"A study to assess the effectiveness of structured teaching programme on knowledge regarding sampling error among staff nurses in territory hospital."

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Abstract
Venous blood sampling (phlebotomy) is the most common procedure done all over the hospitals, especially of the diagnostic purposes. All patients in all departments must experience this procedure; even the ordinary non diseased people may have history of blood sampling. So, it is of the importance to focus our concentration and search on. Especially, if we know that for a blood sample to be drawn in a wrong way, this will lead to sample error, either complication to the patient, i.e. hematoma, infection, nerve damage, pain, arterial puncture, syncope. Or complication to the phlebotomist, i.e. sharp injuries, infection. Or error in the sample itself, i.e. haemolysis, less sufficient sample, broken sample, wrong labelling and identification problems, cannula sampling. All these errors hinder the medical process flow, of getting a reliable lab results. So the phlebotomist must take another sample (re-sampling), 39% of samples drawn were resampled. The study was done in year 2010, through 2 months using structured observational checklist for monitoring the procedure of venous blood sampling (phlebotomy) by the assigned group of nurses (14 nurses/phlebotomists) in the Gastroenterology department while they performing the procedure for diagnostic purposes for chronic liver diseases inpatients. 230 sampling procedure (230 patients) were observed closely after taking consent from the candidate. There are many sources of errors which were entailed in our study, solved by precautions and guidelines to be followed by all stakeholders. Our study revealed that phlebotomists not followed some instructions in the adopted observational structured checklist, and this led to re-sampling. Causes of re-sampling seen in our study were: Re-sampling due to sample haemolysis due to less sufficient sample, and due to broken sample due to identification problems, due to drawing of blood from peripheral line.
Materials and Methods: A Pre-experimental and one group pretest and posttest design was used to assess the knowledge and practice of 40 nurses on Sample Error. A structured questionnaire was developed to assess the knowledge of the nurses and an observational checklist to check the practice of blood sample collection method. The study started with the pretest followed by structured teaching program and posttest.
Results:
The post test showed a significant improvement in the knowledge regarding sample errors, identifying the complications using VacutainersTransport of Blood and Needles/Eclipse practice of nurses on sample error. In the pretest 32 nurses had good level of knowledge and 8 had average level of knowledge. The post test revealed that 28 nurses had Very good knowledge and 12 had good level of knowledge. Paired t-test value of knowledge and practice was 2.06 and 1.47 respectively, which was higher than the table value 2.66* at p <0.05 hence the structured teaching program was found to be effective in improving the knowledge and practice of the nurses.
Conclusion:
Nurses acquired knowledge sample error and sample collection methods. Also have an improvement in safe Transport of Blood to lab and preventing sample errors at the earliest itself and also became skilful in handling of blood sample technique, identifying early clot to prevent errors.
Key words: Vacutainers, Blood Products, Transport of Blood, Needles/ Blood sampling, blood sample error
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I.   Introduction
        A blood test is a laboratory analysis performed on a blood sample that is usually extracted from a vein in the arm using a hypodermic needle, or via fingerpick. Multiple tests for specific blood components, such as a glucose test or a cholesterol test, are often grouped together into one test panel called a blood panel or blood work. Blood tests are often used in health care to determine physiological and biochemical states, such as

disease, mineral content, pharmaceutical drug effectiveness, and organ function. Typical clinical blood panels include a basic metabolic panel or a complete blood count. Blood tests are also used in drug tests to detect drug abuse. The objective of this studies are to make diagnosis, to give appropriate treatment, to identify the pre-analytical errors. The hypothesis will be a significant difference in the level of knowledge of the staff nurses and there be a significant difference in the level of practice of the nurses on sampling error. The blood sampling procedure is complex and prone to failure, as reflected by preanalytical errors in paediatric hospital care. The primary aim was to evaluate if the risk of preanalytical errors was higher with capillary blood sampling than with venous blood sampling, and secondary, explore specific factors associated with preanalytical errors, both overall and stratified by capillary and venous blood sampling.

II. Material and Methods

Study Design:
Pre-experimental and one group pretest and posttest design. And study conducted at Apollo Speciality Hospitals, Jayanagar, and Bangalore from 01.12.2021 to 02.01.2022. And study conducted for 40 Registered Nurses. The sample size was collected from the hospitals nursing staff among who are all interested in the study. And Subjects & selection method: Non probability pre-test and posttest method was applied to select the research material.

Inclusion criteria:
➢   Staff nurses who are working at selected territory hospitals, Bangalore.
➢   Staff nurses who are present at the time of data collection.
➢   Staff nurses who are willing to participate in the study.

Exclusion criteria:
➢   Staff nurses who are sick or leave on the day of data collection.
➢   Staff nurses who are not willing to participate in the study.

Procedure methodology:
A structured questionnaire was used to collect data regarding nurses' knowledge on Sample collection. The questionnaire consists of self-declaration for study, area of work, experience, qualification and designation of work. A multiple choice questionnaire used to assess the knowledge, consist of 10 questions in which each question carries 1 mark. It includes the parameter such as Knowledge on Vacutainers, Blood Products, Transport of Blood and Needles/Eclipse. An observational checklist was used to collect data regarding nurse's practice on sample collection which consist of 10 questions in that each one carries 1 mark. It include the parameters such as patient preparation, articles arrangement, selection of vein, hand hygiene, insertion of needle/ Eclipse, documentation, Transport of Blood to lab.
A randomly selected 40 nursing staffs under inclusion criteria had done the pretest for assessing knowledge and practice. Hands on training were conducted to for nurses in regard to improve the knowledge on sampling errors. Hands on training was conducted for nurses in regarding to Sample collection and sampling error. Posttest for assessing knowledge on sampling error and practice had conducted using same questionnaire checklist on the same sample.

III. Result

After successfully giving information to the nursing staffs who participated in the study, their knowledge level has improved by showing difference in the parameters which is statistically significant. Their knowledge has been improved which is evident in posttest with significant difference in the parameters. Table 1 shows demographic variables with percentage distribution according to (1) Age in years -25 (62.5%) of nurses had to 21-24 Years, 1 (25%) had 24-27 years of age and 5 (12.5%) had more than 27 years of age. Based on (2) Experience, 05 (37.5%) of them were 0-1 year of experience, 20(50%) of them were 2-3 years of experience and 05 (12.5%) of them were 3 years and above. In regard to the (3) qualification- 4 (10%) nurses were GNM nursing, 36 (90%) were Bachelor in nursing and 0 (0%) masters in nursing. (d)Area of work -20 (50%) nurses were from ICU and HDU and 20 (50%) nurses were from wards.

Table1 - Demographic variables with percentage distribution

S. No	Variable		f	%
1	Age In Years			
	a.	21-24 years	25	62.5
	b.	24 to 27 years	10	25
	c.	27 years and above	5	12.5
2	Experience			
	a.	0-1 years	15	37.5
	b.	2 to 3 years	20	50
	c.	3 years and above	05	12.5
3	Education qualification			
	a.	GNM Nursing	4	10
	b.	BSc Nursing	36	90
	c.	MSc Nursing	0	0
4	Working units			
	a.	ICU and HDU	20	50
	b.	Wards	20	50

Table no 2 shows the knowledge level of the nurses. In the pretest 24 (80%) nurses had average level of knowledge and 6(20%) had poor knowledge. Whereas, in posttest 22(73.4%) nurses had good knowledge and 8(26.6%) had average level.

Table 2-The level of knowledge in Pretest and Posttest

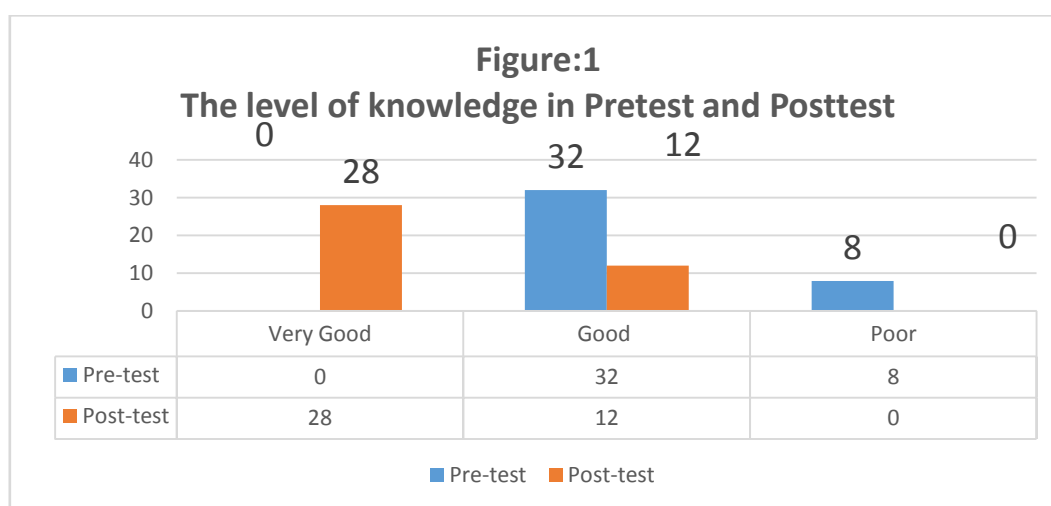| Level of Knowledge	Very Good		Good		Average	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Pre-test	0	0	32	80%	8	20%
Post-test	28	70%	12	30%	0	0

Figure:1
The level of knowledge in Pretest and Posttest

	Very Good	Good	Poor
Pre-test	0	32	8
Post-test	28	12	0

Table no 3 shows Paired t-test value of knowledge and practice was 11.9 and 18.2 respectively, which was higher than the table value 0.699 at $p<0.05$ hence the structured teaching program was found to be effective in improving the knowledge and practice of the nurses

Knowledge score	Max Score	Nursing Staffs			Paired 't' test
		Mean $\bar{x}$	Mean percentage $\bar{x}$ (%)	SD (σ)	
Pre test	10	6.53	21.79	1.83	2.66[*]

Post test	10	8.4	28.31	1.45	
Enhancement	**10**	**1.87**	**6.52**		

Figure:2
Paired t-test value of knowledge and practice
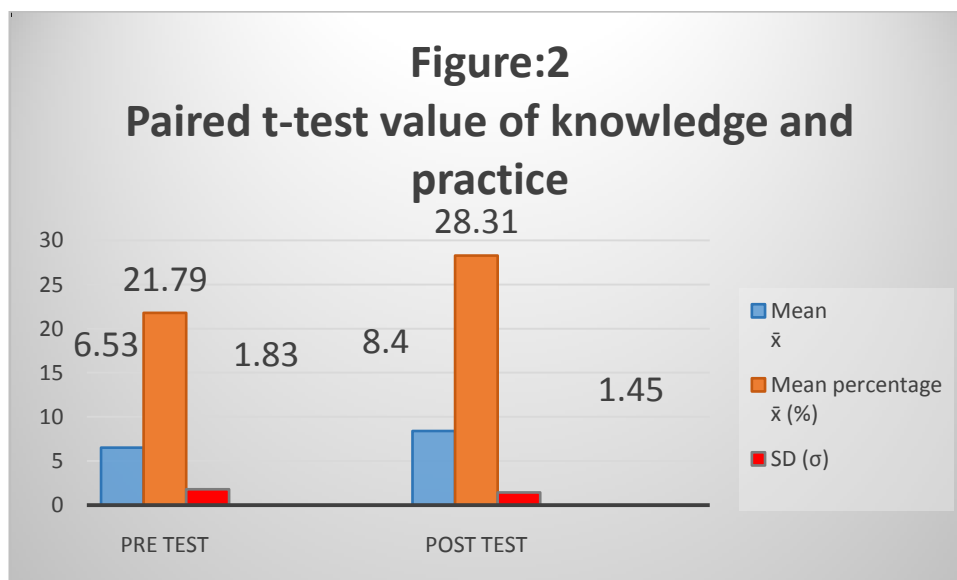
IV. Discussion

This chapter deals with the discussion, based on the formulated objectives of the study and hypothesis. The study was designed to assess the effectiveness of Structured Teaching Programme on sample error among nursing staffs in Apollo Speciality hospitals, Bangalore.

Pre analytical blood sampling errors are common in our setup. Eighty six percent participants though thought that they had adequate knowledge regarding blood sampling, but most of them were not adhering to standard protocols. There is a need of continued education and refresher courses.

We believe that the introduction of standardized routines and regular staff training, combined with an exchange of the existing paper-based referral management system with an electronic system for managing referrals, could increase safety in the preanalytical process, with positive effects on patient safety. Given the importance of venous blood samples in patient care, a more extensive study covering other hospital wards and primary health-care centres is needed

V. Conclusion

The sample error is a common problems receiving from the labs. Hence the nurses knowledge and practice on identification of the vein, sample collection method and using of the vacutainers, has improved after implementing a structured teaching programme. Now there is huge reduction related to sample errors.

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