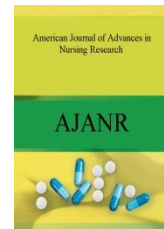




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KNOWLEDGE AND PRACTICE OF REGISTERED NURSES REGARDING THE LABORATORY SAMPLE SAFETY MEASURES

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ABSTRACT

Laboratory sample safety is one of the quality indicators in hospital. Due to lack of awareness among healthcare workers, repeated incidents of sample errors are being tracked. This study was conducted with a aim to assess the knowledge and practice of Registered Nurses regarding the laboratory sample safety measure so that lacking in the existing process could be identified and corrected. The research approach adopted for the study was descriptive in nature. Simple random sampling technique was adopted and were selected from ICUs and other hospital units. Data was collected from 30 sample subjects through a structured knowledge questionnaire and practice checklist. The analysis was done by descriptive statistics. The result shows that majority of the registered nurses 17 (53%) had good knowledge regarding laboratory sample safety measures and maximum 18 (60%) were following good practice regarding laboratory sample safety measures.

INTRODUCTION

A laboratory sample is a biological specimen or a gathered matter of patient's tissue, fluid, or other material derived from the patient used for laboratory analysis to assist differential diagnosis or staging of a disease process. Common examples include throat swabs, sputum, urine, blood, surgical drain fluids, tissue biopsy *etc.* Different types of specimen samples are collected with different techniques, like,

- (i) Obtaining excretions or materials that leave the body anyway, such as urine, stool, sputum, or vomitus, by direct collection as they exit;
- (ii) Excision (cutting out) for the removal of solid or soft tissue samples;
- (iii) Puncture (also called *contests*) followed by aspiration is the main method used for sampling of many types of

tissues and body fluids e.g. thoracentesis to sample pleural fluid, and amniocentesis to sample amniotic fluid. Puncture *without* aspiration may suffice in, for example, capillary blood sampling.

(iv) Scraping or swiping as in a Pap test, cells are scraped off a uterine cervix with a special spatula and brush or a special broom device that is inserted through a vagina without having to puncture any tissue. Epithelial cells for DNA testing can be obtained by swiping the inside of a cheek in a mouth with a swab.

Quality of health care and patient safety is topics that have received increasing attention in recent years. Mistakes and insufficient routines in health care systems cause patient suffering and increased expenditure. By identifying areas in which mistakes are made, measures can be taken to ensure high quality and cost effective patient care.

Laboratory investigations are one of the areas that have a major impact in clinical decision. Improving specimen quality as well as health care worker safety

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Research Article



poses significant concern for today's laboratory investigations.

With an increasing number of diagnostic tests request, laboratory professionals and health care professionals are facing challenges in reducing laboratory errors to improve quality of laboratory results, assure accurate diagnosis, implement initiative to ensure health care worker safety and minimize risk of exposure to blood borne pathogens.

When performing specimen collection procedures, proper laboratory attire must be worn. Laboratory attire includes gloves, laboratory coat, and, where appropriate, masks and/or goggles. Collect all specimens in leak proof containers. Transport containers within a sealable, leak proof plastic bag which has a separate compartment for paperwork. Syringes with needles should never be transported to the laboratory. Contents of a syringe should either be transferred from the syringe to a sterile tube, or the needle should be removed (using a protective device), and the syringe recapped then placed in a sealable, leak proof plastic bag. Specimen containers which are leaking should neither be transported to, nor be processed by the laboratory. Instead, they should be autoclaved, and another specimen should be obtained and submitted.

All specimens must be submitted directly to the laboratory without delay, preferably within two hours of collection. If there is to be a delay, the specimen should be stored under the appropriate conditions.

When reviewing deeper into the literature about specimen collection, the laboratory test process is divided into three phases: pre-analytical, analytical, and post-analytical. The pre-analytical phase contains the steps from when the healthcare provider enters or places the order until the specimen reaches the laboratory. The analytical phase is the actual analysis or testing of the specimen and the last phase, post-analytical, consists of reporting and interpretation of results. A literature review of the laboratory test process by revealed that the majority of laboratory errors occur in the pre-analytical phase, which is the phase involved in this cross-sectional study. A study has found that pre-analytical errors account for up to 75 per cent of the total laboratory errors. The pre-analytical phase contains three steps: before, during, and after specimen collection. It is influenced by specimen collection, specimen handling and transportations. The value and reliability of reports are clearly affected by quality of specimen received by laboratory and length of time between its collections and processing. For the reliable laboratory reports, it is very necessary that specimen should be collected, handled, labelled and transported properly to laboratory [1].

In another study, a total of 853 valid samples were collected; 355 samples (41.6%) were drawn via

venipuncture and 498 samples (58.4%) were drawn through an intravenous catheter. Of these, 28 intravenous catheter samples (5.6%) were found to be haemolysis, whereas only 1 venipuncture sample (0.3%) was haemolysis. Drawing blood through intravenous catheters was associated with significantly more haemolysis than drawing blood with straight needles. Using a combination of intravenous catheter and vacutainer caused more haemolysis than using an intravenous catheter with a syringe. Many pre analytical errors originate at the time of specimen collection and occur either due to inadequate patient identification or when labelling samples and completing pathological request forms. The effects from specimen labelling errors can be devastating and could lead to misguide treatment or death [2].

A similar study performed root-cause analysis from the Veterans Health Administration. Of the 227 reports, 182 of those were patient misidentification errors that occurred during one of the three specimen collection phases. Of the 182 misidentification reports, 132 events were in the pre-analytical phase. Wrong wrist band applied to the patient, specimen mislabelling during collection and failure of two patient identifiers used were a few of the reasons for errors [3].

One nursing article noted that 37 per cent of nurses who responded to their survey said that prevention of specimen management errors were a high priority for action [4]. In this view present study was conducted to identify the areas of knowledge and practice which needs improvement to reduce the chances of errors.

MATERIALS AND METHODS

The study was conducted in November & December 2015. This was an exploratory study which used a structured self-administered knowledge questionnaire and an observational practice checklist to assess the knowledge and practice of staff nurses regarding laboratory sample safety measures in a quaternary care hospital located in New Delhi.

Tools Used: The knowledge questionnaire consisted 20 questions and practice checklist had 14 questions. Both were self-generated and adapted from literature. The questionnaires were pretested by conducting a pilot study. The scoring as for correct '1' score and for wrong as '0' score. The questionnaires covered 1) safety precautions, 2) Handling and transport of specimen 3) Hand washing 4) Disposal of waste.

Study Subjects: 30 registered nurses working in different clinical areas like ICU, general ward etc. of Indraprastha Apollo Hospital, New Delhi.

Data Collection: In the study, 30 registered nurses of different clinical units (like general ward, ICUs, OPD



etc.) were selected by simple random sampling method. They were interviewed and observed personally. Before the questionnaire was given to the participants, the aims and objectives the study were explained to them. Grading criteria for knowledge questionnaire was Good (score >70%), Average (score 50-70%) and Poor (Score <50%). Grading criteria for Practice checklist was Good (score >70%) and Poor (score <70%).

RESULTS

Table 1 shows the distribution of background information of the registered nurses. Out of 30 participants, 23(77%) were females and 7(23%) were males. Majority 18 (60%) were in the age group of 21-25years and 11 (37%) were in the age group of 25-30 years and 1(3%) was in the age group of 30-35 years. Majority of the subjects 17(57%) have done GNM , 12

(40%) have done BSc Nursing and 1(3%) have done MSc Nursing. Work experience of 13 participants(43%) had work experience of 0-1 years, 14(47%) had experience of 1-3years and 3(10%) had experience of 3-5 years.

Table 2 shows the item wise frequency and percentage distribution of knowledge score of registered nurses. Mean knowledge score and standard deviation of registered nurses was 14.7 ± 2.09 . Out of 30 registered nurses, 16 (53%) had good knowledge, 14 (47%) had average knowledge. No one had poor knowledge about laboratory sample safety measures.

Table 3 shows the item- wise frequency and percentage of practice checklist score of Registered Nurses. Mean practice score of registered nurses was 9.6 ± 1.6 . The practice checklist score depicts that maximum registered nurses (18; 60%) were following good practices and 12(40%) were following poor practices.

Table 1. Distribution of study subjects

Demographic Data	Frequency	%
Gender		
Male	7	23
Female	23	77
Age in Years		
21-25years	18	60
25-30years	11	37
30-35years	1	3
Above-35		
Educational Qualification		
GNM	17	57
B.Sc. Nursing	12	40
M.Sc. Nursing and above	1	3
Work Experience		
0-1 years	13	43
1-3 years	14	47
3-5 years	3	10
5 years or more	0	0
Clinical Area		
ICU	17	57
Government Ward	1	3
Government ICU	12	40
Any other	0	0

Table 2. Item Wise Frequency and Percentage Distribution of Knowledge Score of Registered Nurses

S.No.	Knowledge Items	Correct Response	(%)
1.	Written order from the doctor should be ensured?	30	100%
2.	Before collecting the sample, patient identification is done by two identifies?	30	100%
3.	Sample collection procedure should explained to the patient?	26	87%
4.	The sample vial should be labeled?	15	50%
5.	Which of the following should be checked before using Vacutainer?	14	47%
6.	What should be followed while collecting the critical laboratory values?	24	80%
7.	The initial step of collecting blood sample?	18	60%



8.	What must be done before collection of blood sample?	18	60%
9.	Sample for grouping and cross matching should be taken from?	28	94%
10.	Critical samples should be dispatched in?	16	54%
11.	While collecting a blood sample, when to remove the tourniquet?	22	74%
12.	Responsibility of nurses while collecting blood sample?	15	50%
13.	Which technique must be follow while taking sample for blood culture?	27	90%
14.	What is the turnaround time from order to dispatch blood sample in ICU?	5	17%
15.	Grouping and cross matching sample is collected, witnessed and signed by?	25	84%
16.	ABG samples should be dispatched with?	25	84%
17.	If the report is critical inform?	28	93%
18.	Transport of sample from ward to laboratory is done by?	30	100%
19.	Gloves stained with blood are discard in?	18	60%
20.	After sample collection one must?	17	57%

Table 3. Item Wise Frequency and Percentage Distribution of Practice Score of Registered Nurses

S.No.	Practice Items	Correct Response (f)	%
1	Checked for doctor's order	30	100%
2	Entered patient's detail for billing	28	93%
3	Identified patient using the identifiers [UHID and name]	22	73%
4	Followed infection control protocols	17	57%
5	Explained the procedure to the patient	21	70%
6	Check if patient is comfortable	20	67%
7	Collected the articles needed	13	43%
8	Procedure performed under aseptic technique	22	73%
9	Sample is dispatched after entering in dispatch register	28	93%
10	Critical sample is dispatched in special sample box	28	93%
11	Checked receiving signature in the laboratory book with name & clock no.	25	83%
12	Collected & informed the report of critical values to the concerned physician	27	90%
13	Well labeled immediately after procedure	25	83%

DISCUSSION AND CONCLUSION

The study was conducted with an aim to assess the level of knowledge and practice of registered nurses as well as to identify the areas which were needed to improve in their knowledge and practice skills and reduce the chances of errors. Majority of registered nurses had good knowledge and were following good practices. A similar study conducted by Gurubhacharya DL (2003) depicts that 46% of nurses and lab technicians had correct knowledge regarding universal precautions [5]. In another study by Rao & Konanur (2004), 81% of doctors had knowledge about PEP [6]. On the contrary in the study by

J. Parra- Ruiz et al (2004), none of the doctors had knowledge regarding PEP [7].

In the present study 73% registered nurses used aseptic technique while performing the procedure whereas Maqbool (2002) in his study found that only 27% of respondents (nurses, technicians & health workers) were using gloves regularly [8].

In closing, knowledge and practice of registered nurses regarding laboratory sample safety is average. Recommendations to refine the shortfall include continuing nursing education program on lab sample safety measures and nursing audit on safety practices.

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