PROVISION OF ORAL CARE IN THE CARDIOThoracic INTENSIVE CARE UNIT: A SURVEY OF CURRENT NURSING PRACTICES

By

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A THESIS PRESENTED TO THE GRADUATE SCHOOL OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

UNIVERSITY OF FLORIDA

2021
I would like to dedicate this work to all the patients that I have encountered throughout graduate school. Interacting with these individuals has changed my life for the better and they have unknowingly allowed me to become a better clinician and researcher. I hope that I have impacted their lives for the better, just as they have done mine. They are the reason why I strive to be the best clinician and researcher I can be. They are the reason why this work is possible.
ACKNOWLEDGMENTS

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I thank all the speech-language pathologists of the Aerodigestive Research Core Laboratory. Your support means everything to me. This would not have been possible without your guidance throughout this process. Amber, Lauren, and Mackenzie, I look up to all of you, and hope to be half the clinician that you are.

Last but most certainly not least, I would like to thank my family and my boyfriend who have been a solid rock for me throughout these past few years as a student at the University of Florida. Your hard work and dedication in your own careers only motivate me to do the same. Your continuous support and love did not go unnoticed. I love you all.
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<tr>
<td>AACN</td>
<td>American Association of Critical-Care Nurses</td>
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</tr>
<tr>
<td>APRN</td>
<td>Advanced practice nurse</td>
<td></td>
</tr>
<tr>
<td>CHG</td>
<td>Chlorhexidine gluconate</td>
<td></td>
</tr>
<tr>
<td>ETT</td>
<td>Endotracheal tube</td>
<td></td>
</tr>
<tr>
<td>HAP</td>
<td>Hospital acquired pneumonia</td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive care unit</td>
<td></td>
</tr>
<tr>
<td>LOS</td>
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<td></td>
</tr>
<tr>
<td>Q</td>
<td>Question</td>
<td></td>
</tr>
<tr>
<td>QR</td>
<td>Quick response</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
<td></td>
</tr>
<tr>
<td>SLP</td>
<td>Speech-language pathologist</td>
<td></td>
</tr>
<tr>
<td>SRQR</td>
<td>Standards for reporting qualitative research</td>
<td></td>
</tr>
<tr>
<td>VAP</td>
<td>Ventilator acquired pneumonia</td>
<td></td>
</tr>
</tbody>
</table>
Abstract of Thesis Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Master of Arts

PROVISION OF ORAL CARE IN THE CARDIOTHORACIC INTENSIVE CARE UNIT: A
SURVEY OF CURRENT NURSING PRACTICES

By

Kayla Croft

May 2021

Chair: Emily K. Plowman
Major: Communication Sciences and Disorders

Development of poor oral hygiene is common in hospitalized cardiothoracic
patients and associated with significant morbidity. Although frequent oral care by
nursing staff reduces risk of oral infection, no standardized clinical guidelines exist for
provision of oral care in the cardiothoracic Intensive Care Unit (ICU) setting. The current
study sought to understand: 1) training and confidence for the provision of oral care to
patients, 2) methods, frequency, and documentation of oral care provision, and 3)
prioritization and perceived barriers of providing oral care to patients in the
cardi thoracic ICU. An anonymous, voluntary 18-item online survey was administered
to nurses working in a cardiothoracic ICU setting using Qualtrics software. During a
one-month period, 110 nurses completed the survey (70% response rate). Despite low
levels of training, 70% of nurses reported confidence in the provision of oral care.
Variability in methods, products, and frequency of oral care administration was noted
with 9 different methods reported (mean: 5.65, mode: 6, range: 2-9, SD: 4.95), 17
different products reported (mean: 5.8, mode: 6, range: 1-11, SD: 7.07), and
frequencies of daily oral care provision ranging from zero to five times per day or
greater. Documentation was noted to be very consistent with 99% utilizing electronic
charting in a systematic fashion. Oral care was rated as a “moderate priority” by 53% of nurses who did not perceive any significant barriers in this area. Data highlight the need for the formal education and evidence-based standardized protocols for the provision of oral care in this high-risk setting.
CHAPTER 1
INTRODUCTION

Background on Oral Care

Oral care is the practice of assessing and caring for an individual’s oral cavity to prevent, manage, or eliminate oral disease (Bonetti et al., 2015). Individuals undergoing cardiothoracic surgical procedures are at an increased risk of developing poor oral health during the post-operative recovery period given their exposure to endotracheal intubation, ventilation, transesophageal echocardiogram probe placement and bronchoscope placement through the oral cavity, possible feeding tube placement, altered mental status, and dependence on others to complete self-care during the post-operative recovery period (Hoben et al., 2017; Danckert et al., 2016; Zander & Boniface, 2017; Jablonski-Jaudon et al., 2016; Wardh et al., 2012; Yi et al., 2015; Rozas et al., 2017; Willumsen et al., 2012; Porter et al., 2015).

Standardized implementation of oral care protocols by nursing staff in hospitalized ICU patients is associated with reduced rates of both hospital and ventilator acquired pneumonia (HAP, VAP) (Liao et al., 2015; Robertson & Carter, 2013; Mori et al., 2006; Prendergast et al., 2013; Haghhighi, et al., 2017). Therefore, such programs have been implemented in ICU patients, much like this study’s population of interest. Currently, however, no guidelines or protocols are utilized in the cardiothoracic ICU setting for recovering post-surgical patients who are at risk of poor oral care due to several factors.

Relvance of Oral Care in Cardiothoracic ICU Patients

First, cardiothoracic patients typically undergo lengthy procedures requiring endotracheal intubation and mechanical ventilation and, in some patients, pre- or post-
operative tracheostomy (Neiderman et al., 2005; Liao et al., 2015; Edmonton (AB): CPSI, 2016). It is well documented that such medical treatments increase the risk of pathogenic bacterial colonization leading to VAP (U.S. Department of Health and Human Services, 2010) representing the leading cause of death associated with hospital acquired infection (Edmonton (AB): CPSI, 2016). HAP and VAP have been correlated with increased length of stay (LOS), higher rates of morbidity and mortality due to increased LOS, and prolonged ventilatory support (Edmonton (AB): CPSI, 2016).

Concerningly, cardiothoracic surgical patients demonstrate high rates of aspiration and silent aspiration during the acute post-operative recovery period (Plowman et al., 2021; Miles et al., 2018). Patients with impaired airway protection abilities are at increased risk for colonized bacteria from the oral cavity entering the lungs and subsequently leading to the development of HAP, a form of aspiration pneumonia (Edmonton (AB): CPSI, 2016). Despite these risks, nursing guidelines for the provision of oral care lack research and are not well defined.

**General Risks Cardiothoracic Patients Experience**

In general, cardiothoracic patients are placed at an increased risk of experiencing adverse outcomes during their hospital stay. Such events include pulmonary complications including pneumonia, atelectasis, and pulmonary edema, respiratory infection, respiratory failure, pleural effusion, pneumothorax, aspiration pneumonitis, exacerbation of lung disease, acute lung injury, and acute respiratory distress syndrome (Touw, et al., 2018; Canet et al., 2010; Marseu & Slinger, 2016). Of which can lead to such as increased morbidity, mortality, and length of hospital stay (Pasquina et al., 2004; Marseu & Slinger, 2016). Additionally, wound complications are common and may lead to reoperation (Hazel & Weyant, 2015) and potentially infection. Alarmingly, in
the month following thoracic surgery, 1-20 patients will die. This has been mostly attributed to pulmonary complications, which affects 1 in 5 patients (Slinger & Darling, 2011). Another alarming finding revealed that approximately 1 in 5 patients who develop post-operative respiratory failure will die within 30 days (Smetana, 2009). Given that cardiothoracic patients are already placed at an increased risk for developing adverse health outcomes, it is essential that they receive good oral care to prevent any further negative events.

**Aims of the Study**

Nurses represent the frontline health-care professionals and are therefore instrumental for the provision of oral care in acute specialist units, such as the cardiothoracic ICU, during the acute recovery period (Driscoll et al., 2018; Salamone et al., 2013). Inadequate provision of oral care of hospitalized patients has been previously attributed to: 1) lack of training (Binkley et al., 2004; Dale et al., 2013), 2) lack of standardized policy (Wardh et al., 2000), 3) low prioritization (Binkley et al., 2004; Dale et al., 2013), and 4) perceived lack of benefit to the patient (Jones et al., 2004). Although frequent and stringent oral care is known to reduce the risk of infection and mitigate adverse health outcomes, guidelines for the provision of oral care in the cardiothoracic ICU setting is lacking. It is therefore unclear what practices cardiothoracic ICU nurses currently utilize. The current study therefore sought to determine current parameters of nurse provision of oral care in cardiothoracic patients. Specifically, we aimed to determine: 1) training and confidence for the provision of oral care to patients, 2) methods, frequency, and documentation of oral care provision, and 3) prioritization and perceived barriers of providing oral care to patients in the cardiothoracic ICU.
CHAPTER 2
METHODS

Design

This study represents a prospective observational study design conducted at a single academic level 1 academic medical teaching hospital. An 18-item survey was developed and administered to nurses working on the cardiovascular or cardiothoracic ICUs.

Survey Item Development

Development

Survey-items were developed by a multidisciplinary team that consisted of several cardiothoracic nurses, physicians, and SLPs who work and specialize in dysphagia management. Survey questions were developed under four themes: 1) nursing demographics (Q1-Q5), 2) oral care training (Q6-Q8), 3) oral care methods and documentation (Q9-Q13), and 4) perceived barriers (Q14-18).

Survey Items

A combination of binary, multiple choice, and open text response options were provided. Branching logic and detailed response-based filtration for seven additional multiple choice questions (Q1a, Q3a, Q6a, Q6b, Q10a, Q13a, Q14a) were employed to elicit further follow up information. The open access Qualtrics platform and software (Qualtrics, 2005) was utilized to develop, execute, and summarize survey data and results. The final survey is provided in the Appendix.

Recruitment

Participation was voluntary and anonymous. An email invitation to complete the survey was sent to nurses working in either a thoracic and vascular surgery ICU or
cardiac surgical ICU of a level 1 academic medical teaching hospital. The e-mail contained a flyer with an embedded Quick Response (QR) code and direct link to the electronic survey in Qualtrics (Qualtrics, 2005). The survey was open and available for completion between January 25 and February 25, 2021. A reminder email was sent two weeks following the initial email invitation and a research team member attended a team meeting for each nursing staff shift to hand out approved flyers containing a QR code to link directly to the survey website in real time from personal mobile devices to encourage survey completion. The survey could be accessed and completed on a computer, tablet, or mobile phone device. Respondents were permitted to submit the survey with no time restrictions. This study was approved by the local Institutional Review Board.

Data Analysis

All qualitative and quantitative data were retrieved from the Qualtrics Default Report feature described above were tracked in Microsoft Excel. Descriptive summary statistics were utilized (frequency counts, percentages, range, mode, range) to characterize nursing practice patterns. Methodological integrity was critically appraised and in alignment with recommendations from the Standards for Reporting Qualitative Research (SRQR) Checklist provided in the Supplement file (O'Brien, Harris, Beckman, Reed, & Cook, 2014).
CHAPTER 3
RESULTS

Participant Demographics

One hundred and ten surveys were submitted between January 25 and February 25, 2021. This represented a completion rate of 70%. Of the responding nurses, 58 (54.7%) worked in the cardiac ICU while 48 (45.3%) worked in the thoracic and vascular ICU. In rank order, participant credentials include (Q1): Bachelor of Science in Nursing (50.8%, n=67), diploma in nursing (20.45%, n=27), graduate degree in nursing (Masters or Doctor of Nursing) (8.3%, n=11), graduate degree outside of nursing (2.3%, n=3), or a specialized certification (10.6%, n=14). Ten nurses (7.6%) selected “other” where they were prompted to specify via a free text box. Responses are as follows: Associates Degree in Nursing (n=5), some graduate/doctorate schooling in nursing (n=2), APRN (n=1), and did not specify (n=2). Half of the participants reported practicing as a nurse for one to five years (n=53), 23.6% reported working clinically for less than one year (n=25), 17.9% had six to ten years of experience (n=19), while 8.5% reported working for more than ten years (n=9). Sixty nurses (56.6%) reported working the day shift and 46 (43.4%) worked the night shift.

Training and Confidence for Provision of Oral Care

Formal Training in the Provision of Oral Care

Forty nurses (38%) reported having received formal training in the provision of oral care (Q6), while 66 responded that they had not received formal training in this area (62%, Figure 1). Of the 40 who received formal training, specified type of training in oral care included, in rank order (Q6a): classroom training during nursing school (44.3%, n=27), at their workplace (22.9%, n=14), training during clinical practicum experience in
nursing school (21.3%, n=13), online training program (8.2%, n=5), or through the American Association of Critical-Care Nurses (AACN) or another organization's training program (3.3%, n=2). Duration of training in oral care (Q6b) ranged from, in rank order: less than one hour (52.6%, n=20), one to five hours (42.1%, n=16), six to ten hours (2.6%, n=1), and greater than ten hours (2.6%, n=1). Sixty-eight (65.4%) respondents reported that they had received adequate training in the provision of oral care, 22.1% (n=23) reported uncertainty with the adequacy of training, and 12.5% (n=13) did not feel that they had received adequate training in the provision of oral care.

Confidence Levels

Confidence levels for providing oral care in responding nurses is summarized in Figure 2. In rank order, nurses reported feeling 1) very confident (52.9%, n=55), 2) somewhat confident (27.9%, n=29), 3) extremely confident (17.3%, n=18), and 4) not confident (1.9%, n=2) in the provision of oral care.

Oral Care Methodology and Frequency

Methods Utilized During the Provision of Oral Care

Items 9 and 10 allowed nurses to select any responses that applied regarding methods and products utilized in the provision of oral care. Table 2 details methods utilized by nurses in the provision of oral care and denotes a total of 9 different methods in this cohort of nurses. The most common methods included: mouth swabbing (n=101), mouth suctioning (n=97), and teethbrushing (n=81). The number of methods used by nurses ranged between 2 to 9 with a mean of 5.65, a mode of 6, and a standard deviation of 4.95.
Products Utilized During the Provision of Oral Care

Nurses reported using a wide range of products in their provision of oral care (Q10). These data are summarized in Table 3 and indicate that the most commonly utilized products were: oral swab (n=87), chlorhexidine gluconate (n=86), and suction toothbrush (n=84). On average, nurses reported using 5.8 (mean) number of products (mode: 5, 6; SD: 7.07), and the number of products used by nurses ranged between 1 and 11. Of the nurses who reported using toothpaste (n=56), 29 used fluoride, 11 used non-fluoride, while 15 reported not knowing the type of toothpaste used and utilized whatever was stocked on their unit.

Frequency of Oral Care

Frequency of oral care in the cardiothoracic ICU was noted to vary across nursing clinicians. Figure 3 represents results of survey item 11 where participants were asked to select the frequency at which they performed oral care in a typical patient on their unit. In rank order, responses included: 1) three times per day (40.4%, n=40), 2) two times per day (28.3%, n=28), 3) greater than or equal to five times per day (12.1%, n=12), 4) one time per day (9.1%, n=9), 5) four times per day (6.1%, n=6), 6) pro re nata (PRN) (3%, n=3), and 7) zero times per day (1%, n=1).

Standardized Policy and Documentation

Of the nurses who responded to survey item twelve, 75 (75.5%) reported that a standardized policy for oral care existed, 23 reported uncertainty regarding the existence of a standardized oral care policy, while 1 reported no standardized policy.

Response to survey item thirteen were consistent with 99% of nurses reporting that they had documented oral care clinical activities and only 1% reported that they did not. Methods for documentation were also consistent with 100% (n=98) reporting that
they documented oral care in an existing smart form, flowsheet, or through manual entry in EPIC.

**Attitudes Toward Oral Care and Perceived Barriers**

Sixty-seven percent of nurses (n=65) who responded to Q14 reported no perceived barriers to performing oral care in the patients they manage. Twenty-eight percent of nurses reported the existence of barriers for implementation of oral care in their clinical practice (n=27). The remaining 5% of respondents (n=5) reported uncertainty to this question. In rank order of frequency reported, perceived barriers include: patient having more urgent problems that must be prioritized (25.6%, n=23), lack of time (18.9%, n=17), uncooperative patient (15.6%, n=14), patient refusal or request not to complete (13.3%, n=12), lack of training (10%, n=9), lack of needed materials (5.6%, n=5), absence of a standard protocol requiring the provision of oral care to patients (5.6%, n=5), lack of benefit to patient (2.2%, n=2), other which prompted a written description (2.2%, n=2), and lack of support from colleagues (1.1%, n=1). Of those who selected “other” for this question, responses include tube in mouth (n=1) and agitation of intubated patients (n=1).

Nurses’ responses to survey items 15 and 16 are summarized in Table 4 and indicate that 90.5% of respondents report having access to all needed materials and supplies to perform oral care, 83.2% of respondents report having adequate time to perform oral care, and 96.8% of respondents agree that oral care is important and significantly improves patient outcomes. The respondents were then asked to complete the following sentence, “I find the task of providing oral care to be…” (Q16). Responses for Q16 ranged from: very pleasant (4.21%, n=4), pleasant (15.79%, n=15), neither
pleasant or unpleasant (65.26%, n=62), unpleasant (12.63%, n=12), and very unpleasant (2.11%, n=2).

Prioritization of Oral Care and Future Learning Opportunities

Prioritization of Oral Care

In rank order, nurses rated their prioritization of oral care as: 1) moderate (52.6%, n=50), 2) high (21.1%, n=20), 3) low (21.1%, n=20), 4) very high (3.2%, n=3), 5) very low (1%, n=1), and 6) not prioritized (1%, n=1).

Future Learning Opportunities

When prompted if they would like to learn more about best practices in the provision of oral care 65.3% (n=62) responded “yes,” 14.7% (n=14) responded “no,” and 20% (n=19) responded “uncertain.”
Table 3-1. Summary of nursing educational backgrounds and years of experience. Nurses who responded to questions 1 and 2 most commonly reported obtaining a Bachelor of Nursing with a total of 1-5 years of experience.

<table>
<thead>
<tr>
<th>Educational Background</th>
<th>Number of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma in Nursing</td>
<td>27</td>
</tr>
<tr>
<td>Bachelor in Nursing</td>
<td>67</td>
</tr>
<tr>
<td>Graduate Degree in Nursing</td>
<td>11</td>
</tr>
<tr>
<td>Graduate Degree Outside of Nursing</td>
<td>3</td>
</tr>
<tr>
<td>Specialized Certification</td>
<td>14</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 3-2. Summary of nursing years of experience.

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Number of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 Year</td>
<td>25</td>
</tr>
<tr>
<td>1-5 Years</td>
<td>53</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>19</td>
</tr>
<tr>
<td>&gt; 10 Years</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 3-3. Methods reported for provision of oral care. A total of nine different methods were reported by the nurses who responded to survey item 9. Number of methods utilized in responding nurses ranged between 2 and 9, with a mean number of methods utilized of 5.65 and a mode number of methods utilized of 6.

<table>
<thead>
<tr>
<th>Oral Care Method:</th>
<th>Number of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth Swabbing</td>
<td>101</td>
</tr>
<tr>
<td>Mouth Suction</td>
<td>97</td>
</tr>
<tr>
<td>Teeth Brushing</td>
<td>81</td>
</tr>
<tr>
<td>Mouth Moisturizing</td>
<td>80</td>
</tr>
<tr>
<td>Lip Moisturizing</td>
<td>78</td>
</tr>
<tr>
<td>Mouth Washing</td>
<td>48</td>
</tr>
<tr>
<td>VAP Prophylaxis Bundle</td>
<td>46</td>
</tr>
<tr>
<td>Pharyngeal Suction</td>
<td>24</td>
</tr>
<tr>
<td>Tongue Scraping / Cleaning</td>
<td>16</td>
</tr>
</tbody>
</table>
Table 3-4. Products reported for provision of oral care. A total of seventeen different products were reported by the nurses who responded to survey item 10. Number of products utilized in responding nurses ranged between 1 and 11, with a mean number of products utilized of 5.8 and a mode number of products utilized of 5 and 6.

<table>
<thead>
<tr>
<th>Product:</th>
<th>Number of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Swab</td>
<td>87</td>
</tr>
<tr>
<td>Chlorhexidine Gluconate</td>
<td>86</td>
</tr>
<tr>
<td>Suction Toothbrush</td>
<td>84</td>
</tr>
<tr>
<td>Toothette Suction Swab</td>
<td>79</td>
</tr>
<tr>
<td>Manual Toothbrush</td>
<td>56</td>
</tr>
<tr>
<td>Toothpaste</td>
<td>56</td>
</tr>
<tr>
<td>Tap Water</td>
<td>42</td>
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<tr>
<td>Petroleum Jelly</td>
<td>38</td>
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<tr>
<td>Sterile Water</td>
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<tr>
<td>Hydrogen Peroxide</td>
<td>5</td>
</tr>
<tr>
<td>Coconut Oil Lip Balm</td>
<td>4</td>
</tr>
<tr>
<td>Normal Saline</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>Powered Toothbrush</td>
<td>2</td>
</tr>
<tr>
<td>Lemon and Glycerin</td>
<td>2</td>
</tr>
<tr>
<td>Cetylpyridinium Chloride</td>
<td>2</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>1</td>
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</tbody>
</table>
Table 3-5. Barriers reported in the provision of oral care. A total of ten different barriers were reported by the nurses who responded to survey item 14. Nurses reported patient having more urgent problems that must be prioritized, lack of time, and poor cooperation as the most common barriers experienced.

<table>
<thead>
<tr>
<th>Perceived Barriers</th>
<th>Number of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient having more urgent problems that must be prioritized</td>
<td>23</td>
</tr>
<tr>
<td>Lack of time</td>
<td>17</td>
</tr>
<tr>
<td>Uncooperative patient</td>
<td>14</td>
</tr>
<tr>
<td>Patient refusal or request not to complete</td>
<td>12</td>
</tr>
<tr>
<td>Lack of training</td>
<td>9</td>
</tr>
<tr>
<td>No standardized protocol requiring the provision of oral care</td>
<td>5</td>
</tr>
<tr>
<td>Lack of needed materials</td>
<td>5</td>
</tr>
<tr>
<td>Lack of benefit to patient</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>Lack of support from colleagues</td>
<td>1</td>
</tr>
<tr>
<td>Perception that oral care is an unpleasant task</td>
<td>0</td>
</tr>
<tr>
<td>Low levels of confidence in the provision of oral care</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3-6. Level of agreement regarding access to needed materials to perform oral care, having adequate time to perform oral care, and the perception that oral care is important and significantly improves patient outcomes. Ninety percent of responding nurses report having access to all needed material to perform oral care, while 9% disagree. Eighty percent of responding nurses report having adequate time to complete oral care, while 17% disagree. Ninety-seven percent of responding nurses agree that oral care is important and significantly improves patient outcomes while 3% disagreed with this statement.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Needed Materials N (%)</th>
<th>Adequate Time N (%)</th>
<th>Oral Care is Important N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>27 (28%)</td>
<td>7 (7%)</td>
<td>48 (51%)</td>
</tr>
<tr>
<td>Agree</td>
<td>48 (51%)</td>
<td>39 (41%)</td>
<td>39 (41%)</td>
</tr>
<tr>
<td>Neutral</td>
<td>11 (12%)</td>
<td>33 (35%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>Disagree</td>
<td>3 (3%)</td>
<td>13 (14%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>6 (6%)</td>
<td>3 (3%)</td>
<td>3 (3%)</td>
</tr>
</tbody>
</table>
Figure 3-1. Thirty eight percent (n=40) of nurses who responded to question 6 reported receiving formal training in the provision of oral care, while 62% did not report training (A). Most common type of training reported was training that occurred during nursing school, clinical practicum, or in the workplace (B). The duration of training was under five hours in 94% of trained nurses (C).
Figure 3-2. Sixty percent (n=73) of nurses who responded to question 8 reported confidence in the provision of oral care while 30% (n=31) felt unconfident in their skillset for provision of oral care.
Figure 3-3. Fifty-nine percent (n=58) of nurses who responded to question 11 reported completing oral care in a typical patient on their unit 3-5 times a day, while 38% (n=38) completed oral care 0-3 times a day. The remaining 3% (n=3) completed oral care as needed.
Figure 3-4. Fifty-three percent (n=50) of nurses who responded to question 17 reported moderate prioritization of oral care relative to other clinical care duties. Twenty-four percent of nurses reported either high (n=20) or very high (n=3) prioritization while 22% reported either low (n=20) or very low (n=1) prioritization. One percent (n=1) of respondents reported not prioritizing oral care at all.
CHAPTER 4
DISCUSSION

Summary of Findings

Collected survey data from 110 nurses working in an academic cardiothoracic surgical ICU setting revealed 1) low levels of training in the provision of oral care, however relatively high levels of confidence, 2) variability in methods, products, and frequency of oral care, 3) moderate prioritization of oral care and 4) the existence of barriers in the provision of oral care. Findings highlight an educational gap in current nursing curriculum and the need for evidence based and standardized practice guidelines.

Formal Training in the Provision of Oral Care

Nurses represent the frontline health-care professionals and are pivotal in the provision of high-quality care in acute specialist units. As such, nurses in the acute medical setting are responsible for performing oral care among many other clinical duties. Given that nurses are expected to perform adequate oral care and understand best practices in the provision of oral care, it is imperative that they receive formal training in this area. However, a majority of nurses (62%) report the absence of formal training for the provision of oral care. This is in alignment with a lack of attention to oral health in nursing curricula (Walid et al., 2004). Additionally, only a small number of nursing programs demonstrate collaboration between nurses and oral health professionals (Kraus, et al., 2002; Bellack et al., 1999) with an emphasis on competencies related to oral health (Spielman et al., 2005). Despite this, research shows that appropriate oral health for nursing students and continued professional development can improve knowledge and attitudes of oral care in addition to reinforcing
oral health practices (Haresaku et al., 2018; Villarosa, et al., 2018). Of the 38% of nurses who received formal training related to the provision of oral care, a majority (44%) reported that their training occurred during nursing school in the context of classroom or clinical training during nursing school. Overall, the reported type of formal training received demonstrated great variability among respondents thus alluding to an absence of concrete formal training guidelines for the provision of oral care. Alarmingly low levels of training duration for the provision of oral care were reported by a majority of the respondents, with 95% receiving training that was less than 5 hours, likely contributing to lack of expertise and competency in this area. Despite an overall lack of training, two thirds of respondents felt they had received adequate training in the provision of oral care and understand best practices related to the provision of oral care. It is presumed that the 65% of individuals who reported an inclination to learn more about best practices in the provision of oral care is partially due to an overall lack of training and variability among current training protocols. Therefore, it is currently unclear how standardized formal training translates to oral care competency representing an area of future investigation.

**Confidence in the Provision of Oral Care**

Interestingly, despite a general lack of training, a majority of respondents reported confidence in their skillset for providing oral care. However, one cannot assume that confidence is commensurate to competency (Castle, et al., 2007) or that confidence replaces the need for continued education for progressive mastery of skills that demonstrate clinical proficiency (Agard & Maindal, 2009). The construct of confidence has previously been recognized as malleable and inconsistent (Oney & Oksuzoglu-Guven, 2015), however, it is continuously thought to be associated with
predictors of behavior and respective outcomes. Several studies have compared self-perceived confidence to evaluations of competency within the field of patient care, however, there is a lack of literature that compares confidence to actual achievement of clinical performance outcomes (McClimens, et al., 2012; Sergeev et al., 2012) representing a need for further research on this topic. Results from the given survey suggest that, with increased levels of experience, increased levels of confidence in their skillset for performing oral care follow. As such, nurses with less than one year of experience were 44% confident, nurses with one to five years of experience were 71% confident, nurses with six to ten years of experience were 95% confident, and nurses with greater than ten years of experience were 89% confident.

**Methods, Products, and Frequency in the Provision of Oral Care**

Although implementation of a standardized oral care protocol has shown to reduce adverse events in the ICU patient population (Liao et al., 2015; Robertson & Carter, 2013; Mori et al., 2006; Prendergast et al., 2013; Haghighi, et al., 2017), the given survey reveals that methods of providing oral care are variable. The most common methods utilized during the provision of oral care included: mouth swabbing (n=101), mouth suctioning (n=97), and teethbrushing (n=81). The number of methods used by nurses ranged from as little as 2 to as many as 9 with a mean of 5.65 methods used. The most common products utilized during the provision of oral care included: oral swab (n=87), CHG (n=86), and suction toothbrush (n=84). The number of products used by nurses ranged from as little as 1 and as many as 11 with a mean of 5.8 products used. Systematic reviews regarding oral care in ICU patients reveal that teethbrushing alone, or in combination with CHG, did not reduce VAP in ICU patients (de Camargo et al., 2019; Hua et al., 2016; Vilela, et al., 2015). However, this requires
further research and is not widely agreed upon despite consistencies in the literature. Interestingly, despite teethbrushing being one of the most commonly reported methods of oral care, toothpaste was only used by 9.6% of responding nurses (n=56). Fifty-three percent of the individuals who reported the use of toothpaste indicated that they used fluoride toothpaste while 27% selected “other” indicating that they were unaware of the type of toothpaste they used and utilized whatever was stocked on their unit.

High quality evidence from the aforementioned systematic reviews revealed that CHG reduces the risk of VAP from 24% to 18%, and for every 17 individuals on a ventilator for more than 48 hours, the use of CHG will prevent one person from developing VAP (Hua et al., 2016). Given this, it appears that CHG is the most effective oral care product used to prevent VAP (de Camargo, et al., 2019; Hua et al., 2016; Vilela, et al., 2015). As such, the method of applying CHG is typically with an oral swab or as an oral rinse. To date, there is no definitive agreement about the most effective oral care protocol. However, brushing the teeth, gums, and tongue with a regular toothbrush; moistening the oral mucosa and lips every 2-4 hours; rinsing with CHG; oropharyngeal suctioning; and brushing with oral swabs are considered optimal measures in critically ill patients (Par et al., 2014; Gupta, et al., 2016). Based on the literature, the surveyed nurses currently utilize the most effective oral care methods and products to prevent adverse health outcomes in cardiothoracic ICU patients.

In terms of frequency, forty percent of nurses report completing oral care 3 times per day and 41% of nurses report completing oral care less than 3 times per day or as needed. A systematic review by Berry et al. reports no standardization for the frequency of oral care. However, intubated patients should be provided oral care every 2-4 hours.
or as needed (Lloyd, et al., 2002) equating to oral care being performed every 3-6 hours in a given shift. Additionally, intubated patients should be assessed every 8 hours to determine the need for suctioning of oropharyngeal secretions (Lloyd, et al., 2002). In general, it has been reported that ICU patients receive oral care twice daily (Gupta et al., 2016; Miranda et al., 2016; Sona et al., 2009; Soh et al., 2012; Munro et al., 2009). Given this, the surveyed nurses appear to provide oral care within the range of recommended frequency.

Aside from the prevention of adverse events, standardized oral care protocols also increase the satisfaction of nurses, speech-language pathologists (SLPs), and family members (Robertson & Carter, 2013). Nurses in the aforementioned study report that having a standardized protocol made providing oral care easier and increased patient comfort and SLPs describe that having a standardized protocol improved the oral health of patients with dysphagia, thus allowing for earlier diet initiation. Additionally, nurses describe that having an oral health protocol improved the quality of the oral care provided (Aro et al., 2018) and required that all needed materials and supplies to perform oral care are provided (Prendergast et al., 2013).

**Standardized Policy and Documentation of Oral Care**

Alarmingly, approximately a quarter of responding nurses were unaware if a standardized policy for the provision of oral care existed on their unit, indicating that they are not following a set of guidelines or protocol for the provision of oral care in their patients. Given these results, it appears that evidence-based oral care is often overlooked by nurses in this ICU setting and oral care is performed without set guidelines. As previously mentioned, implementation of a standardized oral care protocol has been shown to reduce adverse events in the ICU patient population by
reducing HAP and VAP by 60% (Gupta et al., 2016). Despite this, the documentation of oral care was consistent among responding nurses. The ninety-nine percent of nurses who reported documentation of oral care were 100% consistent in their methods of documentation. All documentation of oral care was completed through EPIC either via an existing smart form or template, a flowsheet, or through manual entry.

**Perceived Barriers in the Provision of Oral Care**

Previous nursing surveys show that barriers in the provision of oral care exist and may influence the prioritization and frequency of oral care. Surprisingly, only twenty-eight percent of nurses in the given survey report barriers in the provision of oral care. Of the twenty-eight percent who reported the presence of barriers, the most commonly reported barriers included: patient having more urgent problems that must be prioritized (n=23), lack of time (n=17), and poor cooperation on the patient’s behalf (n=14). Based on the literature, commonly reported barriers in the provision of oral care in the ICU setting included: lack of supplies, lack of time, lack of oral health professionals or staff shortages, lack of knowledge regarding oral care, inadequate understanding of the benefits of oral care, unpleasantries of the task, resistive patient behaviors, fear of hurting patients, fear of dislodging endotracheal tube (ETT), fear of inducing bacteremia, and difficulty visualizing the oral cavity and inserting oral hygiene aids (Garrouste-Ortegas et al., 1997; Adib-Hajbaghery et al., 2013; Ibrahim et al., 2015; Kiyoshi-Teo & Blegen, 2015; Dale et al., 2018). Additionally, when asked to rate their level of agreement for a series of three questions, 90% of nurses report having access to all needed supplies and materials to perform oral care, 80% of nurses report having adequate time to perform oral care, and 97% of nurses agree that oral care is important and significantly improves patient outcomes. Interestingly, despite 80% of nurses reporting having
adequate time to perform oral care, lack of time was the second most commonly reported barrier.

**Prioritization of Oral Care**

Another alarming finding from the given survey is that three-fourths of nurses failed to rate oral care as a high priority relative to other clinical care duties. This is a running theme in the literature and in alignment with results from other surveys regarding the provision of oral care by nurses. Many studies show that nurses working in various settings rate oral care as a low priority due to a variety of barriers (Azodo et al., 2012; Wårdh et al., 2012; Salamone et al., 2013; Lyons et al., 2018; Odgaard & Kothari, 2018; Ferguson et al., 2020). As such, oral care becomes a task that is ignored or inconsistently performed (Yu et al., 2016; Coker et al., 2017). However, only twenty-eight percent of nurses reported barriers in the provision of oral care, indicating that the lack of prioritization of oral care within the cardiothoracic ICU setting is not completely due to barriers that one might experience. Given these results, it appears that oral care is not prioritized or viewed as vital in the context of patient care by a majority of responding nurses.

**Limitations**

Several inherent limitations of this study need to be highlighted. These include potential sources of questionnaire bias such as problems with wording or leading questions (Choi & Pak, 2005). We sought to minimize these risks as much as possible through self-conscious research design and consistent self-inquiry as posed by qualitative experts to foster valid conclusions (May & Pope, 2000; Anderson, 2010). Of note, open-text was frequently used to limit response bias. This inadvertently created missing data for survey items. However, we believe our transparent reporting of
response rates per individual survey item and the integration of this into our analysis prevented any misinterpretation of these results. Additionally, there is a risk of recall accuracy for questions related to frequency or relative percent and risk for participant fatigue in survey research. We believe the concise, simple questions on this survey should have eliminated this risk. Lastly, this study was carried out at only one hospital, thereby the results are context-specific, limiting the ability of its results to be generalized to other medical communities.
CHAPTER 5
CONCLUSIONS

The reported lack of training and formal guidelines for the provision of oral care likely laid the foundation for the noted variability across methods, products, and frequency of the provision of oral care among nurses in this setting. Evidence in other ICU settings support the use of standardized oral care protocols to improve patient outcomes. We recommend consideration of such models in the cardiothoracic ICU setting and the development of formal education modules for nursing students and practicing nurses alike.

Relevance to Clinical Practice

The development of poor oral care in cardiothoracic ICU patients is common and associated with a cascade of adverse events including morbidity and mortality. The provision of frequent and stringent oral care to prevent such events is therefore of high relevance to optimize patient care.

Impact Statement

What does this paper contribute to the wider global clinical community?

- In the absence of formal guidelines for the provision of oral care in cardiothoracic ICU patients, this work elucidates current practices of nurse-initiated oral care and identifies gaps in knowledge and best patient care.

- Highlights the critical need for the development and validation of a standardized oral care protocol for implementation in cardiothoracic ICU settings.

- Provides rationale for enhanced oral care related pre-licensure nursing curricula and oral care continuing education to practicing nurses.
APPENDIX
SURVEY QUESTIONS

110 respondents completed the survey at some capacity. Details regarding the number of responses for each question are below.

1. Please select your training background (check all that apply).
a. Diploma in Nursing
b. Bachelor in Nursing
c. Graduate Degree in Nursing
d. Graduate Degree in something other than Nursing
e. Specialized Certification (free text)
f. Other (free text)
If respondent selects GRADUATE DEGREE IN NURSING, leads to 1a
If respondent does not select GRADUATE DEGREE IN NURSING, leads to 2
106 responses were submitted for Q1

1a. Please select the type of Graduate Degree in Nursing that you received.
a. Clinical
b. Non-Clinical
c. Research
10 responses were submitted for Q1a despite 11 individuals selecting GRADUATE DEGREE IN NURSING for Q1

2. How many years have you worked as a nurse?
a. <1
b. 1-5
c. 6-10
d. >10
106 responses were submitted for Q2

3. What clinical setting do you work in?
a. Medical Intensive Care Unit
b. Neurosurgical Intensive Care Unit
c. Cardiac Intensive Care Unit
d. Thoracic and Vascular Intensive Care Unit
e. Pediatric Intensive Care Unit
f. Neonatal Intensive Care Unit
g. General Medicine Unit
h. Burn Unit
106 responses were submitted for Q3

3a. How many years have you worked in this specific setting?
a. <1
b. 1-5
c. 6-10
d. >10
4. What shift do you most frequently work?
   a. Day shift
   b. Night shift

5. When do you most frequently work?
   a. Weekdays only
   b. Weekends only
   c. Mostly weekdays with the exception of a minimal weekend requirement

6. Have you received formal training related to the provision of oral care in your clinical practice?
   a. Yes
   b. No
   *If respondent selects YES, leads to 6a and 6b*
   *If respondent selects NO, leads to 7*

6a. What type of training did you receive? Select all that apply.
   a. Formal classroom/clinical training in nursing school
   b. Clinical practicum training
   c. Specific training program at my workplace
   d. Training through AACN or another organization
   e. Online training/program (please specify) (free text)

6b. What was the duration of this training (collectively if more than one)?
   a. <1 hour
   b. 1-5 hours
   c. 6-10 hours
   d. >10 hours

7. Do you feel you have received adequate training in providing oral care for your patients and understand best practices in the provision of oral care?
   a. Yes
   b. No
   c. Uncertain

8. How would you rate your level of confidence in your skillset for providing oral care?
   a. Extremely confident
   b. Very confident
104 responses were submitted for Q8

9. When you provide oral care to your patients, what methods do you typically use? Select all that apply.
   a. Teethbrushing
   b. Mouth Swabbing
   c. Mouth Moisturizing
   d. Lip Moisturizing
   e. Mouth Suction
   f. Pharyngeal Suction
   g. Mouthwashing
   h. Tongue Cleaning / Scraping
   i. VAP Prophylaxis Bundle
   j. Other (please specify) (free text)

101 responses were submitted for Q9

10. Please select all products used during provision of oral care.
   a. Manual Toothbrush
   b. Powered Toothbrush
   c. Suction Toothbrush
   d. Toothpaste
   e. Toothette Suction Swab
   f. Oral Swab
   g. Petroleum Jelly
   h. Tap Water
   i. Sterile Water
   j. Coconut Oil Lip Balm
   k. Chlorhexidine Gluconate (e.g., Peridex)
   l. Essential Oils: Eucalyptol, Menthol, Menthy Salicylate, Thymol (e.g., Listerine Antiseptic)
   m. Cetylpyridinium Chloride (e.g., Breath Rx)
   n. Normal Saline
   o. Sodium Bicarbonate
   p. Lemon and Glycerin
   q. Hydrogen Peroxide
   r. Other (please specify) (free text)

   If respondent selects TOOTHPASTE, leads to 10a
   If respondent does not select TOOTHPASTE, leads to 11

101 responses were submitted for Q10

10a. What kind of toothpaste do you use during provision of oral care?
   a. Fluoride
   b. Non-fluoride
   c. Other (please specify) (free text)
55 responses were submitted for Q10a despite 56 individuals selecting TOOTHPASTE for Q10.

11. In a typical patient on your unit, at what frequency do you most commonly complete oral care?
   a. 0 time/day
   b. 1 time/day
   c. 2 times/day
   d. 3 times/day
   e. 4 times/day
   f. ≥ 5 times/day
   g. PRN

99 responses were submitted for Q11.

12. Is there a standard policy or provision of oral care in your unit?
   a. Yes
   b. No
   c. Uncertain

98 responses were submitted for Q12.

13. Is nurse administered oral care documented on your unit?
   a. Yes
   b. No
   c. Uncertain

If respondent selects YES, leads to 13a
If respondent selects NO or UNCERTAIN, leads to 14

98 responses were submitted for Q13.

13a. How is oral care documented on your unit when provided by nursing?
   a. Via an existing smart form or template in EPIC
   b. Via an existing EPIC flowsheet
   c. Via supplementary text in nursing notes
   d. Manual entry

97 responses were submitted for Q13a with 97 individuals selecting YES for Q13.

14. Do you feel there are any barriers regarding your ability to provide oral care to your patients?
   a. Yes
   b. No
   c. Uncertain

If respondent selects YES, leads to 14a
If respondent selects NO or UNCERTAIN, leads to 15

97 responses were submitted for Q14.

14a. Please select all barriers to providing oral care that you have experienced.
   a. Lack of needed materials
b. Lack of training
c. Lack of benefit to patient
d. Lack of support from colleagues
e. Not enough time
f. No standard protocol requiring the provision of oral care to patients
g. Patient having more urgent problems that must be prioritized
h. Patient refusal or request not to complete
i. Uncooperative patient
j. I do not feel confident providing oral care to my patients
k. Providing oral care is an unpleasant task
l. Other (please specify) (free text)

27 responses were submitted for Q13a with 27 individuals selecting YES for Q14

15. Rate the degree to which you agree with the following statements.
1. I have all the needed materials and supplies to provide good oral care to my patients.
   a. Strongly Disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly Agree
2. I have adequate time to provide oral care to my patients.
   a. Strongly Disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly Agree
3. Providing oral care is important and significantly improves patient outcomes.
   a. Strongly Disagree
   b. Disagree
   c. Neutral
   d. Agree
   e. Strongly Agree
95 responses were submitted for Q15

16. Please complete the following sentence. I find the task of providing oral care to be...
   a. Very pleasant
   b. Pleasant
   c. Neither pleasant or unpleasant
   d. Unpleasant
   e. Very unpleasant
95 responses were submitted for Q16

17. How would you rate your prioritization of oral care relative to other clinical care duties?
   a. Very High
   b. High
c. Moderate
d. Low
e. Very Low
f. Not Prioritized

95 responses were submitted for Q17

18. I would like to learn more about best practices in the provision of oral care.
   a. Yes
   b. No
   c. Uncertain

95 responses were submitted for Q18

End of Survey
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BIOGRAPHICAL SKETCH

Kayla Croft received a Bachelor of Health Science degree in communication sciences and disorders from the University of Florida in 2019. She then began the Master of Arts program in communication sciences and disorders at the University of Florida that same year. During this program, she gained clinical experience through practicum placements at Terwiliger Elementary School, UF Health Shands, and, last but definitely not least, the Aerodigestive Research Core Laboratory. She began working in the Aerodigestive Research Core Laboratory under the leadership of Dr. Emily Plowman as a clinical practicum student in her second semester of graduate school. Due to the limitations of COVID, she then went on to complete two more clinical practicum rotations with the Aerodigestive Research Core Laboratory. During this time, she has served as a co-author on numerous poster presentations and aided in the provision of various research projects. Ultimately though, through this position, she developed a passion for research. Upon graduation, she plans to maintain that drive and passion for research and evidence-based practice in her clinical fellowship and future career. Eventually, Kayla hopes to continue her education in speech-language pathology and also become a board-certified swallowing specialist.