

Nurses' Knowledge of Blood Culture Sampling Procedure

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Abstract

Background: False-positive blood culture results due to contaminated samples have shown to increase patients' health costs, including the use of broad spectrum antibiotics and prolonged hospital length of stay. While previous research have suggested that increasing staff knowledge on proper specimen collection lowers contamination rates significantly, staff's current knowledge of hospital-recommended sample collection procedure have yet to be assessed in Dr. Dr. Hasan Sadikin General Hospital, Bandung, Indonesia.

Methods: This was a cross-sectional descriptive study on 81 Emergency Department nurses in Dr. Hasan Sadikin General Hospital, Indonesia. Subjects were asked to complete a questionnaire in order to measure their knowledge of blood culture sampling procedure in accordance with the hospital's standard operating procedure.

Results: Among 81 subjects enrolled, 51 managed to adequately describe the prerequisites in proper blood culture sampling procedure and their purpose as dictated by Dr. Hasan Sadikin General Hospital's standard operating procedure.

Conclusions: Up to 67% of nurses conducting blood sampling procedure in Dr. Hasan Sadikin General Hospital's Emergency Department understood the prerequisites of hospital-recommended blood culture sampling procedure and their purpose. [AMJ.2015;2(1):250-2]

Keywords: Blood culture, knowledge, nurses

Introduction

Blood culture remains the most important diagnostic procedure to detect systemic bacterial infection¹. However, contaminated samples resulting in false-positive cultures significantly increase patient's financial burden compared to true negative results by prolonging hospital length of stay², prompting the need for additional laboratory tests including second blood cultures³ and broad spectrum antibiotics²⁻⁴. Contamination rates vary among institutions from 0.6-6% despite a set target rate of 3%⁵ and tends to be higher in teaching hospitals where blood culture sampling is not conducted by a specialized phlebotomy team⁶. Several prevention methods have been proposed, from procedure modifications, installing a dedicated phlebotomy team⁵, to supplementing instruction sheets on blood culture sampling kit⁷. Roth et al.⁶ study found that in a setting where phlebotomy is conducted

by nurses and auxiliary nurses, increasing the knowledge of the phlebotomy staff about proper blood culture procedure reduce the rate of contamination significantly (2.59% pre-intervention; 2.23% post-intervention, 95% CI, 0.76 to 0.98)⁶

This study aimed to measure the knowledge of nursing staff in Dr. Hasan Sadikin General Hospital's Emergency Room on proper blood culture procedure according to the guidelines published by Dr. Hasan Sadikin General Hospital's Clinical Pathology Department⁸.

Methods

This was a cross-sectional descriptive study conducted in Dr. Hasan Sadikin General Hospital Bandung, Indonesia, from October 2012 to December 2012. All 96 nurses in the Emergency Room were asked to fill a self-completed 11-item questionnaire on blood culture sampling procedure tailored according

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to the hospital's standard operating procedure over a period of time; 15 were sampled to test the validity of the questionnaire for the first week of the study and the rest were taken until the second week of November 2012.

The questionnaire, comprising of 11 items, was designed to measure participant's knowledge on the following: (a). the purpose of blood culture sampling; (b). the purpose, procedure, and recommended materials used in disinfection in blood culture sampling; (c). other preventive measures against sample contamination as prescribed in the hospital's guideline. The results were then classified into "Adequate" ($\geq 70\%$ of responses correct) and "Poor" ($< 70\%$ of responses correct).

Questionnaire development took place in the beginning of October 2012, with questionnaires completed by 15 initial subjects and subsequently tested for reliability using cronbach's alpha test. The remaining 81 subjects completed the questionnaires in the following weeks and responses were then recorded and measured

Results

More female subjects (51.9%) participated in this study from a total of 81 subjects. As many as 46.9% were aged 30-39 years old, 30.9% between the ages 20-29, and 11.1% were 40-49. Twenty-nine point six percent of them had been working in Dr. Hasan Sadikin General

Hospital for 11-19 years, 28.4% for less than 5 years, 22.2% for 5-10 years and a meager 7.4% had been working for more than 20 years.

The majority of subjects (63%) managed to show an adequate level of knowledge regarding blood culture sample collection procedure. There were 79 subjects (97.5%) knew that blood culture is used to detect systemic bacterial infection; all of them understood the purpose of disinfection in blood culture sample collection (Table 1). Other prerequisites in proper blood culture collection were also understood by the majority (other prerequisites: 72.8%, 82.7%, 81.5%, and 72.8%). However, when asked to describe the steps of blood sample collection, only a mere 8 subjects or 9.9% were able to do so correctly.

Discussion

Aronson *et al.*⁹ suggested that blood culture as a diagnostic test is unusually dependent on human behavior (sterile technique, timing and volume) and clinical judgment. A lapse in these influencing behaviors might increase contamination rate; Roth *et al.*⁶ study has shown that informational intervention, or increasing phlebotomy staff's knowledge, could significantly reduce the rate of blood culture contamination.

In this study, the majority of nurses have adequately described the prerequisites

Table 1 Nurses' Knowledge of Blood Culture Sample Collection

Items Asked	Number of responses correct	
	Frequency	%
Purpose of blood culture	79	97.5
Difference between blood sample collection for cultures and other tests	42	51.9
Draw blood for culture before other tests	54	66.7
Purpose of disinfection	81	100
Recommended disinfectant	67	82.7
Sampling site	55	67.9
Other prerequisites		
Letting disinfectant to dry before drawing blood	59	72.8
Recommended numbers of sampling site	67	82.7
Swab bottle top with alcohol	66	81.5
Bottles of media use	59	72.8
Describe the steps of blood culture sampling procedure	8	9.9

in proper blood culture sample collection according to the guidelines issued by Dr. Hasan Sadikin General Hospital. A question is raised, however, when only a scarce minority (9.9%) managed to describe the steps in sample collection correctly; this suggests more training in this area might be helpful for nurses who conduct blood culture sample collection.

This study was limited due to the constraints of time and resources, the lack of deep interview method towards the subjects, which resulted in several missing characteristics data. Further research is needed to improve the limitation and broaden the scope to compare practicing nurses' knowledge to blood culture sampling procedure recommended by other, newer literatures

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