



Standardizing nurse training strategies to improve knowledge and self-efficacy with tracheostomy and laryngectomy care



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ABSTRACT

Objective: Appropriate tracheostomy and laryngectomy care requires that nurses maintain specific knowledge and a particular skillset, to ensure safe, competent care. Deficiencies in this nursing care remain a persistent problem. The objective of this study was to evaluate the effect of a nurse training program on knowledge and self-efficacy with tracheostomy and laryngectomy care.

Study design: Prospective, interventional survey design.

Setting: Academic, tertiary care hospital between September 2014 and April 2015.

Subjects and methods: 1450 nurses at an academic tertiary care hospital were surveyed on tracheostomy and laryngectomy care at two time points: before and after the implementation and completion of the nurse training program. The nurse training program included a hands-on training session and online tutorial on appropriate tracheostomy and laryngectomy care. 732 nurses completed the hands-on training and were asked to complete the online tutorial. A total of 338 surveys were collected. Survey data were collected through an online survey development platform. Analyses were performed using SAS software. Chi-square tests and t-tests were utilized with a significance level of 0.05.

Results: 165 pre-training surveys and 173 post-training surveys were completed. Statistical analysis of the post-training data demonstrated statistically significantly higher knowledge and self-efficacy scores of nurses who completed the training than nurses who did not.

Conclusions: Findings from this study reveal poor overall nursing knowledge and self-efficacy with this care and suggest that optimizing and standardizing nurse training is an effective strategy to improve nursing knowledge and self-efficacy with head and neck surgical airways.

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1. Introduction

The persistence of preventable, life-threatening events in hospitalized patients with tracheostomies and laryngectomies is unacceptable, and warrants an examination of current practices and policies, to identify and rectify deficiencies. Recurrent complications at an academic, tertiary care hospital in this patient population prompted this investigation (Halum et al., 2012; Jalisi, Bearely, Abdillahi, & Truong, 2013). Nursing proficiency with this care is critical to ensuring that these patients are managed appropriately and potential airway emergencies are prevented. However, despite widely available resources outlining proper care, research continues to demonstrate nurse anxiety and poor overall competence, indicating that this remains a challenge for

nurses (Day, Farnell, Haynes, Wainwright, & Wilson-Barnett, 2002; Edgtton-Winn & Wright, 2005; Freeman, 2011; Norwood, Spiers, Bailiss, & Sayers, 2003). Potentially life-threatening complications include mucous plugging and accidental decannulation, which, without prompt action can lead quickly to anoxic brain injury and death (McGrath, Bates, Atkinson, & Moore, 2012; Norwood et al., 2003). Mucus plugging is avoided with appropriate care, and tube displacement and inadequate or inappropriate suctioning are associated with nurses who are lacking the necessary skills and training (Freeman, Isabella, Lin, & Buchman, 2000; Halum et al., 2012; Paul, 2010). A 2012 United Kingdom audit examining airway management complications found that 50% of airway-related deaths were associated with tracheostomy displacement (McGrath et al., 2012). A 2014 British review of patients with tracheostomies performed by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD), highlighted the need for practitioners caring for these patients to have both expertise through mandatory training, as well as evidence-based, established protocols. In this review,

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nearly one quarter of patients had complications while in the critical care unit (CCU), and over 30% of patients had complications on the floor, demonstrating that these patients represent a high-risk, vulnerable population (NCEPOD, 2014; Plowright, 2014).

Nurses are frontline caregivers and first responders to airway emergencies, and as such, must be prepared to respond appropriately to avoid unnecessary morbidity and mortality. Adequate understanding of the respiratory system, the underlying physiology, and the anatomical differences between a tracheostomy and a laryngectomy are essential aspects of a nurse's ability to adequately assess and care for these patients (Freeman, 2011; Hooper, 1996; McGrath et al., 2012; Russell, 2005). Rassekh, Zhao, Martin, Chalian, and Atkins (2015) identified deficient bedside management as one of the factors that contributed to emergency airway scenarios. Furthermore, Das et al.'s, 2011 national survey assessing tracheostomy-related catastrophic events concluded that many of these events were avoidable, and could be effectively prevented by implementing the appropriate system changes.

Therefore, in order to ensure safe, effective care, these authors believe that nurses need targeted training to maintain the knowledge and skillset required for tracheostomy and laryngectomy care (Dennis-Rouse & Davidson, 2008; Morris, Whitmer, & McIntosh, 2013; St. John & Feldman Malen, 2004). Both knowledge and self-efficacy are essential elements in accurately identifying potential problems, and acting promptly to avoid serious complications (Hooper, 1996; St. John & Feldman Malen, 2004; Tamburri, 2000). It has been shown that greater nursing self-efficacy translates into higher quality nursing care (Bandura, 1997; Lee & Ko, 2010; Stajkovic & Sommer, 2000). Targeting the mastery of tracheostomy and laryngectomy skills, through a standardized nurse training competency program, could effectively increase nursing knowledge and self-efficacy with this care (Steffen, McKibbin, Zeiss, Gallagher-Thompson, & Bandura, 2002). This study aimed to demonstrate that an essential solution to addressing gaps in the nursing knowledge and self-efficacy with this care involves a dedicated, annual training program to ensure that nurses maintain the necessary skills.

2. Methods

Institutional review board (IRB) approval was obtained for this study from the Boston University Medical Center IRB, protocol #H-33,297. This study is a prospective, quality improvement intervention study to evaluate the impact of a new training strategy on nursing knowledge and self-efficacy with tracheostomy and laryngectomy care at an academic, inner city, level 1 trauma center. Purposive sampling was used to target all nurses for survey pre-training data, and only those nurses required to complete the medical/surgical, float pool, intermediate care unit (IMCU) and intensive care unit (ICU) competency day, for post-training data. Inclusion criteria for receiving the survey include all nurses at this academic medical center. Inclusion criteria for receiving the hands-on training and who were asked to complete the online tutorial, were those nurses at this academic medical center who were required to complete the competency day. Nurses were surveyed before, and after the implementation of the training program. The training program included a thirty-minute hands-on training session on appropriate tracheostomy and laryngectomy care, which was followed by an online tutorial outlining proper care for tracheostomy and laryngectomy patients. The training took place from mid-September 2014 through January 2015, with each session comprising approximately 30 nurses. In February 2015, a link to the online tutorial was emailed to all nurses who completed the hands-on training. Nurses had 4 weeks to complete the online tutorial. In March 2015, the survey questionnaire was again emailed and responses were collected anonymously.

The questionnaire included questions on appropriate stoma care, anatomical questions identifying the differences between a tracheostomy and a laryngectomy, as well as the modified Riggs and Knight self-efficacy questionnaire. The knowledge questions were scored yes or no. The self-efficacy questions employed a Likert scale and included

strongly agree, agree somewhat, disagree somewhat and strongly disagree. Use of a self-efficacy scale was important, as self-efficacy has been shown to correlate to task accomplishment, performance and greater job satisfaction (Bandura, 1997; Lee & Ko, 2010; Lent, Schmidt, & Schmidt, 2006; Lindsley, Brass, & Thomas, 1995; Stajkovic & Sommer, 2000). The Riggs and Knight Personal Efficacy Beliefs scale (see Table 1) was modified, and the adapted version was validated prior to use (Riggs & Knight, 1994). The survey validation process involved surveying 20 otolaryngology residents, surgeons and nurses, and then clarifying and simplifying the questions, to increase study validity and reliability. Methods to assure the quality and adequacy of the data included utilizing the same nurse educators for the training, as well as the same training program. To increase reliability and decrease inter-rater differences, two primary educators provided the hands-on training session. Data were stored on a password-protected survey platform, on a password-protected computer, and maintained and managed by the primary author. This study was used as part of the primary author's doctoral work.

2.1. Data collection and analysis

Seven hundred and thirty-two nurses completed the hands-on training and were asked to complete the online tutorial. A total of 338 surveys were collected for a 23% response rate: 165 before training and 173 after training. Survey data collected prior to, and after implementation of the training program were compared. T-tests and chi-square tests were employed for comparisons, despite the fact that these are not truly independent observations. Data were then limited to those surveys collected post-implementation of training for evaluation and comparison, and statistical analyses were performed using SAS software (version 9.3; SAS Institute, Cary, NC). Chi-square tests and t-tests were utilized with a significance level of 0.05.

The authors collapsed practice environment into two categories: those with routine tracheostomy/laryngectomy exposure and those without routine exposure. The authors also collapsed years of nursing experience into two categories: those with 5 or fewer years, and those with 6 or more years. T-tests and chi-square tests were employed and observations are independent since they are limited to post-implementation of training surveys. The authors compared nurses who indicated receiving training, versus nurses who indicated they did not receive training. T-tests and chi-square tests were employed, and these observations are independent since they are limited to the post-implementation of training surveys. Finally, the authors compared nurses with 5 or fewer years of nursing practice and those with 6 or more years of nursing practice. These data contain two t-tests: knowledge score and self-efficacy score versus a dichotomous variable of "experience" (<=5 years, 6+ years). Survey data were collected through Survey Monkey, an online survey development platform. No harm or adverse events were encountered in this interventional training study.

Table 1
Riggs and Knights Personal Efficacy Beliefs Scale.

Think about your ability to do the tasks required by your job. When answering the following questions, answer in reference to your own personal work skills and ability to perform your job. Respond with "SA" for "strongly agree", "A" for "agree", "AS" for "agree somewhat", "DS" for "disagree somewhat", and "SD" for "strongly disagree".

1. I have confidence in my ability to do my job.
2. There are some tasks required by my job that I cannot do well.
3. When my performance is poor, it is due to my lack of ability.
4. I doubt my ability to do my job.
5. I have all the skills needed to perform my job very well.
6. Most people in my line of work can do this job better than I can.
7. I am an expert at my job.
8. My future in this job is limited because of my lack of skills.
9. I am very proud of my job skills and abilities.
10. I feel threatened when others watch my work.

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