

## Infection control: Effect of a structured nursing protocol on practice scores of nurses working with hematemesis patients.

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**Abstract:** *Aim of the study:* is to evaluate the effect of a structured nursing protocol on practice scores of nurses working with hematemesis patients regarding infection control. **Hypotheses:** 1- The post mean practice scores of nurses who will expose to a structured nursing protocol will be higher than their pre mean practice scores. **Subjects:** All available nurses working at emergency unit who were willing to participate in the study (50). **Setting:** The study will be conducted at the emergency unit of Assiut University Hospital. **Tools** utilized were: a) Questionnaire sheet to assess sociodemographic data of nurses. b) Observation check list sheet to assess nurses practice. **Results:** highest percentage of the nurses (40% ) their age were less than 20 years, (96%) were having diploma degree in nursing, their experiences were mostly more than 5 years among (52%) of them. The baseline mean scores for total and subtotal practice scores were very low before applying the nursing protocol ( $3.36 \pm 0.69$ ,  $54.16 \pm 5.77$ ,  $35.36 \pm 5.54$ ,  $92.32 \pm 10.25$  respectively). However, a sharp improvement in the mean practice scores immediately after the application of the nursing protocol. All nurses were in unsatisfactory practice level pre nursing protocol; however most of them in post nursing protocol were in good practice level. **Conclusions:** Nurse's practices regarding to infection control in Emergency Unit at Assiut University Hospital are inadequate. Nurses are potentially capable to improve their practice after exposure to nursing protocol. Application of nursing protocol about infection control when dealing with hematemesis patients shows a significant improvement in nurse's practice. **Recommendations:** Patients with hematemesis should be exposed to educational programs about infection and how to avoid. Nurses should be encouraged to attend specific meetings as workshops and seminars held for infectious diseases and infection control to be acquainted with the most advances and skills in this area.

**Keywords:** Infection control, Structured nursing protocol, Practice scores, Hematemesis patients

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### I. Introduction

Hematemesis is the regurgitation of blood from the upper gastrointestinal tract (mouth, pharynx, esophagus, stomach and small intestine). Hematemesis is always an important sign, but its severity depends on the amount, and rapidity of the bleeding. Massive hematemesis (vomiting 500 to 1.000 ml of blood) may be life threatening (Smelter & Bare, 2015).

The common cause of hematemesis is liver cirrhosis with portal hypertension. The other causes of hematemesis are: an ulcer in the stomach or small intestine, gastritis, esophagitis, and medications such as aspirin and ibuprofen which are common causes of stomach and esophagus irritation. Patients and staff dealing with hematemesis patients have the greatest hospital risk of acquiring hepatitis B or C infection. It is important for every worker to keep barrier between them and any one's blood or body fluids (DeLaune S and Ladner P., 2010)

Infection control is an essential aspect of a nurse's role in any field of practice and none more so than in preoperative environment, especially in the operating theater (Holland, 2012). Infection control and prevention required not only new products to decrease infection rates but also the knowledge, skills and mindset to be proactive against infection on daily basis (Motacki and Kapoian, 2011).

When the nurse provide care to the patient the risk of infection is increased for both of them, so the nurse should apply the standard precautions when dealing with those patients, which are defined as the major features of universal precautions and body substance isolation. This system protects against the transmission of both undiagnosed and identified infections. The use of standard precautions protects all health care provider and patients (Curtis K. and Ramsden C., 2011)

Treating all patients in the health care facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors. The universal precautions which must be applied by the nurse include the following: · hand washing and antisepsis (hand hygiene); use of personal protective equipment when handling blood, body substances, and secretions; · appropriate handling of patient care equipment and soiled linen; prevention of

needle stick/sharp injuries; · environmental cleaning and spills-management; and · appropriate handling of waste(Labrague L. etal ,2012).

Personal protective equipment reduces but does not completely eliminate the risk of acquiring an infection. It is important that it is used effectively, correctly, and at all times where contact with blood and body fluids of patients may occur. Continuous availability of personal protective equipment and adequate training for its proper use are essential. Staff must also be aware that use of personal protective equipment does not replace the need to follow basic infection control measures such as hand hygiene (World health organization, 2014)

Safe handling of needles and other sharp devices are components of standard precautions that are implemented to prevent health care worker exposure to blood borne pathogens. The safety devices on needles and other sharps should be activated immediately after use. Used needles should be discarded immediately after use and not recapped, bent, cut, removed from the syringe or tube holder, or otherwise manipulated(Craven&Hirnl.2007).

Nurse's education and training are very necessary for them to gain the knowledge and skills required to prevent infection when dealing with hematemesis patients. For that reason, the current study aimed to evaluate the effect of a structured nursing protocol on practice scores of nurses working with hematemesis patients regarding infection control.

## **II. Significance of the study**

According to experience of researcher, it was noted that the nurse's practices scores regarding to infection control specially those related to the prevention of blood borne infections are not adequate and need for improvement. Therefore the aim of the study is to evaluate the effect of a structured nursing protocol on practice scores of nurses working with hematemesis patients. This might be helpful in many ways, first it will construct a data base about this problem, and second it might help in prevention or reduction of blood transmitted diseases to nurses and patients.

It is hoped that this effort might help nurses to improve their practice in assessment, planning, implementation and evaluation of such patients. This will reflect on shortening patient's length of stay, as well as decreasing hospital costs. Moreover, it might generate an attention and motivation for further researches into this area.

## **III. Aim of the study**

The aim of this study is to evaluate the effect of a structured nursing protocol on practice scores of nurses working with hematemesis patients regarding infection control.

### **Hypotheses**

The post mean practice scores of nurses who will expose to a structured nursing protocol will be higher than their pre mean practice scores.

## **IV. Research design**

Quasi experimental research design was utilized in this study. This design is used to explain relationships, clarify certain events happened or both. This design is also a mean of examining causal relationship, quasi experimental design have insufficient control when compared with experimental design in at least one of three areas: (1) manipulation of the treatment variables ,(2) manipulation of the setting , or (3)selection of subjects. In clinical nursing studies, subjects are frequently not randomly more quasi experimental studies (Polit etal, 2001)

### **Subjects:**

A convenience sample of all available nurses (50) working at emergency unit who were willing to participate in the study.

### **Setting:**

The study was conducted in the emergency unit at Assiut University Hospital.

### **Tools:**

Data pertinent to the study were collected, utilizing the threetools. These tools are developed by the researcher based on reviewing of literature.

- 1. Questionnaire sheet (Annex I):** This tool used to assess Socio demographic data about the nurses such as: name, age, sex, residence, marital status, level of education, years of experience, and previous training.

**2. Observation check list (Annex II):** This tool used to assess nurses practices when dealing with hematemsis patients regarding to infection control. It applied before and immediately after the implementation of nursing protocol as well as after 2 months. It consists of the following items:

- 1- Apply infection control measures. It includes 9 items (Items from 1 to 9) which includes universal precautions as: (Hand washing, Wear gloves, Change gloves, Remove gloves promptly, Wear body gown, Wear mask & eye protection, appropriate handling of patient- care equipment and solid linen, Dealing with sharp objects, Dealing with blood, body secretions& fluids, Maintain clean environment, and safe injection practices).
- 2- Specific precautions which includes 7 items (Items from 10 to 16), as regards skills or actions to minimize infection during the most procedures provided to hematemsis patients (Cannula insertion, IV fluid infusion, Blood transfusion, Urinary catheter insertion, Sengsteken Tube Insertion, Suctioning, and Naso- gastric tube insertion).

**Scoring system:** Each item was observed, categorized and scored into either done correctly, or not don. Those who obtained less than (70%) were considered having unsatisfactory level. From (70% to 90%) were considered having satisfactory level. While those who obtained above than (90%) were considered having good practice level.

**Tools testing and pilot study:**

A pilot study was implemented on (10%) five nurses to examine the feasibility and applicability of the study tools. Analyses of the pilot study revealed that minimal modifications are required. These modifications were done and the subjects were excluded from the actual study.

**Content validity:**

The content validity of study tools were checked by 7 expert professors in fields of nursing and medicine, they reviewed the instruments of clarity, relevance, understanding, applicability and easiness for administrative minor modifications that required correction was carried out accordingly.

**Techniques for data collection:**

A structured interview was utilized to fill out the questionnaire sheet (tool 1). Observation technique was utilized to fill out the observation check list for practice of nurses (tool 2).

**Protection of human rights:**

Permission to carry out the study was obtained by the researcher from the responsible hospital authorities of the emergency unit at Assiut University Hospital, also oral permission from the participating nurses in emergency unit was obtained. After explanation of the nature and aim of the study the investigator emphasized that the participation is voluntary , confidentiality and annonymity will be assured through coding of all data.

**Procedure:**

This study will be carried out on 3 phases:-

**1. Preparatory phase:**

- The researcher designed and tested the proposed nursing protocol after extensive literature review (Nursing textbooks, journals , internet resources, etc...) and assessment of nurses practice in this regard. Then the final form of the proposed protocol and study tools will be checked by a panel of experts for content validity and applicability.
- To facilitate the implementation of a structured nursing protocol about infection control regarding to hematemsis patients, researcher prepared the training places, teaching aids and media (pictures, and handouts). This was followed by arranging for the nursing protocol schedule based on the contents of protocol, number of staff involved, time availability, shifts as well as the resources available.

**2. Implementation phase:**

- It will be directed toward nurses in which the researcher will meet nurses to schedule with them teaching sessions. Number of teaching sessions will vary according to their understanding.
- At initial interview the researcher explained the nature & purpose of the nursing protocol and help respondents to fill out the questioner sheet (tool 1) to assess Socio demographic data about the nurses
- The nurses were divided into small groups; each group contains 2 to 4 nurses.
- The nursing protocol has been implemented for nurses in terms of teaching sessions with a total of 9 sessions. The duration of each session was thirty minutes, including five minutes for discussion and feedback. Each session usually started by a summary of what has been toughed during the previous sessions

and the objectives of the new topics. Giving praise and /or recognition to the interested nurses were emphasized for motivation during the nursing protocol implementation. Each nurse obtained a copy of the nursing protocol booklet that included all the training contents.

**3. Evaluation phase:**

- It is the last phase in which the nurse's practices were evaluated pre and immediately post as well as after 2 months of protocol implementation through filling the tool (2).

**Administrative design:**

An official permission to conduct the study was obtained by the researcher from the director of Assiut University hospital as well as from the head of the Emergency unit.

**Statistical design:**

SPSS 19.0 was used for statistical analysis of collected data; t-test and Pearson chi-square tests were used to analyze quantitative and qualitative data respectively. Statistical significance was considered at level of p-value  $\leq 0.05$  for testing the research hypotheses.

- n.s  $P > 0.05$  non significant
- \* $P < 0.05$  significant
- \*\* $P < 0.005$  moderated significant
- \*\*\* $P < 0.001$  highly significant

**Limitation of the study:**

- There are no available resources in the emergency unit .
- Number of nurses working with patients was inadequate.
- Nursing researches in this area were inadequate.

**V. Results and Analysis of Data**

**Table (1)** shows that the highest percentage of the nurses (40% ) their age were less than 20 years, more than half (56%) of them were single ,(76%) living in rural areas and (96%) were having diploma degree in nursing, their experiences were mostly more than 5 years among (52%) of them with mean duration of (6.81±2.34). More than half of them(56%) not received previous training about infection control.

**Table (2)** shows that the baseline mean scores for total and subtotal practice scores were very low before applying the nursing protocol (3.36±0.69, 54.16±5.77, 35.36±5.54, 92.32±10.25 respectively). However, a sharp improvement in the mean practice scores immediately after the application of the nursing protocol (8.16±0.72, 61.56±2.10, 108.36±2.51, 243.04±45.64 respectively). This improvement was partially lost 2months later (7.05±0.50, 59.45±1.87, 106.28±1.99, 240.54±34.56 respectively).

**Table (3)** shows a significant statistical difference between nurse's practice in relation to total and subtotal practice scores in all items between pretest and immediately post test but there is non-significant statistical difference in all items between immediately posttest and 2month after application of nursing protocol.

**Figure (1):** documenting that all nurses were in unsatisfactory practice level pre nursing protocol, however most of them in post protocol were in good practice level.

**Table (4):** In this table, education had a positive relation with total and subtotal practice scores especially in the total practice. However duration of experience was found to be having a positive relation with total and subtotal practice scores all through the study period except in general precautions.

**Table (1):** Sociodemographic characteristics of the studied nurses (n= 50) in percentage distribution.

Variables	Frequency	
	No.	%
<b>1-Age:</b>		
- < 20 yrs	20	40%
- 20- 29 yrs	18	36%
-30-39 yrs	4	8%
-40-50 yrs	8	16%
Mean± SD	26.16±10.43	
<b>2- Sex</b>		
- Male	4	8%
- Female	46	92%
<b>3- Residence:</b>		
- Urban	12	24%
- Rural	38	76%

4- Marital status: - Single - Married	28 22	56% 44%
5- Education: - Diplom nursing 3yrs - Technical institute - High nursing	48 2 ---	96% 4% ---
6- Years of experience - < 1 yr - 3-5 yrs - 5-10 yrs ->10 yrs	8 26 10 6	16% 52% 20% 12%
Mean ±SD	6.81±2.34	
7- Previous training - With previous training - Without previous training	22 28	44% 56%

**Table (2)** Total and subtotal mean practice scores obtained by nurses pre, immediately post and 2months after application of nursing protocol (n=50).

Practice Item	Mean ±SD	p-value
<b>1- Infection control measures</b> - Pre-nursing protocol - Post-nursing protocol -2month post-test	35.36±5.54 108.36±2.51 106.28±1.99	
F ratio	0.694	P<0.000** *
<b>2- Specific precautions</b> - Pre-nursing protocol - Post-nursing protocol -2month post-test	54.16±5.77 61.56±2.10 59.45±1.87	
F-ratio	0.529	P<0.000** *
<b>3- Total practice</b> - Pre-nursing protocol - Post-nursing protocol -2month post-test	92.32±10.25 243.04±45.64 240.54±34.56	
F-ratio	0.784	P<0.000** *

\*\*\* Significant at <0.001

**Table (3)** Two by two t-test for the mean practice score obtained by nurses pre, immediately post and 2 months after application of the nursing protocol.

Practice	Pre-test	Immediately post-test
<b>1- Infection control measures</b> - Immediately post-test - 2months post-test	27.51*** 32.51***	9.78n.s
<b>2- Specific precautions</b> - Immediately post-test - 2months post-test	16.28* 10.35n.s	9.51n.s
<b>3- Total</b> - Immediately post-test - 2months post-test	35.98*** 12.53n.s	13.82n.s

\*Significant at<0.05      \*\*\* significant at<0.001      n.s=non-significant

Figure(1): Practice score levels obtained by nurses' pre, immediately posttest and 2 months after application of nursing protocol.

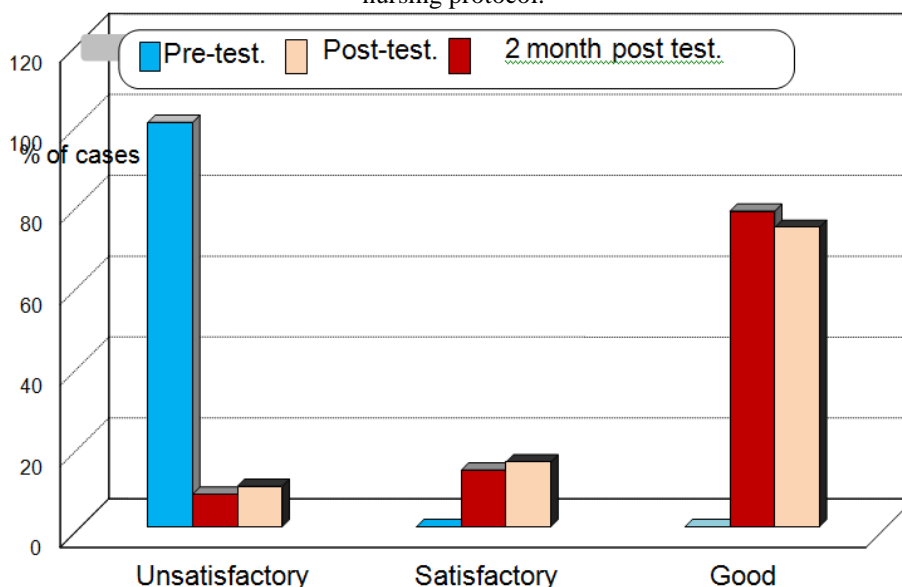


Table (4): Relationship of the total and subtotal practice scores to the nurses education and duration of experience obtained pre, immediately post, and 2 months after the application of the nursing protocol.

Sociodemographic variables Practice items	Education		Duration of experience	
	t.test	P- value	t.test	P- value
<b>1-Infection control measures</b>				
- Pre- nursing protocol	0.899	0.652 n.s	2.48	0.016*
- Immediately post-test	0.725	0.425 n.s	2.72	0.02*
- 2month post-test	0.921	0.381 n.s	3.91	0.001**
<b>2- Specific precautions</b>				
- Pre- nursing protocol	0.246	0.708 n.s	2.28	0.02*
- Immediately post-test	0.425	0.825 n.s	3.52	0.01*
- 2month post-test	0.371	0.638 n.s	4.22	0.03*
<b>3- Total</b>				
- Pre- nursing protocol	3.77	<0.000***	2.61	0.01*
- Immediately post-test	2.58	<0.000***	3.25	0.001**
- 2month post-test	2.91	<0.000***	4.81	0.000***

n.s=non significant \*Significant \*\*moderate Significant \*\*\*highly Significant

## VI. Discussion

Patients with hematemesis are at risk for infection as well as nurses who are dealing with those patients, they have the greatest hospital risk of acquiring hepatitis B or C infection. So it is important for health team member to keep barrier between them and any one's blood or body fluids (DeLaune S and Ladner P., 2010).

Based on the results of the present study, the majority of the nurses were young adults. Most of them have no in-serves training courses related to infection control so their practice scores regarding to infection control before implementation of nursing protocol is unsatisfactory. In this line, Attia R ,(2007):emphasized on the acute need for educational interventions in the field of HAIs(Hospital Acquired Infections) and safety precautions for HCWs(Health Care Workers) particularly among nurses.

In this study the researcher found that the nurses need to be encouraged to attending educational program, in this respect Isara &, Ofili (2008) in their study, entitled as: Knowledge and practice of standard precautions among Health Care Workers in the Federal Medical Centre, Asaba, Delta State, Nigeria, emphasized the need for intensive enlightenment program to educate health care workers on various aspects of standard precautions and infection control programs and policies.

Brooker C. etal(2011)mentioned that infection is a common cause of morbidity and mortality for hospitalized patients, Interventions included a one-to-one education program for nursing staff (n = 30); The education program for nurses focused on the application of standard precautions to three common clinical procedures: hand washing, tracheobronchial suctioning and nasogastric tube feeding. These were evaluated using competency checklists. The prevalence of nosocomial blood and respiratory tract infections declined over

the 7-month study period. This study highlights the importance of education in contributing to the control of infection between hospitalized patients.

The current study revealed a great improvement in the practice score levels obtained by nurses after implementation of the nursing protocol. This has been concluded by the presence of significant differences between results of pre-test and post-test. These findings indicated that skills can be easily improved.

In this respect, **National Institute for Health and Clinical Excellence, 2002**, documented that the in-service training program has a beneficial effect in improving the nurses knowledge and skills. They also recommended that educational programs should be organized according to the needs of nurses with continuous evaluation.

With regards to nurse's practice, it was clear that the nursing protocol had good effects on improving the nurse's practice scores as regard nursing care of patients with Hematemesis. This was proved by the significant difference between results of the pre-test and post-test nursing protocol implementation. These differences remained significant 2 months after the application of the nursing protocol. This indicates that practices are easier to improve, especially if linked with their relevant scientific basic information.

These results are in agreement with those of **Sherward (2006)**, who stated that several studies reported that changes in nursing practice occur following the attendance at continuous nursing education programs increase knowledge and performance and can also change attitudes.

**Park (2004), Baik (2005), Choi (2006), Kim (2010), Ahn (2008), et al**, supported that in-service program has a beneficial effect on improving the nurses performance. These researchers recommended that educational programs should be organized according to the need of the nurses with continuous evaluation.

The results of this study showed that education had a positive relation with total and subtotal practice scores especially in the total practice, However duration of experience was found to be having a positive relation with total and subtotal practice scores all through the study period.

As well, **World health organization, (2014)**, and **Daman N., (2012)**:stated that, nurses with many years of experience may require a minimum of additional instruction before they are ready to take a patient assignment, nurses with years of experiences in one clinical specialty may need a moderate amount of instructions to acquire through training program.

Finally, it can be concluded that, the nursing protocol for nurses working with hematemesis patients who are at high risk of infection had achieved its objectives by improving nurse's practice about infection control measures when dealing with those patients. **Tenías (2006)** mentioned that a professional health care worker, especially nurse have a large role in prevention/or reduction of infection.

## **VII. Conclusion**

### **Based on the results of the present study it can be conclude**

- Nurses who are dealing with hematemesis patients are at high risk for infection and they need effective measures to prevent/ reduce infection.
- Nurse's practices regarding to infection control in Emergency Unit at Assiut University Hospital are inadequate. Nurses are potentially capable to improve their practice after exposure to nursing protocol.
- Application of nursing protocol about infection control when dealing with hematemesis patients shows a significant improvement in nurse's practice. Improving nurse's practice can favorable affect the outcome of hematemesis.

## **VIII. Recommendations**

### **Based on the results of the present study it can be recommended:**

1. Continued nursing education and in-service training programs about infection control should be well organized within Assiut University Hospital and equipped with the necessary educational facilities and materials necessary to upgrade skills of practicing nurses, which will be reflected on better outcome and service for inpatients.
2. Written standards for infection control should be available in all departments.
3. The responsible health authority should develop a national (or regional) programme to support hospitals in reducing the risk of health-care-associated or nosocomial infections.
4. Adequate supplies and facilities have to be available to hospital personnel to maintain good infection control practices and maintain safe environment for patients and staff.
5. Periodic monitoring of nurses knowledge and practice by nursing audits and supervisors.
6. A continuing educations program be planned for and offered on regular basis to nurses in Emergency Unit.
7. Educational programs should be organized according to the needs of nurses with continuous evaluation.
8. It is recommended that similar studies should be replicated on longitudinal basis.
9. Patients who are at high risk for infection as patients with hematemesis should be exposed to educational programs about infection and how to avoid.

10. Nurses should be encouraged to attend specific meetings as workshops and seminars held for infectious diseases and infection control to be acquainted with the most advances and skills in this area.

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