

Nurses' Knowledge and Practice of Trauma Patients during Golden Hours of Care

Salwa Hassan Ahmed Eid⁽¹⁾, Nadia Mohammed Taha⁽²⁾ & Howida Kameel Zaton⁽³⁾

⁽¹⁾ B.Sc, Zagazig University, ⁽²⁾ Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, ⁽³⁾ Lecturer of Medical Surgical Nursing, Faculty of Nursing, Zagazig University

Abstract:

Background: Trauma is the leading cause of mortality in young adults. Many such deaths are preventable if patients are treated effectively. The term "golden hour" is commonly used to characterize the urgent need for the care of trauma patients. **Aim of the study:** to assess the level of nurses' knowledge and practice for trauma patients during the golden hour of care. **Subject and method, Research design:** Descriptive exploratory design was utilized. **Setting:** Data were collected from two setting; the emergency departments EDs of Emergency Hospital at Zagazig University and Al-Ahrar Hospital. **Subject:** The study subject includes 40 Emergency nurses from the same hospital setting which have been selected to the study. **Tools of data collection:** two tools were used for collection of data, the first tool was questionnaire self-administer tool to collect demographic characteristics of study nurses and questions to assess nurses' knowledge regarding trauma patients during the golden hour of care. Second tool was an observational checklist to assess nurses' practice regarding trauma patients during the golden hour of care. **Results:** less than one third of the studied nurses had satisfactory total knowledge regarding trauma patients during golden hour. Less than one fifth of the studied nurses had total satisfactory practice regarding trauma patients during golden hour of care. Relation's analysis showed no significant relationship between total nurses' knowledge and practice with personnel data such as age, training and year's experiences. There was no significant association between total knowledge score and total practice score. **Conclusion** nurses had unsatisfactory level of knowledge and practice about trauma patients during golden hour of care. They did not apply the most recommended nursing practices regarding trauma patients during golden hour of care. **Recommendation:** provide a training program for all nurses who provide care to trauma patients in EDs, periodic evaluation of nurses' practice.

Key words: Trauma. Nurses. Golden Hour. Knowledge. Practice.

Introduction:

The trauma is a mechanical damage to the body caused by an external force. The trauma patient has been defined as "an injured person who requires timely diagnosis and treatment of actual or potential injuries by a multidisciplinary team of health care professionals, supported by the appropriate resources, to diminish or eliminate the risk of death or permanent disability." ⁽¹⁾Egyptian Ambulance Authority, Sharqia Governorate, Egypt, states that the number of trauma victims of road traffic accidents who reported at all hospitals of the governorate reach about 15371 a while the number of other emergency at all hospitals of the governorate reach about 43826 in the 2013 year. ⁽²⁾In 2013, Low and middle-income countries LMICs had higher

road traffic fatality rates per 100000 (24.1 and 18.4, respectively) compared to high income countries HICs (9.2). The Africa region had the highest road traffic fatality rate at 26.6, while the European region had the lowest rate at 9.3. The estimated number of road traffic death in Egypt in (2013) is 10466 and also the estimated road traffic death rate (per 100000 populations) in Egypt in that year is 12.8. ⁽³⁾, ⁽⁴⁾The effect of injury depends on personal and environmental factors, such as the person's age and sex, the presence or absence of underlying disease process, and the geographic region. ⁽⁵⁾Multiple trauma results from tissue exposure to energy forces such as chemical, thermal, kinetic, electrical, or ionizing radiation. ⁽⁶⁾There is a concept in emergency care known as the

"GOLED HOUR." This principle worked on the basis that if treatment were started as soon as possible, and the patient could be taken to surgery predominantly for trauma cases and specifically within the first hour after injury and or illness, then the patient's prognosis for survival would be vastly increased. ⁽⁷⁾The trauma patient requires rapid assessment and management for definitive care. The goals of caring for any trauma patient are to prioritize care to protect life, preserve function, and reduce long-term disability. This early evaluation and resuscitation must be structured and methodical and must identify time-critical cases where patients have life-threatening injuries. All trauma patients should have a primary assessment to rule out problems with airway, breathing, circulation, and disability before attention is focused on injury-specific conditions. The medical history of the patient and mechanism of the injury are the two essential requirements of the trauma history and must be obtained at a speed appropriate to the clinical state of the patient. ⁽⁸⁾

Significance of the study:

The risks of trauma are serious as airway compromise, further spinal injury; hypoxia, hypoventilation, and chest drain blockage, bleeding either internally or externally, worsening cerebral perfusion, and pain from inadequate splinting of fractures. ⁽⁹⁾ The nurse has an important role in care of patient with trauma to prevent further deterioration so the study will be carried out in an attempt to determine the nurses' knowledge and practice during golden hours of care for traumatized patients.

Aim of the study: The aim of this study was to:

Assess the nurses' knowledge and practice for trauma patients during the golden hour of care.

Research questions:

- What is the level of nurses' knowledge during the golden hour of care for trauma patients?
- What is the level of nurses' practice during the golden hour of care for trauma patients?

Subjects and Methods:

Research design:

A descriptive exploratory design was used in this study.

Study setting:

This study will be conducted in the emergency departments (EDs) of Emergency Hospital at Zagazig University and Al-Ahrar Hospital.

Study Subjects:

The study sample included all the available nurses working in all EDs of the Emergency Hospital at Zagazig University and Al-Ahrar Hospital (20 nurses from ED of Emergency Hospital at Zagazig University, 20 nurses from ED of Al-Ahrar Hospital). Total number of the subjects was 40 nurses (males 22 and females 18).

Tools for data collection: Two tools were used for data collection

Tool I: Nurses' knowledge self-administer tool: It was designed in Arabic form to avoid misunderstanding. It was developed by the researcher based on literature review and composed of two parts:

Part I: Demographic characteristics of the nurses which were composed of 8 closed ended questions including (age, sex, marital status, level of education, total years of experience in ED, training courses, benefit in courses).

Part II: Nurses' Knowledge regarding trauma patients during Golden Hour of Care. It consisted of 65 multiple choice questions. It composed of the following: 1- Knowledge of Nurses regarding trauma patients, 2- nursing intervention for trauma patients during the golden hour of care, 3- role of nurse in different injuries in the ED unit.

The scoring system:

Scoring system related to the knowledge of the patients in part II was graded according to the items of interviewing self-administer tool. The answers of respondents (nurses) were evaluated using model key answer prepared by the researcher. Each correct answer scored one grades and zero for incorrect answer. The total score was calculated for each nurse by adding the score items of questionnaire tool. The nurse had satisfactory level of knowledge when the total score equal or above 60%, and unsatisfactory when it below 60%.

Tool II: Nurses' practice observational checklist:

It was developed by the researcher based on literature review and opinions of expertise for content of validity. It was included the following: 1- primary survey Ignatavicius et al,¹⁰⁾ Lewis et al,¹¹⁾ Marmo & D'Arcy,¹²⁾ 2- Secondary survey Lewis et al,¹¹⁾ 3-inserting an oropharyngeal airway Lynn,¹³⁾ 4- A. administering oxygen by mask Taylor,¹⁴⁾ and 4- B. administering oxygen by ambubag, Ehow,¹⁵⁾ 5- A. suctioning the oropharyngeal airways Lynn,¹³⁾ and 5- B. suctioning an endotracheal tube: open system(Lynn,¹³⁾, 6- intravenous cannulation Med.unsw.edu,¹⁶⁾ 7- A. inserting or Indwelling Male Catheter (Potter et al,¹⁷⁾ and 7- B. Inserting or Indwelling Female Catheter(Potter et al,¹⁷⁾, 8- acute Soft tissue Injury and bleeding care Lewis et al,¹¹⁾ 9- shock assessment and management Lewis et al,¹¹⁾ 10- Cardiopulmonary Resuscitation (CPR) Lewis et al,¹¹⁾ 11- Infection control for trauma patient within ER unit Varon,¹⁸⁾.

The scoring system:-

For observational checklist consisted of given score one for done step and zero for not done. The nurses had satisfactory level of practice when the total score equal or above 50 % and unsatisfactory if it below 50%.

Content validity and Reliability

It was established to assure the content validity by a panel of 5 expertises's in medicine and medical surgical nursing at Zagazig University (1 **Professors**. from medicine faculty and 4**Professors**from nursingfaculty) who revised the tools for clarity, relevance, comprehensiveness, understanding, and ease for implementation and according to their opinion minor modification were applied. Reliability statistics of the study, Cronbach's Alpha was 0.87.

Field work:

Field work of this study was executed in seven months from November 2014 to May, 2015. During this period all the data were collected from the study nurses.

- The researcher started by introducing herself to the patient, the aim of the study and the component of the tools were explained to the nurses at the beginning of collection nurses' knowledge, they were assured that the collected information would be treated confidentially and that it would be used only for the purpose of the study.
- The researcher was available (Saturday, Monday, and Wednesday at the Emergency Hospital at Zagazig University), (Sunday, Thursday, and Tuesday at Al-Ahrar Hospital) during day shift 8am-8pm.
- The researcher observed nurses practice during collecting nurses' knowledge.
- The researcher was interviewed with each subjects individually to fulfill the questionnaire tool, the time required for completion of the questionnaire tool was ranged from 30- 45 ms.
- Also the researcher was observing nurses practical skills about studied procedures. One nurse was observed in each shift; the time needed for completion of the

questionnaire tool was ranged from 1.30 - 2 hrs.

Pilot study

A pilot study for tools of data collection was carried out in order to test whether they are clear, understandable, feasible applicability and time consuming to fill the tool. For this study, the researcher randomly selected 10 nurses to participate in the pilot testing of the questionnaire sheet and checklist. Modification was done based on pilot results and the sample who shared in the pilot study excluded from the study nurses.

Administrative and Ethical considerations:

An official permission for data collection in Zagazig University Hospitals was obtained from the out-patient administrative personnel by the submission of a formal letter from the dean of the faculty of Nursing. An oral consent was taken from nurses for permission to participate in research process. The agreement for participation of the subjects was taken after explaining the aim of the study and component of the tool to them; they were given the opportunity to refuse to participate and to withdraw at any time. In addition, confidentiality, and anonymity of the subjects were assured through coding of all data.

Statistical Design:

After the collection of data, Data were checked, entered and analyzed using SPSS version 20 for data processing and statistic- P value of < 0.05 indicates significant results.

Results:

Figure (1): Shows that less than one third (32.5) of the studied nurses had satisfactory total knowledge regarding trauma patients during golden hour of care.

Figure (2): illustrates that 12.5% of the studied nurses had total satisfactory practice regarding trauma patients during golden hour of care.

Table (1): clarifies that demographic characteristics of the nurses in the study, it was showed that 70% of the nurses were less than 30 years, 55% were male, 72.5% were married. In relation to educational level 47.5% had diploma and 42.5% had experience in hospital between 1-5 years. Regarding to experience in ED, more than half 52.5% had experience between 1-5 years, 72.5% attended in training courses and 89.6% of them gained benefits from them.

Table (2): presents that there was no statistical significant relation between nurses' knowledge and demographic characteristics of them with p. value >0.05.

Table (3): demonstrates that here was no statistical significant relation between nurses' practice and demographic characteristics of them with p. value >0.05.

Table (4): clarifies that, there no significant association between total knowledge scores and items of practice.

Table (5): displays that, there no significant association between total practice scores and items of knowledge.

Table (6): displays that, there no significant association between total practice scores and items of knowledge.

Discussion:

The study sample consisted of 40 nurses (who provide direct care for trauma patients during golden hour of care) in the Emergency Department unites of Emergency Hospital at Zagazig University and Al-Ahrar Hospital. More than half of them were males, more than two third of the nurses were married, the majority of the nurses graduated from diploma nursing school, their age ranged from 20- 30 years and more than two fifth of them had less than 5 years of experience in hospital, and slight more than half of them had years of

experience in the ED less than 5 years. Also, slight near three quarter of them were married. This may be due to majority of the nurses graduated from nursing school and our cultural recommended the marriage in early age.

These agree with (Ahmed, ¹⁹) in her study about Effect of an educational program on nurses' performance during the golden hour of care for traumatized patients, a study at Ain Shams University, who found that the majority of nurses graduated from diploma nursing school. These findings were not in accordance with (Maarouf, ²⁰) in her study about Nurses' Performance for Patients with Traumatic Head Injury during Golden Hour, a study at Ain Shams University, who found that slight near half of the sample on the ED nurses had bachelor degree.

The results of the study revealed that slight near three quarter of studied sample had training course about trauma patients, and more than four fifth of them gained benefits from it. This agrees with (Metwaly, ²¹) in her study about nurses' performance regarding nasogastric tube feeding in intensive care units, a study at Zagazig University, who found that more than half of studied samples had training course about critically ill patients. These findings disagree with (Mohamed, ²²) in his study about nurses' practice and adverse health effects on nurses dealing with chemotherapeutic agents, a study at Zagazig University, who reported that less than one quarter of studied sample had a training course.

Training courses and programs are two components of nurses' development. It is recommended that continuous education in nursing is needed to promote development of knowledge and practice and improve quality of care to give for their patients, also the training courses

played important role in enhancing and updating nurses' knowledge and performance.

The present study reported that more than two third of the studied nurses had unsatisfactory total knowledge regarding trauma patients during the golden hour of care. This inadequacy of nurses' knowledge at this critical stage might be as a result of level of education, lack of refreshment of the nurses' knowledge, and lack of continuous training educational program. These agree with (Maarouf, ²⁰) who found that about two third of the study nurses had unsatisfactory knowledge regarding traumatic head injury and nursing management during golden hour.

These results disagree with, (Biz ^{et al}, ²³) who emphasized that the majority of the studied nurses had satisfactory level of knowledge regarding poly-trauma patient. In the same consequence (Ahmed, ¹⁹) who reported that majority of the studied nurses had satisfactory level of knowledge regarding trauma patients during the golden hour of care due to knowledge refreshment throughout a program session.

Regarding the nursing intervention, related to trauma management in the golden hour, the results of the study showed that more than four fifth of the nurses have unsatisfactory total practice related to the assessment and basic nursing care for trauma patients during golden hour of care. This could be attributed to lack of nurses' knowledge which reflects on their performance, inadequate continuous training program, lack of qualification as more than half of nurses were diploma nurses, lack of number of nursing staff, lack of close supervision, the doctors did some practice instead of the nurses, insufficient equipment, and increase number of trauma patients.

These findings are consistent with (Maarouf, ²⁰) who found that near two third of the study nurses had unsatisfactory practice regarding nursing management of patients with traumatic head injury during golden hour. This is contraindicated with (Collins, ²⁴) who found that total nurses' practice regarding nursing management of trauma patients in the emergency unit was satisfactory. In the same consequence, (Browne & Merrill, ²⁵) clarified that the majority of the studied nurses had satisfactory practice regarding assessment and management of sever patients with musculoskeletal injured.

Relation's analysis showed no significant relationship between total nurses' knowledge with demographic data such as age, training and year's experiences. Also, no significant relation was found between total nurses' practice and personnel data as the age, training and years of experiences. This could be attributed to that the majority of them acquired their knowledge from easily resources such as from the practical field. And also may be due to the fact that majority of the studied nurses are diploma nurse, lack of refreshment of nurses' knowledge, the doctors did some practice instead of the nurses and lack of continuous training educational programs.

In the same line, (Ahmed, ¹⁹) clarified that relation's analysis showed no significant relationship between level of knowledge and practice with demographic factors such as age and year's experiences. In the same context, (Taha, ²⁶) found that there was statistically insignificant relation between nurses' performance and age.

This is contraindicated with (Maarof, ²⁰) who revealed that there was statistically significance relation between nurses' practice and years of experience. This is supported by (Delucia et al, ²⁷), (Ali et al, ²⁸) & (Dale et al,

²⁹) who found that work experience influences nurses' performance.

Also (Maarof, ²⁰) revealed that there was highly statistically significance relation between nurses' practice and nurses' age. This may explain that increasing age of the nurses accompanied with increasing experience until reach the level of automatism.

The result of the current study revealed that there was no statistically significant relation between nurses' performance (knowledge & practice) and nurses' educational level. This may be due to lack of continuous in-service educational program, lack of orientation for newly graduated nurses and level of education. The result of this study is incongruent with Al-Ahmadi, ³⁰) in his study about Factors affecting performance of hospital nurses in Riyadh Region, Saudi Arabia, who showed that level of education is negatively correlated with job performance, indicating that the higher the level of education, the lower job performance of nurses this results may be due to that most of registered nurses occupied administrative work more than case management.

This is contrary with (Maarof, ²⁰) revealed that there was highly statistically significance relation between nurses' performance (knowledge & practice) and gender. This result may be due to that the number of sample wasn't representative and the result couldn't be generalized whereas, the representation of female nurses more than male nurses. Also, the current study revealed that there was highly statistically significance relation between nurses' performance and attendance of training courses. This necessitates the importance of conducting continuous in-service training program for nurses caring of

patients with traumatic head injuries THI. This result is similar to (Abualrub,³¹) who reported that there is statistically significant relation between satisfactory nurses' practice and nurses who attended training courses.

Conclusion:

According to the results of the present study, less than one third of the studied nurses had satisfactory total knowledge regarding trauma patients during golden hour of care. Less than one fifth of the studied nurses had total satisfactory practice regarding trauma patients during golden hour of care. There was no statistical significant relation between knowledge and practice and personnel data and job characters. There was no significant association between total knowledge scores and items of practice. There was no significant association between total practice scores and items of knowledge. There was no significant association between total knowledge score and total practice score.

Recommendations

Based on the results of the present study the following recommendations are suggested:

- Adequate education and training of all nurses working with trauma patients in the EDs.
- Evaluation of nurses' work practice and technique should be carried out for trauma patients during golden hour of care.
- Periodic evaluation and validation of the training given and training programs should be included both theoretical and practical. Written procedures should be drawn up specifying safe working methods to cover each process.
- Complete manual procedures should be in Arabic language, easily used and available to all nurses.
- Knowledge and competence of nursing staff should be periodically evaluated, documented and up to date if necessary.
- Booklet about nurses' knowledge and practice care for trauma patients during golden hour of care in the EDs.
- Further studies are necessary to identify effects of educational programs on nurses' performance in the EDs.

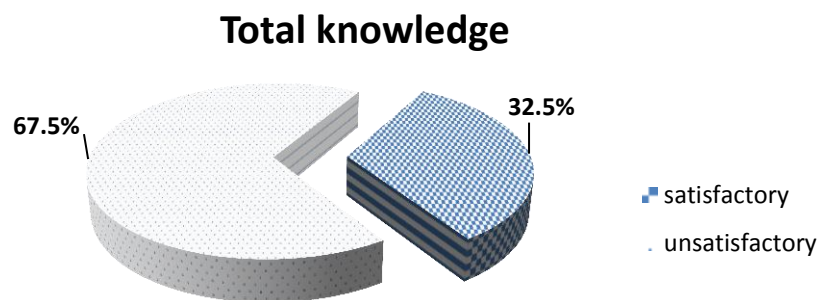


Figure 1: Distribution of total nurses' knowledge regarding the nursing care of trauma patients during golden hours (N=40):

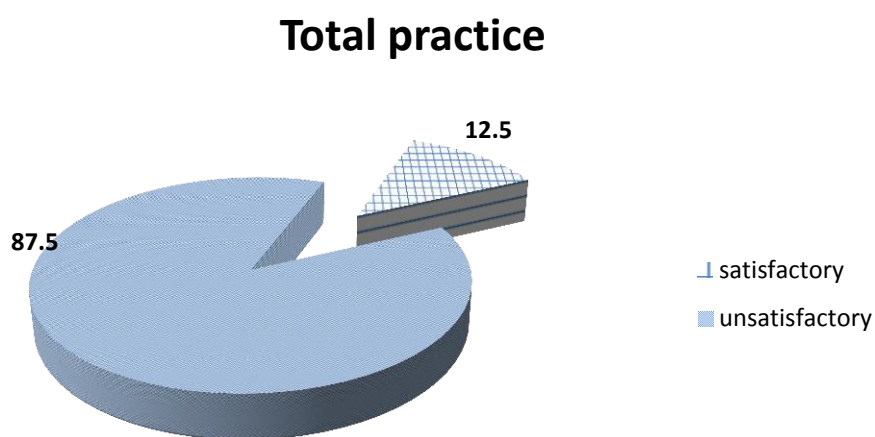


Figure 2: Distribution of total nurses' practice regarding the nursing care of trauma patients during golden hours (N=40)

Table (1): Demographic characteristics of the Nurses in the study (N=40):

Items	N	%
Age		
- < 30	28	70.0
- 30	12	30.0
- Mean± SD	28.9±5.2	
- Median	28.0	
- Range	21- 40	
SEX		
- Male	22	55.0
- Female	18	45.0
Marital		
- Single	8	20.0
- Married	29	72.5
- Widow	3	7.5
Education		
- Diploma	19	47.5
- Diploma and specialty	11	27.5
- Bac+ more	10	25.0
Experience in the hospital		
- 1-5 years	17	42.5
- 6-10 years	13	32.5
- >10 years	10	25.0
• Mean± SD	1.82±0.7	
• Median	2	
• Range	1- 4	
Experience in the ED		
- 1-5 years	21	52.5
- 6-10 years	9	22.5
- >10 years	10	25.0
• Mean± SD	1.7±0.8	
• Median	1	
• Range	1- 6	
Attendant training courses program		
- Yes	29	72.5
- No	11	27.5
Benefit from training courses program		
- Yes	26	89.6
- No	3	10.4

Table (2): Relation between nurses' knowledge and Demographic characteristics of the nurses (N=40)

Personal data and job characters	Unsatisfactory knowledge n=27		Satisfactory knowledge n=13		X ²	P
	N	%	N	%		
Age						
- 20-30	20	71.4	8	28.6	0.65	0.41
- > 30	7	58.3	5	41.7		
SEX						
- Male	16	72.7	6	27.3	0.609	0.43
- Female	11	61.1	7	38.9		
Marital						
- Single	6	75.0	2	25.0	2.1	0.41
- Married	19	65.5	10	34.5		
- Widow	2	66.7	1	33.3		
Education						
- Diploma	13	68.4	6	31.6	0.11	0.94
- Diploma and specialty	7	63.6	4	36.4		
- Bac+more	7	70.0	3	30.0		
Experience in the hospital						
- 1-5 years	11	64.7	6	35.3	0.84	0.65
- 6-10 years	10	76.9	3	23.1		
- >10 years	6	60.0	4	40.0		
Experience in the ER						
- 1-5 years	13	61.9	8	38.1	2.43	0.29
- 6-10 years	8	88.9	1	11.1		
- >10 years	6	60.0	4	40.0		
Attendant training courses program						
- Yes	19	65.5	10	34.5	0.18	0.66
- No	8	72.7	3	27.3		
Benefit from training courses program						
- Yes	19	73.1	7	26.9	0.35	0.55
- No	11	78.5	3	21.5		

Pⁿ: P value of X² test
P < 0.05 (significant)

Table (3): Relation between nurses' practice and Demographic characteristics of the nurses (N=40):

Personal data and job characters	Unsatisfactory practice n=35		Satisfactory practice n=5		X ²	P
	N	%	N	%		
Age						
- 20-30	26	92.9	2	7.1	2.44	0.11
- > 30	9	75.0	3	25.0		
SEX						
- Male	19	86.4	3	13.6	0.05	0.81
- Female	16	88.9	2	11.1		
Marital						
- Single	6	75.0	2	25.0	1.69	0.63
- Married	26	89.7	3	10.3		
- Widow	3	100.0	0	0.0		
Education						
- Diploma	16	84.2	3	15.8	0.41	0.92
- Diploma and specialty	10	90.9	1	9.1		
- Bac + more	9	90.0	1	10.0		
Experience in the hospital						
- 1-5 years	15	88.2	2	11.8	4.62	0.09
- 6-10 years	13	100.0	0	0.0		
- >10 years	7	70.0	3	30.0		
Experience in the ER						
- 1-5 years	18	85.7	3	14.3	1.86	0.39
- 6-10 years	9	100.0	0	0.0		
- >10 years	8	80.0	2	20.0		
Attendant training courses program						
- Yes	24	82.8	5	17.2	2.16	0.14
- No	11	100.0	0	0.0		
Benefit from training courses program						
- Yes	21	80.8	5	19.2	3.07	0.07
- No	14	100.0	0	26.9		

*P*ⁿ: *P* value of X² test
P < 0.05 (significant)

Table (4): Association between total knowledge score and items of practice (N=40):

Items of practice		Unsatisfactory knowledge n=27		Satisfactory knowledge n=13		X ²	P
		N	%	N	%		
Primary assessment	Not satisfactory	10	76.9	3	23.1	0.78	0.37
	Satisfactory	17	63.0	10	37.0		
Secondary assessment	Not satisfactory	27	67.5	13	32.5	0.0	1.0
Intravenous injection and cannula	Satisfactory	27	67.5	13	32.5	0.0	1.0
Shock assessment & management	Not satisfactory	26	68.4	12	31.6	0.29	0.58
	Satisfactory	1	50.0	1	50.0		
Soft tissue assessment & management	Not satisfactory	27	67.5	13	32.5	0.0	1.0
Suction assessment	Not satisfactory	25	65.8	13	34.2	1.014	0.314
	Satisfactory	2	100.0	0	0.0		
CPR assessment	Not satisfactory	13	76.5	4	23.5	1.08	0.29
	Satisfactory	14	60.9	9	39.1		
Air way management	Not satisfactory	22	62.9	13	37.1	2.75	0.09
	Satisfactory	5	100.0	0	0.0		
Indwelling catheter male	Not satisfactory	8	57.1	6	42.9	1.05	0.305
	Satisfactory	19	73.1	7	26.9		
Indwelling catheter female	Not satisfactory	3	75.0	1	25.0	0.11	0.73
	Satisfactory	24	66.7	12	33.3		
Infection control	Not satisfactory	21	70.0	9	30.0	0.34	0.55
	Satisfactory	6	60.0	4	40.0		
Total practice	Not satisfactory	24	68.6	11	31.4	0.14	0.702
	Satisfactory	3	60.0	2	40.0		

Pⁿ: P value of X² test
P < 0.05 (significant)

Table (5): Association between total practice score and items of knowledge (N=40):

Items of knowledge		Unsatisfactory practice n=35		Satisfactory practice n=5		X ²	P
		N	%	N	%		
Knowing	Not satisfactory	25	86.2	4	13.8	0.16	0.68
	Satisfactory	10	90.9	1	9.1		
Role of nurse in different	Not satisfactory	14	93.3	1	6.7	0.74	0.38
	Satisfactory	21	84.0	4	16.0		
Intervention	Not satisfactory	35	87.5	5	12.5	0.0	1.0
Total knowledge score	Not satisfactory	24	88.9	3	11.1	0.14	0.702
	Satisfactory	11	84.6	2	15.4		

Pⁿ: P value of X² test
P < 0.05 (significant)

Table (6) : Association between total practice score and items of knowledge (N=40):

Items of knowledge		Unsatisfactory practice n=35		Satisfactory practice n=5		X ²	P
		N	%	N	%		
Knowing	Not satisfactory	25	86.2	4	13.8	0.16	0.68
	Satisfactory	10	90.9	1	9.1		
Role of nurse in different	Not satisfactory	14	93.3	1	6.7	0.74	0.38
	Satisfactory	21	84.0	4	16.0		
Intervention	Not satisfactory	35	87.5	5	12.5	0.0	1.0
Total knowledge score	Not satisfactory	24	88.9	3	11.1	0.14	0.702
	Satisfactory	11	84.6	2	15.4		

P[∞]: P value of X² test

P < 0.05 (significant)

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