session: (Primary assessment, circulation)

Included items related to reason for assessing pulse, normal and abnormal patient's skin color, temperature, and capillary refill. Also NGNs demonstrated the techniques for assessing the patient's pulse and cardiac compression.

7th session: (Primary assessment, disability)

This session included methods and technique of assessing patient's mental status.

8th session: (secondary assessment)

This session included information related to components of secondary assessment and the technique of assessing patient's vital signs and assess pain severity.

9th session: (head to toe assessment)

Involved information related to the components of head to toe assessment and demonstrated the areas of the body that are evaluated during the head to toe examination.

10th session: (Focused assessment)

Included the components of focused assessment and demonstrated the areas of the body that are evaluated during focused examination.

Phase Three " Implementation of triage training program"

- This program was implemented in the Emergency Hospital at Mansoura University and it was done for the study group only.
- This program was delivered throughout five weeks periods, every week involved two sessions, and every session took fifty to sixty minutes approximately. This time is between morning and afternoon shift. *Theoretical sessions* were explained by using simple, brief and clear words; the researcher summarized each session at the end with NGNs and emphasized the most important points included in each session. Teaching methods were used including lectures, open discussion, and brain storming. Also, the researcher was used other audio visual materials such as slide presentation, simple pictures, and booklet. Each NGNs received " Triage training booklet" to attract her attention, motivate her and support her teaching. *Practical sessions* has lasted from thirty to forty minutes during the shift work. The audio visual material were used including, demonstration, and re-demonstration.
- The study was conducted on first June 2013 till the end of March 2014.

Phase Four "Evaluation phase"

During this phase, the researcher evaluated NGNs knowledge and skills for the study and control groups regarding triage process.

A) The researcher evaluated knowledge of NGNs about triage process in ED. It was performed for the study and control groups in pre, immediately and two months post program implementation by using *tool I* and comparing results of assessment pre, immediately and two months post program implementation. **B)** The researcher evaluated skills of NGNs *practice* about triage process by direct observation of nurses' competent performance. It was done for both groups in pre, immediately and two months post program implementation by using *tool II* and comparing results of assessment pre, immediately and two months post program implementation. **C)** The researcher evaluated NGNs *communication and interpersonal relationship* by using *tool III*. It was done in pre, immediately and two months post program implementation.

Statistical designs:

- The collected data were organized, tabulated and statistically analyzed using the statistical package for social studies SPSS (Statistical Package for the Social Sciences) version 16.0 Figures were made using Excel software.
- The quantitative data were presented as a mean and standard deviation. Student t-test was conducted to compare the mean of continuous variable for two different groups of individuals and paired t test used for comparison between paired groups.
- The qualitative data were presented as number and percentage. The chi-square (χ^2) was used to find the association between variables of qualitative data. The P value of < 0.05 and ≤ 0.001 indicate significant and highly significant results respectively.
- Pearson correlation used for correlation between continuous parametric data.



Results



Results

This chapter presents the current study findings concerning the effect of implementing triage training competencies on newly graduated nurses (NGNs) working in emergency department at emergency hospital. The findings of the present study illustrated in five parts.

Part one: Presents demographic data of the NGNs (table 1).

Part two: Illustrates comparison between the study and control groups regarding *triage knowledge* mean score in pre, immediately and two months post program implementation (table 2).

Part three: Illustrates comparison between the study and control groups regarding *triage practice* mean score in pre, immediately and two months post program implementation (table 3).

Part four: Presents total triage knowledge score and total competency score of NGNs between the study and control groups in pre, immediately and two months post program implementation (table 4, 5, and 6).

Part five: Correlation between knowledge, practice and communication score in study and control groups (table 7,8, and 9).

Table (1):- Illustrates frequency distribution of the NGNs in the study and control groups according to their socio-demographic data.

This table shows that all NGNs for the study and control group were in the age groups from 20 to 30 years and had a Bachelor degree. Regard to the marital status, 78.0% of the study group, compared to 60.0 % in the control group were married. While 22.0% of the study group are single compared to 40.0% in the control group. Concerning to years of experience, it was found that, all NGNs for the study and control groups had less than 5 years of experience in the ED. It can also be noted that, 42.0 % of the nurses worked 40 to less than 45 hours per week, compared to 60.0 % in the control group. While 58.0% of the study group working 45 hours and more, compared to 36.0% in the control group. In relation to the triage training in ED, It can also be observed that the majority of nurses 90.0% in the study group were not attended any triage training compared to 80.0% for the control group. While 10.0% of the study group practiced triage in an ED compared to 20.0% for the control group. There is no any statistically significant difference between the study and control groups in relation to socio-demographic data.

Table (1):- Frequency distribution of the NGNs in the study and control groups according to their socio-demographic data.

Socio-demographic and clinical data	Study group N= 50		Control group N= 25		Test of sig	P
	No	%	No	%		
Age in years						
• 20-30 years	50	100	50	100	0	0
• >30- 40 year	0	-	0	-		
• >40- 50	0	-	0	-		
Marital status						
• Single	11	22	10	40	0.1	2.7
• Married	39	78	15	60		
Education level						
• Bachelor in Nursing	50	100	50	100	0	0
• Master in Nursing	0	-	0	-		
• Doctorate in Nursing	0	-	0	-		
Job title						
• Staff nurse	50	100	25	100	-	-
• Head nurse	0	-	0	-		
Working area						
• Medical	9	18	3	12	0.3	2.1
• Recovery	12	24	10	40		
• Surgical emergency and trauma	29	58	12	48		
Years of working experience						
• 1-<4years	50	100	24	96	2.03	0.2
• 4-<5years	0	-	1	4		
• 5 years and more	0	-	0	-		
Working hours per week						
• 35-<40 hour	0	-	1	4	0.09	4.7
• 40-<45	21	42	15	60		
• 45 hours and more	29	58	9	36		
Previous triage training in ED						
• Previous education	45	90	20	80	1.44	0.23
• Practiced triage in an ED	5	10	5	20		

Table (2): Illustrates comparison between the study and control groups regarding triage knowledge mean score in pre, immediately and two months post program implementation.

This table reveals that, there were highly statistical significant difference between the study and control groups $*p = 0.001$ regarding to the total mean score for all items of triage knowledge in pre, immediately and two months post program implementation.

There were highly statistical significant difference between the study and control groups regarding triage knowledge safety, triage knowledge process, across the room assessment, primary and secondary assessment immediately and two month post program implementation $*p = 0.001$. While there was no statistical significant difference between the study group and control groups in relation to triage knowledge safety, across the room assessment, and secondary assessment in pre program implementation.

In relation to triage safety (total score 3), it should be pointed that, total knowledge mean score of the study group were increased immediately and two month post program implementation respectively 2.86 ± 0.4 and 2.78 ± 0.42 with highly statistical significant difference in pre, immediately and two month post program implementation, $*p = 0.001$.

Concerning triage process, it can be observed that, triage knowledge mean score increased immediately and post program implementation for the study group from 5.66 ± 0.52 to 5.58 ± 0.61 out of a total score of 6 compared with 3.24 ± 0.88 to 3.12 ± 0.88 for the control group.

In relation to primary assessment knowledge (total score 14), It was observed that total knowledge mean score of the study group was increased immediately and two month post program implementation. There were highly statistical significant different between the study and control group after applying sessions where p values were ($*p = 0.001$).

Concerning to secondary assessment knowledge (total score 10), it was found that, total knowledge mean score of the study group was increased immediately and two month post program implementation respectively **9.4±1.14** and **9.38±1.16** with highly statistical significant difference in pre, immediately and two month post program implementation, ***p = 0.001**.

Table (2): Comparison between the study and control groups regarding triage knowledge mean score in pre, immediately and two months post program implementation

Triage knowledge	Score of items	Study group N= 50			Control group N= 25			Significance test		
		Pre mean ±Sd.	Immediately post mean ± Sd.	2 months Post mean ± Sd.	Pre mean ± Sd.	Immediately post mean ± Sd.	2 month post mean ± Sd.	P1	P2	P3
Triage safety	3	1.28±0.81	2.86±0.4	2.78±0.42	1.6±0.5	1.44±0.51	1.4±0.58	0.109	<0.001**	<0.001**
Triage process	6	2.74 ±1.03	5.66±0.52	5.58±0.61	3.64±1.41	3.24±0.88	3.12±0.88	0.004	<0.001**	<0.001**
Critical look	2	0.92±0.6	1.92±0.27	1.88±0.33	0.84±0.62	0.8±0.41	0.88±0.6	0.477	<0.001**	<0.001**
Primary assessment	14	6.32±2.07	13.06±0.98	12.98±0.99	5.44±1.16	5.08±0.95	5.24±1.09	0.031	<0.001**	<0.001**
Secondary assessment	10	3.26±1.14	9.4±1.14	9.38±1.16	2.96±0.93	2.88±0.72	2.88±0.72	0.146	<0.001**	<0.001**
Total Score	(35)	14.52±3.31	32.9±1.73	32.6±1.78	14.48±2.58	13.44±1.78	13.52±2.04	.958	<0.001**	<0.001**

** Highly statistical significant difference ($P \leq 0.001$)

P1= Comparing study and control groups pre program implementation

P2= Comparing study and control groups immediately program implementation

P3= Comparing study and control groups two month post program implementation

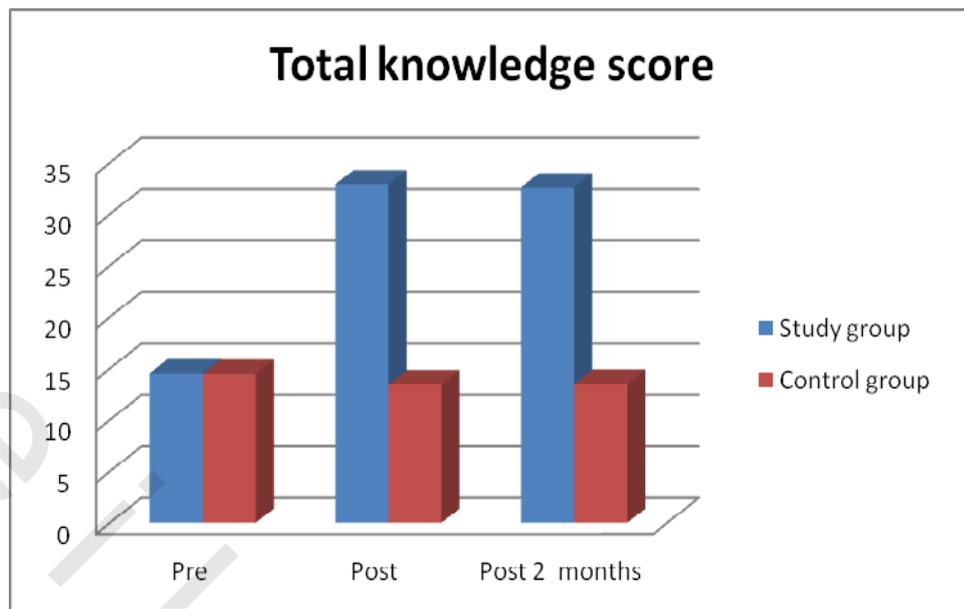


Figure (7): Comparison between the study and control groups regarding triage knowledge mean score in pre, immediately and two months post program implementation

Table (3): Illustrates comparison between the study and control groups regarding triage practice mean score in pre, immediately and two months post program implementation.

This table reveals that, there were highly statistical significant difference between the study group and control groups $*p = 0.001$ regarding to the total mean score for all items of triage practice in pre, immediately, and two months post program implementation.

It was observed from the table that there were highly statistical significant difference between study and control groups regarding practical competency of triage safety, triage process, across the room assessment, primary and secondary assessment immediately and two month post program implementation, $*p = 0.001$. There was no statistical significant difference between study and control groups in pre program implementation regarding across the room assessment. In addition, there were highly statistical significant difference between the study and control group in pre program implementation regarding triage safety, triage process, primary and secondary assessment.

Concerning triage safety competencies (total score 20), it should be pointed that, total practical competency mean score of the study group was increased immediately and two month post program implementation respectively 19.52 ± 2.73 , and 18.92 ± 0.75 compared with the control group immediately and two month post program implementation respectively 6.68 ± 1.41 , and 6.84 ± 1.4 . There were highly statistical significant difference between the study and control groups in pre, immediately and two month post program implementation.

In relation to triage process competencies, it was found that the total competency mean score was increased immediately and two month post program implementation for the study group from 13.88 ± 2.81 and 13.36 ± 0.69 out of a total score of 14 compared with 4.84 ± 1.1 and 4.88 ± 1.05 for the control group.

Concerning primary assessment competencies (total score 42), It can be observed that the total competency mean score of the study group was increased immediately and two month post program implementation. There were highly statistical

significant different between the study and control groups after applying sessions where **p** values were (***p = 0.001**).

In relation to secondary assessment competencies (total score 62), it should be pointed that, total competency mean score of the study group was increased immediately and two month post program implementation respectively **60.76±1.48** and **60.58±1.55** with highly statistical significant difference in pre, immediately and two month post program implementation, where **p** values were ***p = 0.001**.

Table (3): Comparison between the study and control groups regarding triage practice mean score in pre, immediately and two months post program implementation.

Triage competencies	Score of items	Study group N= 50			Control group N= 25			Significance test		
		Pre mean ±Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.	Pre mean ± Sd.	Immediately post mean ± .Sd	2 months post mean ± Sd.	P1	P2	P3
Triage safety	20	10.12±1.33	19.52±2.73	18.92±0.75	9.08±1.93	6.68±1.41	6.84±1.4	0.008**	<0.001**	<0.001**
Triage process	14	5.28±1.46	13.88±2.81	13.36±0.69	4.16±1.03	4.84±1.1	4.88±1.05	<0.001**	<0.001**	<0.001**
Critical look	2	0.96±0.19	1.94±0.24	1.92±0.27	0.88±0.33	0.92±0.27	0.92±0.27	0.195	<0.001**	<0.001**
Primary assessment	42	21.18±2.11	39.84±1.25	39.64±1.22	17.04±2.54	18.52±2.58	18.56±2.53	<0.001**	<0.001**	<0.001**
Secondary assessment	62	33.92±4.49	60.76±1.48	60.58±1.55	27.04±3.69	25.48±5.48	25.56±5.45	<0.001**	<0.001**	<0.001**
Total score	(140)	71.46±6.43	135.5±4.26	134.42±2.41	58.2±5.56	56.44±8.21	56.76±7.79	<0.001**	<0.001**	<0.001**

** Highly statistical significant difference ($P \leq 0.001$)

P1= Comparing study and control groups pre program implementation

P2= Comparing study and control groups immediately program implementation

P3= Comparing study and control groups two month post program implementation



Figure (8): Comparison between the study and control groups regarding triage practice mean score in pre, immediately and two months post program implementation.

Table (4): Presents total triage knowledge mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation.

This table reveals that total knowledge mean score of the study group in relation to NGNs knowledge regarding triage safety, triage process, across the room assessment, and primary and secondary assessment were very good knowledge immediately and two months post program implementation, while control group were poor knowledge in pre, immediately and two months post program implementation.

Table (5): Presents total triage competency mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation.

This table shows that total competency mean score between the study group and control group in relation to NGNs practice regarding triage safety, triage process, across the room assessment, primary and secondary assessment, it was found that there were poor and quiet good competent pre program implementation. While there were increase in competency level of the study group from poor competency to very good competency immediately and two months post program implementation.

Table (6): Presents comparison between the study and control groups regarding communication process mean score in pre, immediately and two months post program implementation.

This table shows that total competency score between the study group and control groups regarding communication process, it was found that there were poor and quiet good competent pre program implementation. While there were increased competency level of the study group from poor competent to very good competency immediately and two months post program implementation.

Table (4): Total triage knowledge mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation

Triage knowledge Score	Study group N= 50			Control group N= 25		
	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.
Triage safety (3) <ul style="list-style-type: none"> ▪ Poor knowledge <1.8 ▪ Good 1.8-<2.25 ▪ Very good ≥2.25 	1.28±0.81 — —	— — 2.86±0.4	— — 2.78±0.42	1.6±0.5 — —	1.44±0.51 — —	1.4±0.58 — —
Triage process (6) <ul style="list-style-type: none"> ▪ Poor knowledge <3.6 ▪ Good 3.6-<4.5 ▪ Very good ≥4.5 	2.74±1.03 — —	— — 5.66±0.52	— — 5.58±0.61	3.64±1.41 — —	3.24±0.88 — —	3.12±0.88 — —
Across assessment (2) <ul style="list-style-type: none"> ▪ Poor Knowledge <1.2 ▪ Good 1.2-<1.5 ▪ Very good ≥1.5 	0.92±0.6 — —	— — 1.92±0.27	— — 1.88±0.33	0.84±0.62 — —	0.8±0.41 — —	0.88±0.6 — —
Primary assessment (14) <ul style="list-style-type: none"> ▪ Poor Knowledge <8.4 ▪ Good 8.4-<10.5 ▪ Very good ≥10.5 	6.32±2.07 — —	— — 13.06±0.98	— — 12.98±0.99	5.44±1.16 — —	5.08±0.95 — —	5.24±1.09 — —
Secondary assessment (10) <ul style="list-style-type: none"> ▪ Poor Knowledge <6 ▪ Good 6-<7.5 ▪ Very good ≥7.5 	3.26±1.14 — —	— — 9.4±1.14	— — 9.38±1.16	2.96±0.93 — —	2.88±0.72 — —	2.88±0.72 — —
Total Knowledge score (35) <ul style="list-style-type: none"> ▪ Poor knowledge <21 ▪ Good knowledge 21-<26.25 ▪ Very good knowledge ≥26.25 	14.52± 3.31 — —	— — 32.9±1.73	— — 32.6±1.78	14.48±2.58 — —	13.44±1.78 — —	13.52±2.04 — —
Total Knowledge score (35)	14.52±3.31	32.9±1.73	32.6±1.78	14.48±2.58	13.44±1.78	13.52±2.04

- Poor knowledge <21 (<60%)
- Good knowledge 21-<26.25 (60%-74.9%)
- Very good knowledge ≥26.25 (>75%)

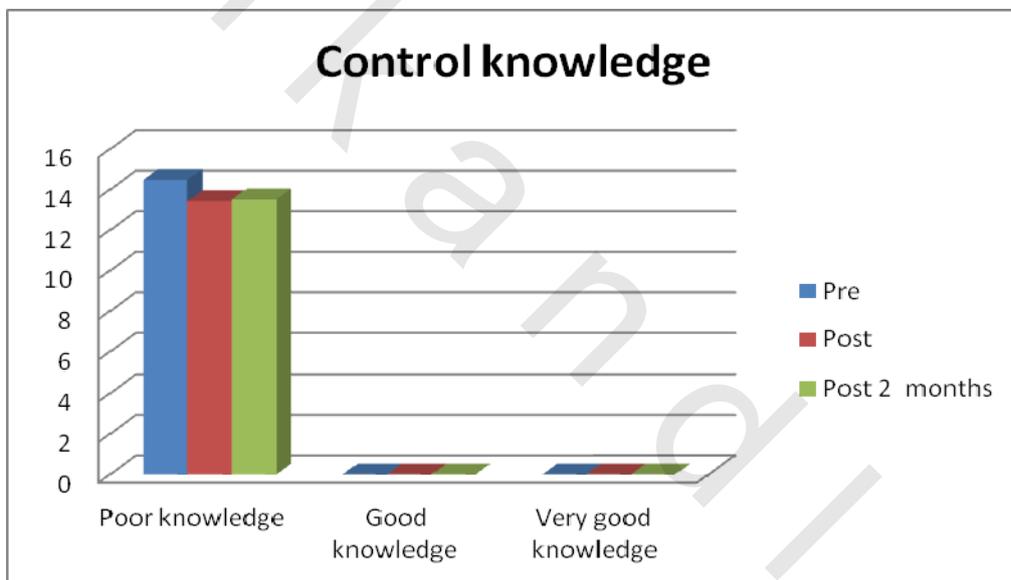
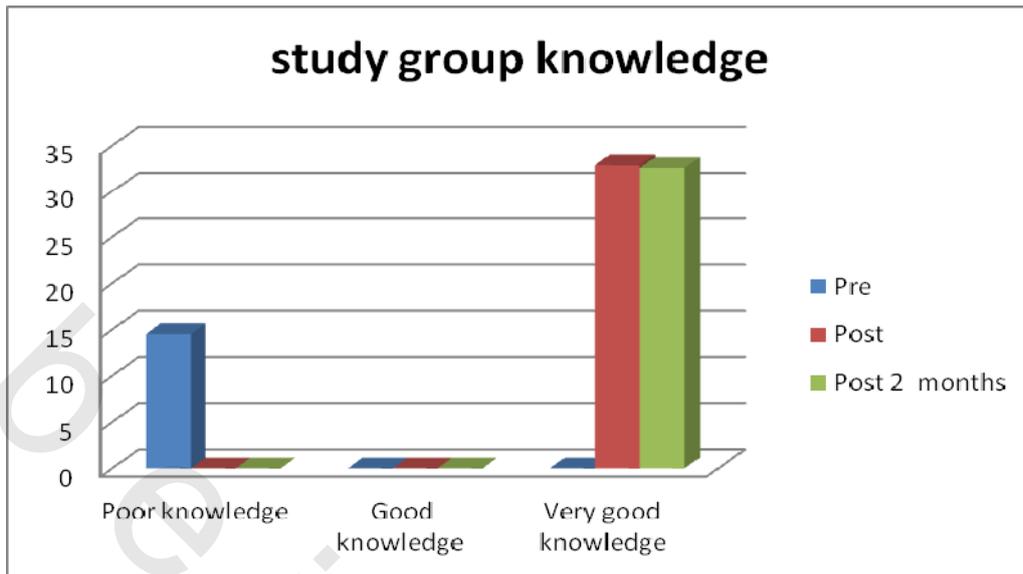


Figure (9): Total triage knowledge mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation.

Table (5): Total triage competency mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation

Triage practice score	Study group N= 50			Control group N= 25		
	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.
Triage safety (20)						
Poor competency <10	9.82±2.27	—	—	8.82±1.8	6.62±1.41	6.79±1.41
Quiet good competency 10-<13	10.21±.95	—	—	12±0	8±0	8±0
Good competency 13-<15	—	—	—	—	—	—
Very good ≥15	—	19.12±0.63	18.92±0.75	—	—	—
Triage process (14)						
Poor competency <7	4.18±2.27	—	—	4.13±0.97	4.83±1.13	4.87±1.07
Quiet good competency 7-<9.1	5.59±0.96	—	—	4.5±2.12	5±0	5±0
Good competency 9.1-<10.5	—	—	—	—	—	—
Very good ≥10.5	—	13.88±2.81	13.36±0.69	—	—	—
Across assessment (2)						
Poor competency <1	0.82±0.4	—	—	0.91±0.29	0.92±0.28	0.92±0.28
Quiet good competency 1-<1.3	1±0	—	—	0.5±0.71	1±0	1±0
Good competency 1.3-<1.5	—	—	—	—	—	—
Very good ≥1.5	—	1.94±0.24	1.92±0.27	—	—	—
Primary assessment (42)						
Poor competency <21	20.27±2.76	—	—	16.74±2.18	18.29±2.37	18.33±2.31
Quiet good competency 21-<27.3	21.43±1.86	—	—	20.5±4.95	24±0	24±0
Good competency 27.3-<31.5	—	—	—	—	—	—
Very good ≥31.5	—	39.84±1.25	39.64±1.22	—	—	—
Secondary assessment (62)						
Poor competency <31	28.09±4.72	—	—	26.48±2.63	24.92±4.79	25±4.78
Quiet good competency 31-<40.3	35.56±2.74	—	—	33.5±9.19	39±0	39±0
Good competency 40.3-<46.5	—	—	—	—	—	—
Very good ≥46.5	—	60.67±1.48	60.58±1.55	—	—	—
Total practice score						
Poor competency <70	63.18±7.79	—	—	57.08±4.17	55.58±7.15	55.91±6.91
Quiet good competency 70-<91	73.79±3.45	—	—	71±1.41	77±0	77±0
Good competency 91-<105	—	—	—	—	—	—
Very good ≥105	—	135.14±2.08	134.42±2.41	—	—	—
Total Practice score (140)	71.46±6.43	135.5±4.26	134.42±2.41	58.2±5.56	56.44±8.21	56.76±7.79

- Low competency <70 (< 50 %)
- Quiet good competency 70-<91(50- <65%),
- Good competency 91-<105 (65- <75%)
- Very good competence ≥105 (≥ 75 %)

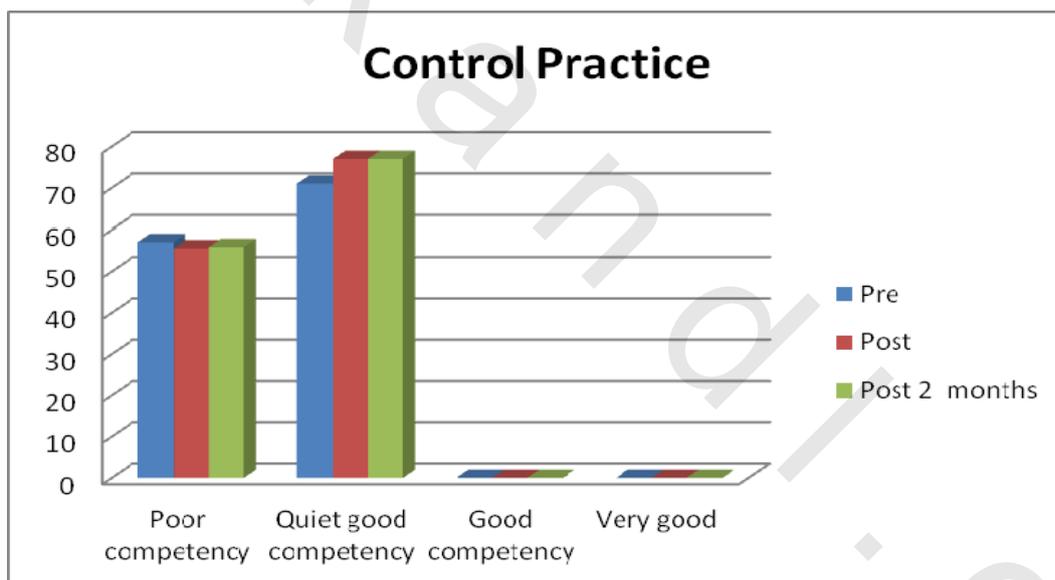


Figure (10): Total triage competency mean score of NGNs between the study and control groups in pre, immediately and two months post program implementation

Table (6): Comparison between the study and control groups regarding communication process mean score in pre, immediately and two months post program implementation.

Communication	Study group N= 50			Control group N= 25		
	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.	Pre mean ± Sd.	Immediately post mean ± Sd.	2 months post mean ± Sd.
Poor competency <20	14.09±3.51	----	---	14.30±4.12	14.42±2.72	14.5±2.67
Quiet good competency 20-<26	15.84±2.52	---	---	14.5±6.36	13±0	13±0
Good competency 26-<30	----	----	----	----	----	----
Very good ≥30	----	39.1±0.79	38.7±0.95	----	----	----
Total communication score(40)	15.46±2.82	39.1±0.79	38.7±0.95	14.32±4.15	14.36±2.67	14.44±2.63

- Low competency <20 (< 50 %)
- Quiet good competency 20-<26 (50- <65%),
- Good competency 26-<30 (65- <75%)
- Very good competence ≥30 (≥ 75 %)

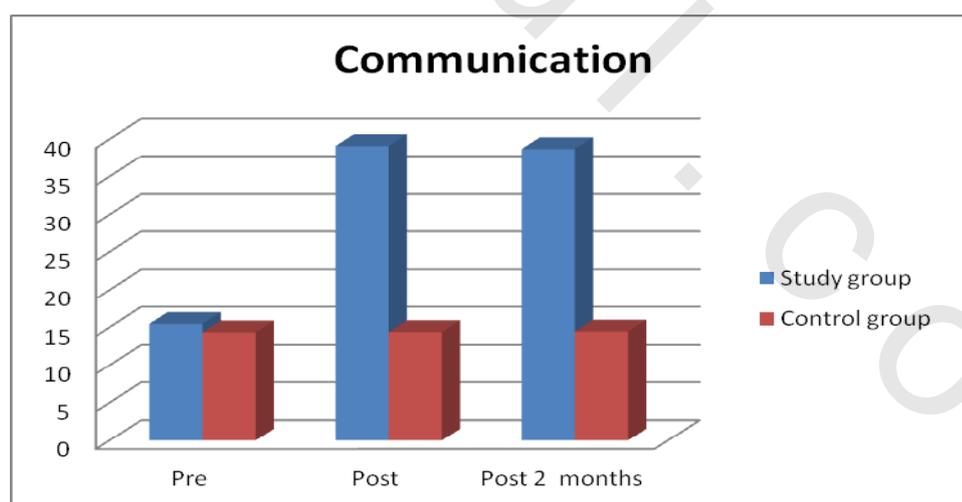


Figure (11): Comparison between the study and control groups regarding communication process mean score in pre, immediately and two months post program implementation.

Table (7): Correlation between knowledge score and practice score in study and control groups.

This table show strong positive correlation between knowledge score and practice score in study group. Increase in knowledge in NGNs is associated with increase in their practice. No correlation between knowledge score and practice score in control group.

Study group		Control group	
R	P	R	P
.957	≤0.001*	.088	.453

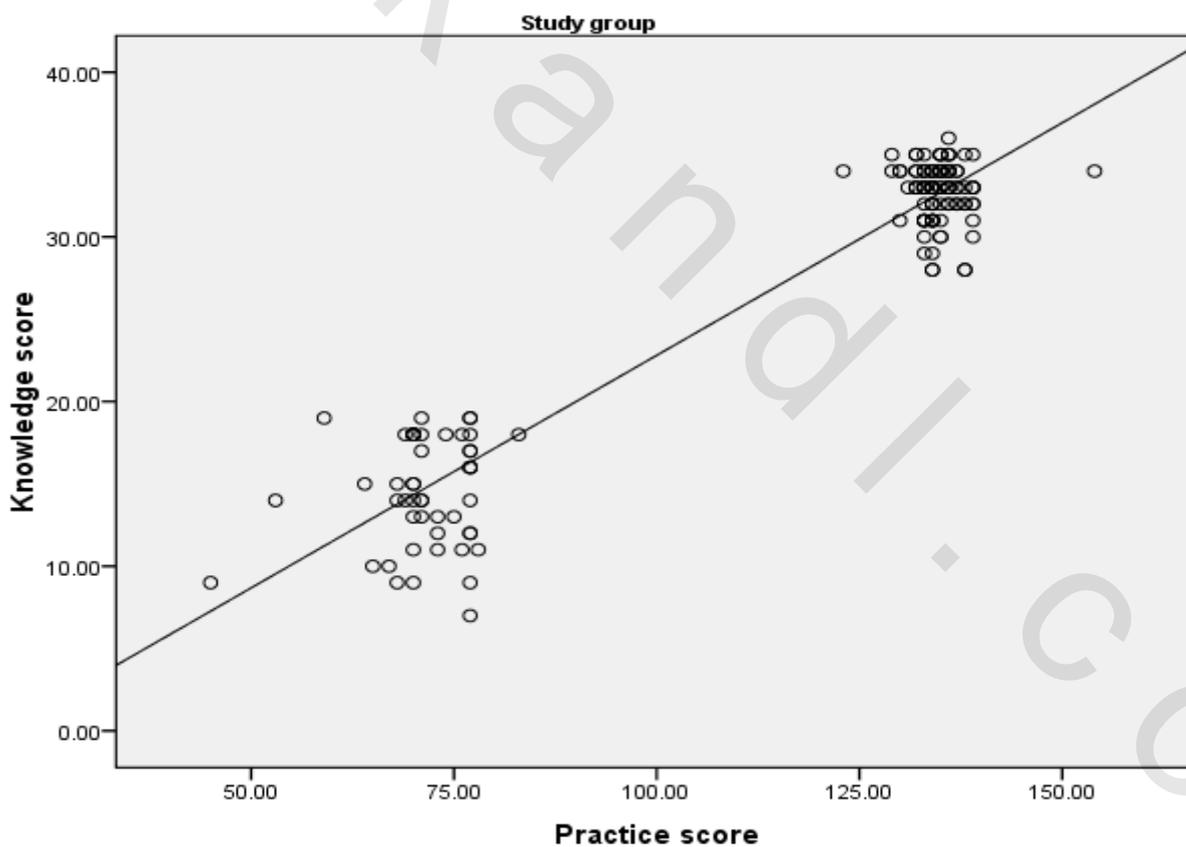


Figure (12): Scatter diagram for correlation between knowledge and practice in study group

Table (8): Correlation between knowledge score and communication score in study and control groups.

This table show strong positive correlation between knowledge score and communication score in study group. Increase in knowledge in NGNs is associated with increase in their communication. No correlation between knowledge score and communication score in control group.

Study group		Control group	
R	P	R	P
.946	≤0.001*	.058	.621

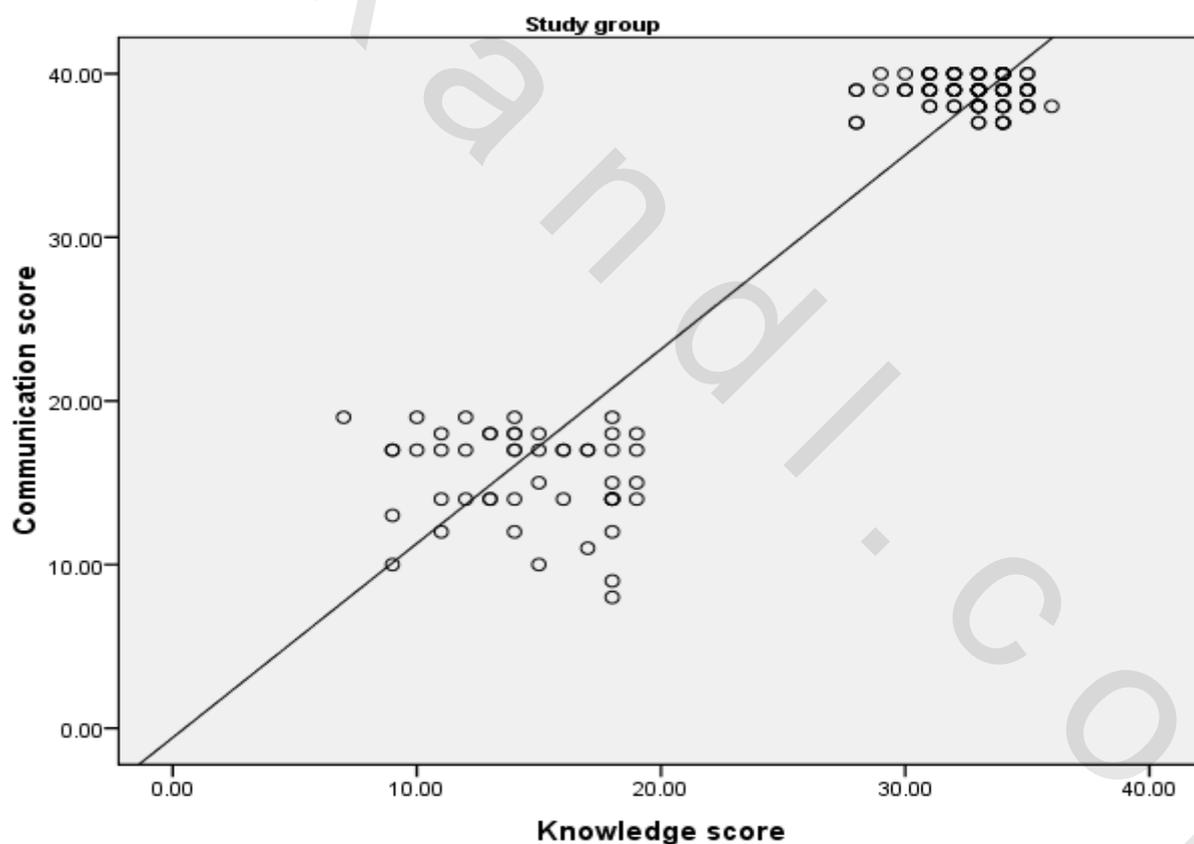


Figure (13): Scatter diagram for correlation between knowledge and communication in study group

Table (9): Correlation between practice score and communication score in study and control groups.

This table show strong positive correlation between practice score and communication score in study group. Increase in NGNs practice is associated with increase in their communication. No correlation between practice score and communication score in control group.

Study group		Control group	
R	P	R	P
.981	≤0.001*	.033	.778

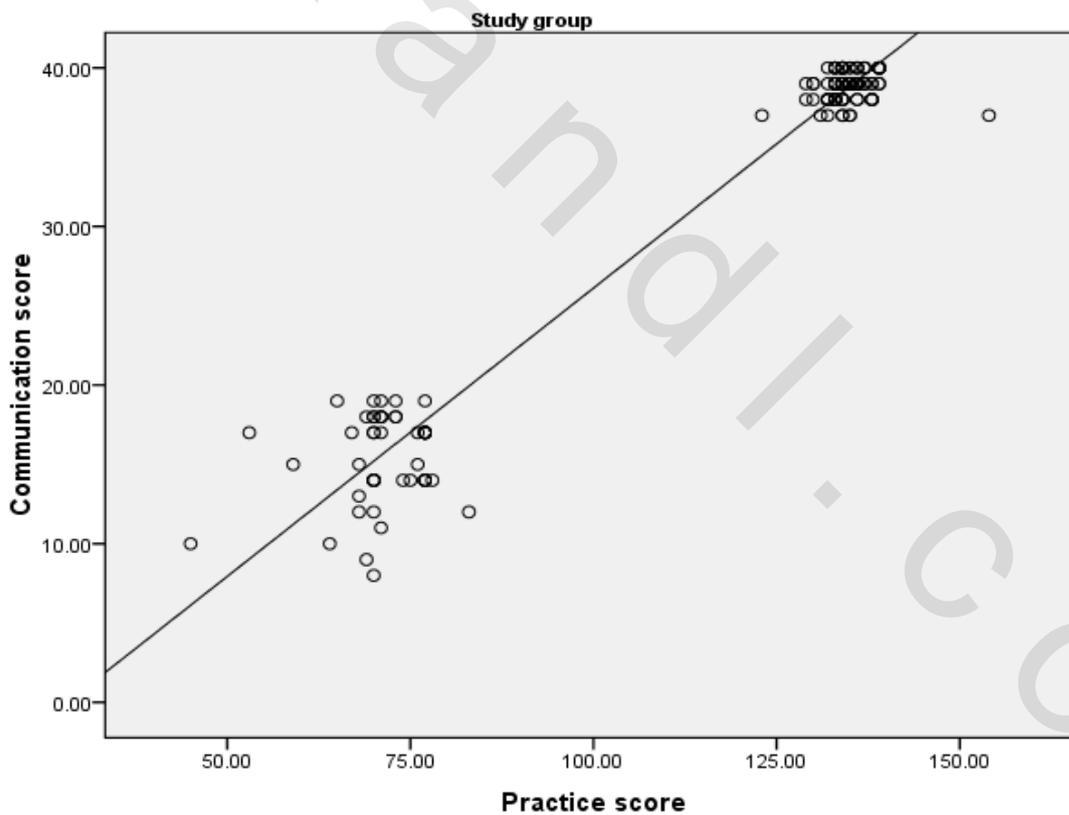


Figure (14): Scatter diagram for correlation between practice and communication in study group