International Journal of Nursing Studies 71 (2017) 28–33

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

The relationship between perceived role and appropriate use of peripherally inserted central catheters: A survey of vascular access nurses in the United States

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ARTICLE INFO

Article history:
Received 1 September 2016
Received in revised form 9 January 2017
Accepted 1 March 2017

Keywords:
Vascular access
Interdisciplinary health teams
Nursing
Survey research
Patient safety

ABSTRACT

Background: The presence and proliferation of vascular access nursing in hospital settings has been identified as a potential contributor to growing demand, and possible overuse, of peripherally inserted central catheters (PICCs).
Objective: We examined vascular access nurses' perceived role related to use of PICCs and the association with appropriateness of PICC use in hospitals.
Design: A web-based survey was administered to members of two vascular access professional organizations.
Participants: Of 2762 potentially eligible respondents who accessed the link, 1698 (61%) completed the survey. This sample was further restricted to vascular access nurses who worked in a U.S. hospital (n = 1147).
Methods: Respondents were categorized based on perceived role: 1) an operator who inserts PICCs; 2) a consultant whose views are not valued by the care team (unvalued consultant); 3) a consultant whose views are valued by the care team (valued consultant). Facility and respondent characteristics, reported practices, leadership support and relationships with other providers were compared across groups using chi-squared tests and analysis of variance. Multivariable logistic regression was used to assess the association between perceived role and reported percentage of PICCs placed for inappropriate reasons.
Results: Among the 1147 respondents, 210 (18%) viewed themselves as operators, 683 (59%) as valued consultants, 236 (21%) as unvalued consultants, and 18 (2%) could not be categorized. A significantly higher percentage (93%) of valued consultants reported that vascular access nurses placed the majority of PICCs at their facility, compared to operators (83%) or unvalued consultants (76%) ($p < 0.001$). After adjustment, compared with operators, valued consultants were significantly more likely to report that <10% of PICCs at their facility were inserted for inappropriate reasons (OR 1.7, $p = 0.002$); the finding was reversed for unvalued consultants (OR 0.69, $p = 0.06$).
Conclusions: Vascular access nurses and their perceived role as part of the healthcare team are associated with PICC use in hospitals. Strong inter-professional collaboration and respect may help ensure more appropriate use of PICCs.

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What is already known about the topic?

- Use of peripherally inserted central catheters (PICCs) has been rapidly expanding over the past several years, leading to concerns about possible inappropriate use.
- Vascular access nurses with specialized training are often responsible for inserting PICCs in hospitals.

What this paper adds

- Roles and responsibilities of vascular access nurses who insert PICCs and how this might affect PICC use in hospitals are examined.
- The study shows that the perceived roles of vascular access nurses who insert PICCs vary.

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http://dx.doi.org/10.1016/j.ijnurstu.2017.03.001
0020-7489/Published by Elsevier Ltd.

- Nurses who insert PICCs and perceive their role to be that of a consultant whose views are valued by the care team report lower rates of inappropriate PICC use at their facilities.
- This finding suggests that inter-professional collaboration and respect may help ensure more appropriate use of PICCs in hospitals.

1. Introduction

Use of peripherally inserted central catheters (PICCs) for providing intravenous therapy and reliable venous access has been rapidly expanding over the past several years in the United States (Akers and Chelluri, 2009; Gibson et al., 2013; Hornsby et al., 2005; Meyer, 2012). While increased use may reflect clinical advantages, such as safer insertion and the ability to continue intravenous therapy beyond the hospital setting, concerns regarding risk of complications, variation in use and even inappropriate use have emerged (Chopra et al., 2012; McMahon et al., 2014). Some of the most serious and commonly encountered PICC-related complications include central line-associated blood stream infection (CLABSI), deep venous thrombosis (DVT), catheter occlusion and catheter migration (Chopra et al., 2012, 2016). Indeed, the potential for serious complications coupled with concerns about possible PICC overuse prompted the Society of General Internal Medicine to issue a Choosing Wisely recommendation, "Don't place, or leave in place, peripherally inserted central catheters for patient or provider convenience" (McMahon et al., 2014). These concerns also led to a multidisciplinary initiative to develop appropriate indications for PICC use in various patient and care settings (Chopra et al., 2015).

Although key first steps, implementing appropriateness criteria and strategies for ensuring appropriate PICC placement requires a thorough understanding of factors that influence device use. For example, safe and cost-effective insertion of PICCs by vascular access nurses with specialized training, commonly referred to as "PICC teams", has been implicated as a potential reason for increased PICC use (Funk et al., 2001; Hornsby et al., 2005; Sainathan et al., 2014). Indeed, in 2013 over 60% of U.S. hospitals with more than 50 beds reported having designated nurse PICC teams (Krein et al., 2015). Nonetheless, relatively little is known about the specific roles and responsibilities of these nurses or how they affect PICC use and management in hospitals nationwide.

Increasing complexity, resources constraints and a burgeoning focus on value and quality heighten the need for collaboration across disciplines in healthcare delivery (Reeves et al., 2013). Further, a growing body of literature demonstrates the significant effect of inter-professional communication and teamwork on care effectiveness, efficiency and safety in hospitals (McKay and Wieck, 2014; Saint et al., 2013; Zwarenstein et al., 2013). This is particularly applicable to venous access, as many different types of clinicians are involved in PICC placement, care and maintenance (Meyer and Chopra, 2015). The objective of this study, therefore, was to examine the perceived role of vascular access nurses, how they function as part of the broader healthcare team, and how this might relate to appropriateness of PICC use in U.S. hospitals.

2. Methods

2.1. Study design and data collection

Data were collected through a web-based survey distributed to members of two vascular access professional organizations, the Association for Vascular Access (AVA) and the Infusion Nursing Society (INS). These two groups have a combined membership of over 8300 individuals, although not all members insert PICCs. Each organization sent an invitational e-mail to their respective members in May and June of 2015 that included a link to the web-based survey, which had been programmed into an online survey administration tool (SurveyMonkey®) to facilitate electronic dissemination. Both organizations also announced the survey and included electronic links on their website homepages. After completing the survey, respondents were given the option of receiving a $10 Amazon gift card. The study was reviewed and deemed exempt from regulation by the University of Michigan Institutional Review Board (HUM00088351).

The survey was developed by the study team with input from leading experts in the field of vascular access. After pilot testing by several nurses, the final instrument consisted of 76 questions (primarily fixed choice) that asked about PICC policies and procedures, use of technologies for PICC insertion, device management including management of complications, perceptions about PICC use and relationships with other healthcare providers. Questions about the respondents, such as number of years of experience, whether they hold a current vascular access certification, and characteristics of their primary practice location (e.g., volume of PICCs placed in a month, type of facility, types of providers who insert PICCs, and use of hospitalists, who are physicians that specialize in the care of hospitalized patients) were also included. The survey tool included skip-logic, which allowed respondents to skip over questions that were contingent on a prior response. This included an initial question that asked the respondent if they had previously completed the survey in order to prevent multiple surveys from the same individual. Responses to all questions were not required; therefore, respondents could complete the survey without responding to all of the items. Respondents were not, however, allowed to partially complete the survey and resume their work at a later point in time. Thus, the survey had to be completed at a single sitting. Further details about the survey and its development are published elsewhere (Chopra et al., 2016; Chopra et al., 2017).

2.2. Study measures

Questions of interest for this study focused on respondents' views of their role as a vascular access specialist, relationships with physicians and bedside nurses, and certain hospital practices, such as tracking of PICC use and duration, device removal and percentage of PICCs placed for inappropriate reasons. Specifically, respondents were asked "Considering your practice and facility, which of the following best describes how you view your role as a vascular access specialist?" The response categories included, 1) I view myself as an operator and my primary role is to insert PICCs; 2) I view myself as a consultant who considers which device is best for which patients, but my views are not valued by members of the care team (e.g., doctors, nurses); 3) I view myself as a consultant who considers which device is best for which patients, but my views are valued by members of the care team; 4) other, please specify. Respondents were categorized based on their responses as: PICC operator, unvalued consultant (views are not valued by the care team), and valued consultant (views are valued by the care team). Some respondents who submitted an "other" response indicated they viewed their role as that of a consultant whose views were both valued and not valued. For the purpose of this analysis, these respondents were classified as a valued consultant.

Respondents were asked to describe their relationship with physicians and bedside nurses using a five item response choice ranging from very poor to very good, and from poor to excellent for hospital leadership. Questions about hospital practices focused on whether the facility tracked the number of PICCs placed each month (yes/no), whether duration or dwell time is tracked (yes/no), and whether vascular access nurses are empowered to remove