

Effectiveness of Structured Teaching Program on Knowledge and Practice Regarding Blood Specimen Collection among Nurses

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Abstract: Objective the study was carried out to was to investigate the effectiveness of structured teaching program on knowledge and practice regarding blood specimen collection among nurses Methods: Research design: A quazi experimental design was utilized. Setting: Menoufia University Hospital at Menoufia governorate, Egypt. Subjects: A purposeful sample of 286 nurses from different departments in Menoufia university hospital, Menoufia governorate, Egypt. Tools for data collection: Interviewing questionnaire includes socio demographic date, structured knowledge questionnaire sheet: regarding blood specimen collection, and observational checklist. Results: more than half of studied sample aged above 30 years, they mainly working in surgical department. The measures taken to improve prominence of vein showed statistically significant difference before and after structured educational program, nurses' knowledge regarding blood specimen collection showed obvious improvement and good practice after structured educational program. Conclusions: The program helps the Staff nurses to improve their knowledge on BSC. This will ultimately improve their practice that reflects on patient's safety. The findings of the study indicate that there is improvement in knowledge of Staff nurses and practice even this improvement was less slightly which indicate that the STP is an effective in improving the knowledge and practice of the staff nurses.

Keywords: blood specimen collection, Knowledge, practice

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I. Introduction

Venous blood specimen collection (VBSC) is a common procedure in nursing care. A fundamental responsibility for nurses is to alleviate suffering. Repeated VBSC due to deficiencies in the organization or suboptimal VBSC practices can be prevented. Training in work technique is important for safety and well-being of patients. Good practical skills in nursing that combine technical, theoretical, psychosocial and physical elements are therefore needed. ⁽¹⁾Laboratory results play a key role in patient care. It is estimated that around two thirds of important clinical decisions about admissions, discharge and medication are based on laboratory test results that is also an important source of medical errors that can affect patient safety. ⁽²⁾Venous blood specimen collection (VBSC) is one of the most common procedures that were done in every ward for disease diagnosis and prognosis. ⁽³⁾ Errors in VBSC may lead to patient suffering and endanger patient safety ⁽⁴⁾. Injuries related to VBSC errors are caused most often by human mistakes and relatively few are related to technical errors ⁽⁵⁾. In addition, VBSC errors are latent and distant from direct control and thus often go unrecognized. Therefore, VBSC practices should strictly follow guidelines based on evidence and best practices. ⁽⁶⁾Staff nurses working in the clinical field are said to be backbone of the hospital. Most of the care of patients is taken by the staff nurses working in the hospital. She is the person who stays most of the time with patient and their relatives who are present in the hospital or comes in the clinic with patients. Obviously, the role of nurse is increased due to long stay with the patient. She has to take care of patients as well as she has to provide health education to patient and their relatives regarding necessary care for the prevention of complications progressive to disease. ⁽⁷⁾The role of nurse is important for management of central venous access device. She has to perform routine dressing and flushing of the device. She has the important role in health education of patient and caregivers regarding venous access device care. ^{(7)& (8)}VBSC can be viewed as a dependent practical skill, meaning that different kinds of professionals perform and encompass the totality of VBSC practices. Worldwide, different professionals perform VBSC, but venipuncture should be performed by educated and competent personnel, because VBSC practices demand theoretical knowledge as well as good practical skills ^(9 & 10 & 6). Nurses in clinical practice collect blood from patients as part of routine laboratory tests. It is well known that these results are often erroneous due to several factors, one of which being incorrect performance of venous blood specimen collection. ⁽³⁾Nursing education facilities assure that they follow the guidelines when teaching VBSC practices, so the fact that health care staff does not always adhere to VBSC guidelines to the letter ⁽⁸⁾. must mean that nursing students or newly

graduated nurses are deviating from guideline practices over time. To improve knowledge in regard to adherence to VBSC guidelines and patient safety, it is important to investigate to what extent nursing students in clinical practice adhere to VBSC guidelines and the reasons why they tend to deviate from those guidelines.⁽³⁾ Nursing professionals must know the best practice technique for the management of intravenous cannulation and complications caused by intravenous cannulation including ways to prevent and manage these complications. We need not forget that nurses are the ones mainly responsible for improving knowledge and application of best practice technique for the management of intravenous cannulation. As nurses, we are responsible for maintaining our skills and knowledge in relation to all aspects of patient care.⁽¹²⁾

Theoretical framework:

In nursing research there exists a lack of evidence-based knowledge focused on hands-on performance in clinical settings. However, this focus is as important as taking care of the mind and emotions. Attention should be given to physical and practical aspects of how nurses develop and perform practical skills⁽¹¹⁾. VBSC is a nursing skill that demands theoretical knowledge as well as good practical skills⁽¹³⁾. A theorisation based on a model of practical skill performance in nursing⁽⁹⁾ might contribute to a more holistic approach to VBSC.⁽⁶⁾ Therefore, practical skills within nursing research must be worthy of interest. Using a model for practical skills in nursing to describe VBSC in a more holistic and less technical way might highlight VBSC as a practical nursing skill.⁽¹⁴⁾

Significance of the study:

It is important to assess the ability of nurses to create positive change in the practice. The correctness of the blood test is closely related to the sample. According to the recent reported data, 80 percentage unsatisfactory results of the clinical test are due to the poor quality of sample, especially the blood sample⁽¹⁵⁾. Clinical practice guide (CPG) is directly to instruct the clinical nursing practice. And the recommendations in the clinical practice guide are based on the best available study evidences.⁽¹⁶⁾

Aim of the Study:

The aim of the study was to investigate the effectiveness of structured teaching program on knowledge and practice regarding blood specimen collection among nurses. 1. To assess the knowledge and practice of nurses regarding blood specimen collection at different departments of selected hospital before and after structured teaching program. 2. To find out association between knowledge score and practice score regarding blood specimen collection among staff nurses and selected demographic variables.

Research Hypothesis:

Implement the structured teaching program regarding blood specimen collection will improve nurses' knowledge and practice that improve patient safety.

Inclusion criteria:

1. Staff nurses who have completed graduation in nursing.
2. Nurses who are willing to participate in the study.

Exclusion criteria:

1. Nurses who have completed specialized course in venous access device care.
2. Nursing superintendent.

II. Subjects and Method

Design: The present research design was quasi experimental.

Setting: The present study conducted at different department (medical, surgical, orthopedic departments,.....ect) of the Menoufia University Hospital at Menoufia governorate, Egypt.

Subject: A purposeful sample of 286 nurses from different departments in Menoufia university hospital, Menoufia governorate, Egypt.

Sample size:

Sample size was calculated utilizing the following Equation 1:

Where: n = sample size;

N = total population number (1100);

e = margin error (0.05).

$$n = \frac{N}{1 + N(e)^2}$$

A total 293 of nurses administered were current study but 7 nurses refused to complete the

recruited in the

study so the final recruited number were 286. They were allocated into pre and post groups (286 nurses). The

data collection was carried out from June 2017 to September 2017.

Tool 1: socio demographic data sheet to assess subject characteristics as age, gender, professional status, department, years of experience.

Tool 2: structured knowledge questionnaire sheet regarding blood specimen collection. It was developed and used by the researchers after reviewing the related literature (^{1, 14, 25}) to assess patients' knowledge. It consisting of 20 items of open questions covering the following areas: inspection of vein, Measures to Improve Prominence of Vein, strategies after blood collection to avoid complications, and safety aspects during blood collection.

The scoring system was categorized as follow:

•Poor knowledge (< 50%); •Fair knowledge (50 - <75%); •Good knowledge (≥75%)

Tool 3: Observation Checklist: items related to practice of blood specimen collection to check practice / performance of nurses. There were 25 items covering steps of blood specimen collection. **Scoring system as follow:**

The checklist consists of two options; performed and not performed, for all 25 items. Score for 'performed' is '1'. Score for 'not performed' is '0'. The scores range from minimum zero to maximum 25.

The levels of practice have been classified as:

- Un satisfied (Poor) Practice (0-13)
- Satisfied (Average) Practice (14-17)
- Good Practice (18-25)

Validity and reliability:

Tools were tested for content validity by three experts in the field of Medical Surgical Nursing, Faculty of Nursing, Menoufia University, and two experts in the field of Medicine, Faculty of Medicine, Menoufia University and modifications were done accordingly. All tools were tested for reliability using test retest method to ascertain consistency: patient's knowledge regarding blood specimen collection r = 0.85, observation check list r = 0.73

Field work:

the researcher will assess the knowledge through knowledge sheet regarding blood specimen collection, technique of blood specimen collection through observational checklist) among nurses by the means of pretest. The researcher will administer Structured Teaching Program as the following:

- (1) Knowledge through one by one teaching (lecture) during interview.
- (2) Practice regarding blood specimen collection. Through demonstration and return demonstration procedure.
- (3) The researcher used audiovisual aids as colored booklet and instructional videos to provide knowledge and technique of blood specimen collection.

After one month of nursing structured educational program (post test):

- (1) The researcher will assess the knowledge through knowledge sheet regarding blood specimen collection
- (2) Practice regarding blood specimen collection among nurses clients through observational Check-list to assess the technique of blood specimen collection and repeated this measurement after two months. The data were collected on first day as pretest and second post- test for the same data was collected after one month, and after two months.

A pilot study: conducted by the investigators on (10%) 28 nurses. These nurses excluded from the study sample. The purpose of the pilot study was to check and ensure the clarity, feasibility and applicability of the study tool.

Administrative and Ethical consideration:

The Ethical Committee of the faculty of nursing approved the research. An official permission and official letter was obtained from the responsible authorities after explaining the aim of the study. Formal consent was obtained from each participant. Voluntary participation, anonymity, and confidentiality were all guaranteed.

Statistical Analysis:

The Data collected and entered into the personal computer. Statistical analysis done using Statistical Package for Social Sciences (SPSS version 16) software. Both descriptive and inferential statistic established. The level of significant was considered at P- value <0.05.

III. Results

Table 1: Distribution of the studied sample regarding their demographic data:

Variable	N=286	%
Age		
<25	39	13.6
25-30	89	31.1
>30	158	55.2

mean	30.84	
Sex		
Male	25	4.8
Female	261	87.9
Education		
Secondary/ diplom	122	41.1
Institute	116	39.1
College/ bachaloric	48	16.2

Table (1) illustrated that more than half of studied sample at the age above 30 year old (55.2%), majority of these sample were female (87.9%). and (41.1%) was secondary/ diplom education.

TABLE 2: Studied Sample Characteristic:

Variable	N=286	%
Department:		
• Urology	36	12.59
• Surgical	75	26.22
• Orthopedic	39	13.64
• Medical	64	22.38
• ICU	35	12.24
• Oncology	5	0.70
• Emergency	32	11.18
• total	286	100
Routine time:		
• Don't know	4	1.4
• yes	282	98.6
How often:		
• Every month	114	39.86
• Every day	172	60.14
Experience in years		
≤1	28	9.79
>1-3	53	18.53
>3-5	38	13.29
>5	167	58.39
Type of selected vein:		
• Median antecubital vein	91	31.82
• Dorsal hand	175	61.19
• Subclavian	20	6.99
• total	286	100

Table 2: illustrated that nurses included in the study were mainly working in surgical (26.22%) and urology (22.38%) department, majority of them perform blood specimen collection as a routine work (98.6%) nearly every day (60.14%). More than half of the studied sample have experience more than 5 years old(58.39%), the dorsal hand vein was the most common selected vein for blood specimen collection (61.19%) followed by median antecubital vein(31.82%) then subclavian vein(6.99%).

Table 3: Comparison of measures taken to improve prominence of vein:

variable	Pre Educational Program		Post Educational Program		T test	P value
	Mean	SD	Mean	SD		
Incline the arm in a downward position	0.98	0.10	0.97	0.14	-0.98	0.32
Stroke the vein in a distal direction	0.92	0.26	0.94	0.22	0.99	0.32
Clench the fist	0.86	0.34	0.94	0.22	3.341	0.000
Tap the vein	0.86	0.34	0.95	0.21	3.80	0.000
Warm the area (bathe arm or use a heating pad)	0.71	0.45	0.87	0.33	4.84	P < 0.000
Skin patch with local anaesthetic	0.83	0.36	0.94	0.23	4.355	P < 0.0001
Applying tourniquet	0.68	0.46	0.95	0.21	9.030	P < 0.0001
Disinfecting the Puncture Site	0.86	0.34	0.95	0.21	3.809	P= 0.0002

This table showed measures taken to improve prominence of vein that revealed statistically significant difference in most of measures as warm area, applying tourniquet. But incline arm in a downward position and stroking vein in distal direction didn't show the same significance.

TABLE 3: Distribution of measures taken to improve prominence of vein

Variable	Pre Structured Educational Program		Structured Educational Program	
	NO	%	NO	%
Incline the arm in a downward position ○ Yes ○ no	283 3	98.95 1.05	280 6	97.9 2.10
Stroke the vein in a distal direction ○ Yes ○ no	264 22	92.31 7.69	271 15	94.76 5.24
Clench the fist ○ Yes ○ no	246 40	86 14	271 15	94.76 5.24
Tap the vein ○ Yes ○ no	247 39	86.36 13.64	272 14	95 4.90
Warm the area (bathe arm or use a heating pad) ○ Yes ○ no	205 81	71.68 28.3	249 37	87.06 12.94
Skin patch with local anaesthetic ○ Yes ○ no	240 46	83.9 16.08	270 16	94.41 0.02
Applying tourniquet ○ Yes ○ no	196 90	68.53 31.47	272 14	95 4.90
Disinfecting the Puncture Site ○ Yes ○ no	247 39	86.36 13.64	272 14	95 4.90
Before removing the needle from the vein, the tube is removed from the holder. ○ Yes ○ no	249 37	87.06 12.94	274 12	95.80 4.20
The tourniquet should already have been released completely - this should be made sure of! ○ Yes ○ No	272 14	95 4.90	286 0	100 0
The compression must be carried out directly after removing the needle. ○ Yes ○ no	271 15	94.76 5.24	286 0	100 0
Taking normal coagulation time into account, 2 - 4 minutes time for compression is necessary to prevent a haematoma from forming. ○ Yes ○ no	274 12	95.80 4.20	286 0	100 0
A sterile adhesive plaster should only be applied, when compression is complete. ○ Yes ○ no	195 19	68.18 6.64	195 19	68.18 6.64
If the antecubital area has been punctured, the arm should be held upwards, without bending. ○ Yes ○ no	260 26	90.90 9.09	273 13	95.45 4.55

Table 3: This table showed Knowledge related to measures to improve prominence of vein, illustrated that the most common steps to improve prominence of vein were Incline the arm in a downward position, The tourniquet should already have been released completely - this should be made sure of!, Taking normal coagulation time into account, 2 - 4 minutes time for compression is necessary to prevent a haematoma from forming, and The compression must be carried out directly after removing the needle. While the least percentage was Applying tourniquet and A sterile adhesive plaster should only be applied, when compression is complete. Before teaching program; while after teaching program there was obvious improvement in all measures to improve prominence of vein except A sterile adhesive plaster should only be applied, when compression is complete (68.18%)

TABLE 4: Strategies after Blood Collection to Avoid Complications Before and After Teaching Program

Variable	Pre Structured Educational Program		Post Structured Educational Program	
	no	%	no	%
Factors that increase risk of hemolysis:				
o Wrong answer	129	45	-	-
o Don't know	154	53.85	154	53.85
o Complete wright answer	3	1.05	132	46.15
Areas to avoid when choosing vein:				
o Wrong answer	144	50.35	-	-
o Don't know	139	48.60	139	48.60
o Complete wright answer	3	1.05	147	51.40
Causes of inadequate blood flow:				
o Wrong answer	143	50	3	1
o Don't know	-	-	40	14
o Complete wright answer	143	50	243	85
Solution for above problem:				
o Wrong answer	144	50.35	-	-
o Don't know	139	48.5	139	48.60
o Complete wright answer	3	1.05	147	51.40
Safety aspects for using tourniquet:				
o Wrong answer	146	51.05	-	-
o Don't know	137	47.9	137	47.9
o Complete wright answer	3	1.05	149	52.1

TABLE 4: strategies after blood collection to avoid complications before and after teaching program, showed that nearly half of studied sample don't know Areas to avoid when choosing vein before and after structured teaching program. Regarding presence of any complication, how can nurse manage and Solute this problem 50.35% give wrong answer while 1>05 give complete wright answer which turn after structured teaching program to 51.40 % who give wright complete answer even 48.60 % don't know how to manage complications. Safety aspects for using tourniquet showed 51.05 % give wrong answer, 47.9% don't know, and 1.05% give complete wright answer but after structured teaching program 52.1% give complete wright answer.

Table 5: Number and percentage distribution of nurses' knowledge regarding blood specimen collection

Knowledge scores		Pre Structured Educational Program (n=286)		Post Structured Educational Program (n=286)	
		No	%	No	%
A. knowledge Relating inspection of vein	Poor	51	17.8	40	14
	Fair	205	71.7	160	56
	Good	30	10.5	88	30
B. Measures to Improve Prominence of Vein	Poor	129	45.1	90	31.5
	Fair	110	38.5	67	23.4
	Good	47	16.4	131	45.1
C. strategies after blood collection to avoid complications	Poor	268	93.7	97	39.9
	Fair	16	5.6	25	8.7
	Good	2	0.7	164	57.4
D. safety aspects during blood collection	Poor	176	61.5	87	30.4
	Fair	109	38.1	68	23.8
	Good	1	0.3	133	46.5

This table showed nurses' knowledge regarding blood specimen collection that revealed that obvious improvement in parameters of strategies after blood collection to avoid complications (57.4%) followed by safety aspects during blood collection parameter (46.5%) and there is little improvement in measures to improve prominence of vein parameter (45.1%) and inspection of vein parameter (30%) .

TABLE 6: Observational check list:

Variable	Pre Structured Educational Program (n=286)		Post Structured Educational Program (n=286)	
	NO	%	NO	%
o Satisfied	118	41.3	68	23.8
o Good	168	58.7	218	76.2

This table showed nursing practice regarding blood specimen collection through observational checklist: it revealed that percentage of good practice improved after structured educational program

IV. Discussion

Regarding demographic data: our study illustrated that more than half of studied sample aged above 30 year old (55.2%), majority of these sample were female (87.9%). More than 2 thirds (41.1%) have secondary/ diplom education in nursing. In line with our study The mean age of the participants in Wallin O; et al;⁽¹⁷⁾ study was 45 years, and the mean duration of employment was 18 years. Of these subjects, 98% were women, While In Deshmukh⁽⁷⁾ study the majority of the subjects 70 % were 21-30years old and 30 % were in the age group of 31-40 years. In that study, females were 83.33 %. The majority of the subjects 56.67 % were having Diploma in general nursing and 43.33 % were Basic B.Sc. in Nursing. From researchers point of view, wide base of nurses have secondary and diploma due to economic status that require working of all family members in our country while experience play important role that elevate level of those nurses to be competent with nurses with bachelor education. II- Our study illustrated that nurses included in the study were mainly working in surgical (26.22%) and medical (22.38%) departments, majority of them perform blood specimen collection as a routine work (98.6%) nearly every day (60.14%). More than half of the studied sample have experience more than 5 years (58.39%), matching with this result; (Wallin O; et al⁽¹⁷⁾ study , A higher proportion of participants in psychiatric (13%), intensive care (23%) and women's health/paediatric (21%) wards, compared with all other wards (0-7.4%), and 85% worked full-time, and 39% performed VBS at least weekly also; Deshmukh⁽⁷⁾ In clinical experience, the majority of subjects 71.67 % were having clinical experience of 0-5 years of clinical experience, this discrepancy may be due to nature of work in different department and policy of hospital. In this study all subjects didn't have special training for VBSC before conducting this program; in the same line; a study of (Zehra⁽¹⁸⁾ who revealed that 39.5% never received any recent education in blood sampling techniques in past 10 years where as only 37.2% received it 5 years back. (Zehra⁽¹⁸⁾. Also; Wallin O;⁽¹⁷⁾ study showed almost all participants in the laboratories reported having a formal education in VBS (95%) and 30% reported having received further education in VBS. And Nkhoma⁽¹⁹⁾ Showed that the majority of the staff, 69% had formal vein puncture training, while 31% attained the training informally. From researchers' point of view, continuing training programs have positive effect on subjects' practice/ performance that reflected on patients' safe. In this study; the dorsal hand vein was the most common selected vein for blood specimen collection (61.19%) followed by median antecubital vein (31.82%) then subclavian vein (6.99%). Omiepirisa⁽²⁰⁾; illustrated that a superficial vein most commonly used for vein puncture. The best sites for vein puncture of superficial veins of the upper limbs are the median cubital vein. However, practices vary considerably between countries and between institutions and individuals within the same country. These differences include variations in blood sampling technique, use of safety devices, disposal methods. Concerning measures taken to improve prominence of vein, this study illustrated that after structured teaching program there was obvious improvement in all measures taken to improve prominence of vein *except* application of a sterile adhesive plaster that should only be applied, when compression is complete (68.18%). Oladeinde⁽²¹⁾ study (Assessment of venous blood collection practices among medical laboratory workers in Edo State, Nigeria) Practice of hand hygiene, use of a pair of gloves per patient, proper skin disinfection and method of disposal of used syringes were observed to be poor. This default may be due to lack of facilities in our hospital. Proper disinfection of the collection site is the single most important step in preventing false positive blood collection sample. Although most (78%) of the nurses reported the use of alcohol and povidone-iodine, the majority (75%) did not allow the adequate contact time of 1.5—2 min for the maximal antiseptic effect⁽²²⁾. In addition, some nurses incorrectly believed that the stoppers of BC bottles are sterile and do not need to have their tops cleaned, which can increase the opportunities for introduction of contaminants.⁽²³⁾ Regarding to strategies after blood collection to avoid complications before and after teaching program, this study showed slightly improvement in many strategies after structured teaching program as; nearly half of studied sample don't know Areas to avoid when choosing vein before structured educational program which improved after structured educational program. Regarding presence of any complication, how can nurse manage and Solute this problem 50.35% give wrong answer which turn after nursing structured educational program to only 52.1% who give wright complete. Safety aspects for using tourniquet showed 51.05 % give wrong answer, but after structured educational program 52.1% give complete wright answer. In studied sample of Deshmukh⁽⁷⁾; study, the mean score of practice regarding venous access device care was increased from 15.4 to 19.6 in the post-test after structured education. When Cai Q.⁽²⁴⁾ reported during collection: Some studies reported that samples were collected in inappropriate Containers, preventing their analysis and causing harm to patients as a result of the need for re-collection. And Bölenius⁽⁶⁾ reported that the participants became aware of risks, achieved improvements in clinical practice and felt strengthened in working as usual. Reflections on safety revealed during the analysis could be identified in almost all subthemes and in relation to the educational structured educational program program. Differentiation in practice from study to another may be due to availability of supplies and tasks overloaded on nurses' standard guideline to be followed not available. Concerning nurses' knowledge regarding blood specimen collection; this study showed obvious improvement in nurse's knowledge after structured teaching program. Concerning our result; Eighty six percent participants thought that they had adequate knowledge regarding blood sampling, but most of them were

not adhering to standard protocols zehra⁽¹⁸⁾. The methodical systematic procedure for disinfection, blood drawing, timely labeling of test tubes and transportation is already framed⁽⁶⁾Nurses knew less on blood specimen quality control, probably because the nurses were more concerned about the phlebotomy procedure instead of quality of blood sample. This may also reflect the inadequacy of phlebotomy training received by nurses.⁽²⁴⁾In studied sample, the maximum of 43.33 % of subjects scored between 0-13 (Poor) knowledge score in the pre-test before structured education and 65 % subjects scored between 18-25 (Good) knowledge score in the post-test after structured education.⁽⁷⁾In studied group of the study, the mean score of knowledge regarding venous access device care was increased from 14.6 to 21.3 in the post-test after structured education. It indicates that the structured education is effective in increasing the knowledge scores of subjects regarding venous access device care (7).The participants reflected on lack of knowledge among VBSC personnel. Not knowing the content in the VBSC guidelines was experienced as risky. Before the educational structured educational program several of the participants did not know how to label test tubes and to perform VBSC with the correct sequence and the correct order of tubes. After education, the participants increased their understanding of several VBSC practices. Transfer of information was described as a risk for misunderstanding and sample delay. The participants described those patients and/or the professionals sometimes received wrong or no information at all, which was experienced as a safety risk.⁽⁶⁾On the other hand; Cai Q. et al.⁽²⁴⁾ mentioned that the level of knowledge on phlebotomy among Chinese nurses was found to be not quite satisfactory. Compared with previous survey in China, some progress had been made in the steps of patient preparation, tourniquet application time and test tube labeling, while the survey also showed that the mastery of some knowledge on venous blood sampling needed to be improved Regarding nurse's practice / performance during blood specimen collection; Improvement of nurses' practice / performance after structured teaching program that have positive effect in refreshing their knowledge. Many studies explore in details nurses' practice/ performance during blood specimen collection which globally point to improving practice after teaching. In line with our study; a study of Bölenius⁽⁶⁾ several specific VBSC practices were significantly improved, indicating that the educational structured educational program had an impact on the adherence to guideline practices. In the studied group, the maximum of 75 % of subjects scored between 14-17 (Average) practice score in the pretest before structured education and 48.33 % subjects scored between 18-25 (Good) practice score in the post-test after structured education. (Deshmukh⁽⁷⁾In addition, around two thirds of the investigated nurses knew that gloves should be worn during phlebotomy, yet only about one third knew the proper time to put on gloves.⁽²⁴⁾The correct rates on where to dispose needle, post-venipuncture education and tube labeling were relatively high (more than 85%). However, half of the investigated nurses considered the disposal of the needle after detaching the device with both hands acceptable practice. Around one quarter of the nurses stated that there was no need of documenting the time and person of blood collection.⁽²⁴⁾ Also; All participants recapped used needles after venous draws. However, only 20 (18.3%) of all 109 participants practiced the scoop technique of re-capping needles,⁽²¹⁾. Concerning the above results this might be attributed to the satisfactory impact of the educational program on nurse's performance and knowledge

V. Conclusion

As a part of the study 286 Staff nurses were given the STP (structured teaching program regarding blood specimen collection). The program helps the Staff nurses to improve their knowledge on BSC. This will ultimately improve their practice that reflects on patient's safety. The findings of the study indicate that there is improvement in knowledge of Staff nurses and practice even this improvement was less slightly which indicate that the STP is an effective in improving the knowledge and practice of the staff nurses. Acknowledgments: Authors wish to extend sincere gratitude to all the staff nurses working in Menoufia university Hospital, for active participation in our study.

Relevance to clinical practice:

In Menoufia university hospital, VBSC is almost always performed by trained enrolled nurses. Staff nurses working in the hospital setting need to know about complications due to use of venous access device. One of the roles of nurse is to prevent the patient from complications. Although the hospital is succeeding in providing regular training in venipuncture, this is only one aspect of quality. The process and outcome also need structured educational programs. For that purpose, the nurse should have continuous training to refresh their knowledge and updating their performance with the help of structured education given at periodic intervals

Conflicts of Interest Disclosure:

The author declares that there is no conflict of interest statement.

Recommendation:

- Training program should be established and conducted regularly and a team specially trained in the area of phlebotomy being responsible for the training program.
- Nursing procedure manual should be available on the patients' wards with Practical part carried out under supervision

- Regular supervision of the nurses being responsible for intravenous infusion on the wards. Refresh courses, conferences established for nurses to provide them with the recent advances in phlebotomy.

Recommendation for Future Researches:

- We suggest future efforts to improve VBSC guideline adherence further. For instance, the educational program should provide time for reflection and discussions.
- Furthermore, a modular structure would allow directed educational structured educational program based on the specific VBSC guideline flaws existing at any specific unit.

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