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Deviations from venous blood specimen collection guideline adherence among senior nursing students

Karin Nilsson [a,*], Kjell Grankvist [b], Christina Juthberg [a], Christine Brulin [a], Johan Söderberg [b]

[a] Department of Nursing, Umeå University, Umeå, Sweden
[b] Department of Medical Biosciences, Clinical Chemistry, Umeå University, Umeå, Sweden

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SUMMARY

Background: Despite considerable efforts to increase patient safety by supporting the use of best practice medical and nursing guidelines by healthcare staff, adherence is often suboptimal. Swedish nurses often deviate from venous blood specimen collection (VBSC) guideline adherence. We assessed the adherence to national VBSC guidelines among senior nursing students.

Methods: We conducted a cross-sectional, self-reported questionnaire survey among 101 out of 177 senior nursing students consisting of web-based students in their fifth semester and campus-based students in their fifth or sixth semester out of six. In regard to the VBSC procedures, we asked about adherence to the patient identification, test request handling, and test tube labelling protocols that the students had learned during their second semester and practiced thereafter.

Results: Guideline adherence to patient identification was reported by 81%, test request handling by 74%, and test tube labelling by 2% of the students. Students with no prior healthcare education reported to a higher extent that they operated within the guidelines regarding *labelling the test tube before entering the patient's room* compared to students with prior healthcare education. Using multiple logistic regression analysis, we found that fifth semester web-based program students adhered better to VBSC guidelines regarding *comparing patient ID/test request/tube label* compared to campus-based students.

Conclusions: Senior nursing students were found to adhere to VBSC guidelines to a similar extent as registered nurses and other hospital ward staff in clinical healthcare. Thus student adherence to VBSC guidelines had deteriorated since their basic training in the second semester, and this can impact patient safety during university/clinical studies. The results of our study have implications for nursing practice education.

Introduction

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 (VBSC) (Gren, 2009). Of all errors, 46–68% are considered due to pre-analytical errors, i.e. errors made before the sample arrives at the laboratory (Kalra, 2004; Paquay et al., 2008; Plebani and Carraro, 1997). Possible pre-analytical errors include identification errors (Amon, 2002; Bologna et al., 2002; Chiaroni et al., 2004; Ibojie and Urbaniak, 2000) and not acting according to guidelines when performing VBSC or handling test tubes (Dzik et al., 2003; Wagar et al., 2008).

VBSC procedures should be performed in accordance with best practice guidelines, and all Swedish nursing programs include theoretical as well as skill training in VBSC procedures according to national guidelines. Swedish nursing education facilities assure that they follow the guidelines when teaching VBSC practices, so the fact that Swedish health care staff does not always adhere to VBSC guidelines to the letter (Söderberg et al., 2009; Wallin et al., 2008) 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. We hypothesized that nursing students deviate from VBSC guideline practices early during the study/clinical practice period.

Background

Clinical practice guidelines aim to improve the quality of patient care and patient safety by providing evidence-based recommendations for daily practice (Janssen et al., 2011). Adherence to guidelines promotes

Abbreviations: VBSC, venous blood specimen collection; OR, odds ratio; CI, 95% confidence intervals.

* Corresponding author at: Department of Nursing, Umeå University, Box 843, S-891 18 Örnsköldsvik, Sweden. Tel.: +46 660 29 25 26, +46 70 275 87 88 (mobile); fax: +46 660 29 34 69.
E-mail address: karin.nilsson@umu.se (K. Nilsson).

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patient safety (Grol and Grimshaw, 2003) and is associated with positive clinical and financial outcomes (Frankel et al., 1999; McGuirk et al., 2001).

A considerable number of studies have been conducted on adherence to the practical procedures of medical guidelines, e.g. studies on adherence to peripheral venous catheter guidelines (Hasselberg et al., 2010; Johansson et al., 2008) and to pressure ulcer prevention guidelines (Baumgarten et al., 2010; Paquay et al., 2008). The reasons why healthcare staff do not always adhere to guidelines has been proposed to be due to a lack of theoretical knowledge, not being familiar with the guideline content, poor attitudes towards the guidelines, work overload, or lack of time (Amon, 2002). There are only a few studies assessing adherence or determinants for adherence to VBSC guideline practices (Godin et al., 2000; Söderberg et al., 2009; Wallin et al., 2008), and to the best of our knowledge nursing students' adherence to VBSC guidelines has not been studied previously.

Although having excellent theoretical knowledge, newly graduated Swedish nurses often lack knowledge in practical skills (Swedish National Board of Health and Wellfare, 2002) and they use evidence-based knowledge to a surprisingly low extent when providing patient care (Forsman et al., 2010). Conflicts of interest between theory and practice during nursing studies have been proposed as an explanation for this deviation from the guidelines (Greenwood, 1993; Kapborg and Berterö, 2009; Ohlsson, 2009). This is supported by an interview study (Corlett, 2000) among student nurses, teachers, and preceptors describing situations in which theoretical teaching differed from clinical practice. The teachers in such circumstances were often considered to be out of date and of questionable credibility as opposed to the preceptors. Because practical skills are important, there is a need for further studies on how nurses develop their practical skills (Bjork, 1995).

In Sweden, the national guidelines (The Handbook for Healthcare) are available to all staff and students. It is designed to help meet national goals for health and medical care and contains national guidelines on nursing practices, including the VBSC guidelines. Practical nursing procedures in Swedish nursing educational programs are taught in accordance to theories and guidelines, so it is reasonable, therefore, to assume that nursing students or newly graduated registered nurses must be changing their VBSC practices from guideline adherence to non-adherence. Such behavior is not consistent with safe care and is not in line with current patient safety law. To ensure patient safety and enhance patient outcomes, bridging research and practice is crucial (Brady and Lewin, 2007). Studies on nursing students' adherence and the development of non-adherence to the VBSC and other medical or nursing guidelines are warranted. In this study we investigated senior nursing students' adherence to the national VBSC guidelines regarding patient identification, test request handling, and test tube labelling.

Methods

Study Design and Setting

This cross-sectional study is part of a larger research project focusing on laboratory test ordering, interpretation, and pre-analytical procedures for blood sampling among the sampling staff in primary healthcare centers and in two hospitals in two county councils in northern Sweden. In Sweden there is no specific VBSC staff, and VBSC is performed by several personnel categories, including registered nurses, enrolled nurses (also called assistant, practical, or licensed-to-practice nurses), clinical chemistry laboratory staff, and, more rarely, by physicians and other healthcare personnel. Enrolled nurse education is two or three years of secondary school, whereas the nursing program for registered nurses is three years of university studies. Depending on the university, the program structure and content may vary to some extent. Nevertheless, approximately half of the total program consists of clinical education in various healthcare units.

This study was conducted among senior nursing students at Umeå University, Sweden, who attended either a campus-based or a web-based online education program. Prior to this survey, all of the participants had participated in theoretical education as well as skill training in their second semester that was in line with the national best practice VBSC guideline, which is almost identical to the international CSLI H3-A6 VBSC guideline (CSLI, 2010). In addition to this, students also had the opportunity for skill training during clinical practice periods. It should be noted that students attending the web-based program often alternated between theoretical and clinical studies and, therefore, underwent numerically more clinical study periods than campus-based students, but the total amount of time spent in clinical studies was similar in both student groups. The latter program was based on e-learning using a web-based learning management system (PING PONG AB, Stockholm, Sweden).

Participants

Out of the 178 nursing students invited by two PhD students within the project, one student with clinical chemistry laboratory education prior to present nursing studies was excluded because clinical chemistry laboratory staff represents the VBSC 'golden standard' (Wallin et al., 2010). Seventy-six students declined participation resulting in a final total of 101 students (response rate 57%) included in this study. The participants consisted of fifth semester students on campus, (n = 42, 33 women and 9 men), sixth semester students on campus (n = 27, 24 women and 3 men), and fifth semester students in the web-based program (n = 32, 30 women and 2 men). The majority (86%) were women. Because the web-based program only admits students every third year and no sixth semester students were available, this group consisted of solely fifth semester students. The majority of the students were between 20 and 39 years old (mean age 28.5 years, SD 6.8) (Table 1).

Thirty-six per cent reported previous healthcare profession studies or work prior to their present university studies and 64% did not report such previous experience (Table 1). In the sixth semester campus group, 63% of the students had some kind of healthcare training or education prior to the commencement of university nursing program studies compared to 24% for the fifth semester campus students and 29% for the web-based fifth semester students. Among the students in the sixth semester campus group, 56% were enrolled nurses, whereas the corresponding proportions in the fifth semester web- and campus-based students were 16% and 17%, respectively.

Data Collection

The participants in the web-based student group completed a web-based version of the survey whereas the campus-based students used an identically worded paper version. Both were adjusted regarding background data to fit the students. The research group distributed a

Table 1
Age distribution and frequency of prior healthcare education of nursing students.

	Campus-/web-based and semester			
	Web 5th	Camp 5th	Camp 6th	Total
	n = 32	n = 42	n = 27	
Age (years) M (SD)	25.9 (3.9)	27.2 (5.8)	33.5 (8.5)	28.5 (6.8)
Former education				
No education n (%)	22 (71)	32 (76)	10 (37)	64 (64)
Enrolled nurse n (%)	5 (16)	7 (17)	15 (56)	27 (27)
Nursing aid n (%)	1 (3)	3 (7)	2 (7)	6 (6)
Other n (%)	3 (10)	–	–	3 (3)

M = mean, SD = standard deviation.
Web 5th = web-based program, fifth semester.
Camp 5th = campus program, fifth semester.
Camp 6th = campus program, sixth semester.