

A survey of oral care practices in South African intensive care units

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Background. Recent research has highlighted the importance of oral care in the prevention of ventilator-associated pneumonia. Although oral care is a fundamental aspect of nursing care, it is often given lower priority than other nursing interventions in intensive care units (ICUs).

Objectives. The aim of this study was to describe current oral care interventions for ventilated patients in South African ICUs. The objectives of the study were to determine the knowledge, attitudes and beliefs, and training of ICU nurses who render oral care; the type and frequency of oral care delivered to ventilated patients; hospital support and supplies available; and the availability of oral care protocols in the ICU.

Methods. A quantitative, prospective, cross-sectional research design was used. Approval to conduct the study was obtained from the Human Research Ethics Committee, University of the Witwatersrand. The study population consisted of nurses working in ICUs who provide oral care to ventilated patients.

Results. Almost all the nurses perceived oral care to be a high priority. Nurses were generally aware of the most likely mechanism of acquiring pneumonia. The type and frequency of oral care varied widely. Most nurses stated that they had adequate time and supplies to provide oral care. The majority of nurses had had some formal training in oral care, but would appreciate an opportunity to improve their knowledge and skills.

Conclusions. There is a variety of oral care practices for ventilated patients. The introduction of evidence-based oral care guidelines into units that do not currently have these guidelines may further enhance best practice and ensure that patient outcomes are not compromised unnecessarily.

Traditionally, oral care has been a low-priority intervention in intensive care units (ICUs) and has been regarded by the ICU team as a comfort measure for patients.¹⁻³ Recent research, however, has highlighted the importance of oral care in the prevention of ventilator-associated pneumonia (VAP).^{4,5} VAP is the second most common nosocomial infection in the ICU,⁶ affecting approximately 27% of ICU patients.⁷ VAP is associated with increased morbidity and mortality,⁸ longer ICU and hospital stays, and higher healthcare costs.⁹

The most important focus of oral care is plaque control in the oral cavity. Oral care practices in the ICU vary widely,⁴ with some being more effective than others in controlling plaque. The two most effective practices are tooth brushing (if correctly done) and the use of chlorhexidine (CHD), a broad-spectrum antibacterial agent.¹⁰ Foam/gauze swabs moistened with either mouthwash or water are still frequently used in practice,^{2,11} even though they have been found to be ineffective for plaque removal.¹²

Providing evidence-based oral care may decrease the incidence of VAP in critically ill patients. Surveys of oral care practices conducted in ICUs in the USA,⁴ Europe¹³ and the UK¹⁴ were found in the literature, but no such studies appear to have been published in

South Africa. An important first step in changing practice is to ascertain current practice. It was therefore decided to conduct a national survey of current oral care practices in South African ICUs.

Methodology

A quantitative, prospective, cross-sectional research design was used. The objectives of the study were to determine the knowledge, attitudes and beliefs, and training of ICU nurses who render oral care; the type and frequency of oral care delivered to ventilated patients; hospital support and supplies available; and the availability of oral care protocols in ICUs.

A convenience sample of ICU nurses was used. A questionnaire was distributed to nurses working in ICUs at an ICU refresher course in 2007, at a Critical Care Society of Southern Africa (CCSSA) national congress in 2008, and at CCSSA branch meetings in the Eastern and Western Cape, the Free State, KwaZulu-Natal and Gauteng. Two researchers collected completed questionnaires from the participants at the refresher course and national congress, and questionnaires from branch meetings were returned to one of the researchers at a CCSSA council meeting by representatives from the various areas.

Permission to conduct the study was obtained from the Human Research Ethics Committee, University of the Witwatersrand. Participation in the study was voluntary, and anonymity and confidentiality were assured.

The questionnaire used for the survey was based on one developed by Binkley *et al.*⁴ at the University of Louisville (Louisville, KY, USA). Their questionnaire was based on a review of the literature, done by specialists in the field and pre-tested before distribution to participants. Permission to use the questionnaire was obtained from these authors, who suggested that a question pertaining to the availability of oral care protocols in the ICU be included. The questionnaire included a section for participants' demographic data, that in turn comprised 6 sub-sections, as follows:

Demographic data of participants

Knowledge that aspiration of oropharyngeal secretions is a likely mechanism for the development of VAP was assessed using the following scenario: 'An 18-year-old male was involved in a motor vehicle accident and was admitted to your unit five days ago. He has been mechanically ventilated since admission and has now developed pneumonia.' Four possible mechanisms for the development of the disease were described and participants were asked to assess the likelihood of each on a scale of 1 - 10, where 1 was the least likely mechanism of transmission and 10 was the most likely.

The **attitudes and beliefs** of participants regarding oral care were assessed by 5 questions using a 5-point Likert scale (ranging from 'strongly agree' (5) to 'strongly disagree' (1)).

Type and frequency of provision of oral care: participants were asked to indicate how often, if at all, they used various supplies, and to indicate the type of mouthwash they used when providing oral care.

A 5-point Likert scale was used to address 5 questions pertaining to **oral care training**. Two questions addressed previous training, and 3 addressed participants' attitudes towards further training needs.

Four questions were asked to assess the **availability of time and supplies** to provide oral care, again using a 5-point Likert scale.

Availability of an oral care protocol. On the advice of the researchers involved in the development of the original questionnaire,⁴ a question was included on whether or not an oral care protocol/guideline was available in the ICU in which the participant worked.

Following minor modifications (e.g. adapting the nursing qualifications to those appropriate for South African nurses), the questionnaire was distributed to ICU nurses as described above. This method of questionnaire distribution precluded a response rate being calculated.

Data were entered onto an Excel spreadsheet, and descriptive statistics were used for analysis.

Results

Demographic data of participants

Ninety-six usable questionnaires were returned to the researchers. The demographics of the participating nurses are shown in Table I. Nearly half the sample were ICU-trained nurses (45.8%), almost two-thirds were from the public sector (63.5%), and the majority worked in multidisciplinary ICUs (75.9%). The Northern Cape was the only area with no representation. The mean years of ICU experience of the nurses was 8.6 (range 0.4 - 28).

Table I. Demographics of participants

	%	N
Participants' qualifications*		
ICU/trauma registered	45.83	44
Registered general nurse	36.45	35
ICU/trauma student	10.41	10
Staff nurse	4.16	4
Auxiliary nurse	1.04	1
Other	2.08	2
Hospital type		
Private	36.45	35
Public - academic	54.16	52
Public - non-academic	9.37	9
Type of ICU		
Medical	3.12	3
Surgical	5.20	5
Multidisciplinary	75.92	73
Cardiothoracic	5.20	5
Coronary care	3.12	3
Cardiothoracic/coronary care	3.12	3
Neurological	2.08	2
Trauma	2.08	2
Province [†]		
Eastern Cape	28.12	27
Free State	5.20	5
Gauteng	19.79	19
Limpopo	4.16	4
Mpumalanga	2.08	2
KwaZulu-Natal	20.83	20
Northern Cape	0	0
North West	3.12	3
Western Cape	11.45	11

*Mean years of ICU experience 8.62 (range 0.42 - 28).
[†]Missing data for 5 participants.

Knowledge

Responses to the clinical scenario were rated on a scale of 1 - 10, where 1 was least likely and 10 most likely. A mean response of 7.0 (standard deviation (SD) 2.4) shows that nurses are generally aware of current evidence that aspiration of oropharyngeal secretions is a risk factor, and in this scenario the most likely mechanism, for the patient's pneumonia. The scenario results are presented in Table II.

Attitudes and beliefs

Almost all the nurses (97.85%, N=94) perceived oral care as a high nursing priority. Thirty-nine nurses (40.6%) found cleaning the

mouth an unpleasant task, and 46 (47.9%) found it a difficult task to perform. Over half of the participants (57.3%, $N=55$) found that the mouths of ventilated patients became worse the longer they were ventilated, no matter what the nurses did. The results are shown in Table III.

Type and frequency

Four participants failed to fill in the question pertaining to type and frequency of oral care provided. Both the type and frequency of oral care provision varied among the participants in this survey (Table IV). Mouthwash was used by all but 9 nurses who answered this question, with almost two-thirds of the nurses (64.1%) rinsing their patients' mouths 8-hourly or more frequently. A variety of mouthwashes were used, with 28 participants (30.4%) using more than one type. Thirty nurses (32.6%) stated that they used CHD exclusively, and a further 15 nurses (16.3%) stated that CHD was one of the mouthwashes that they use. Of those using one type of mouthwash only, 7 (7.6%) used over-the-counter solutions, 12 (13.0%) used alcohol-free solutions, 4 (4.3%) used povidone-iodine

solutions, 9 (9.8%) used glycothymoline, and 1 (1.1%) reported using normal saline. Peroxide was not used by any of the nurses in this study. Foam toothettes/gauze swabs, which are often used in combination with mouthwash, were used at least once a day by 57.6% of the nurses ($N=53$). Nearly two-thirds of the nurses (63.0%, $N=58$) indicated that they used manual toothbrushes at least daily, while only 4.3% ($N=4$) reported using an electric toothbrush. Toothpaste was available to 60.9% ($N=56$) of those using toothbrushes.

Oral care training

The majority of nurses (86.5%, $N=83$) felt that they had received adequate training in providing oral care. Basic nursing training was the only source of training for 35 nurses (36.5%), while 22 nurses (22.9%) had received training while completing their postgraduate training. Two nurses (2.1%) stated that their only source of training had been during continuing education activities such as congress attendance, and 10 nurses (10.4%) indicated that their primary source of education had been hospital in-service.

Table II. Response rates on the clinical scenario

Assumed mechanism of disease	Main response*	
	Mean	SD
Aspiration of contaminated secretions	7.01	2.46
Transmission from health care worker's hands	5.61	3.02
Transmission from contaminated equipment	5.39	2.85
Pre-admission colonisation	5.05	2.75

*On a scale of 1 - 10, where 1 is least likely and 10 is most likely.

Table III. Attitudes regarding oral care

	'Oral care is a very high priority' (% (N))	'Cleaning the oral cavity is an unpleasant task' (% (N))	'The oral cavity is difficult to clean' (% (N))	'The mouth of most ventilated patients gets worse no matter what I do' (% (N))	'I have been given adequate training to provide oral care' (% (N))
Strongly agree	86.4 (83)	16.66 (16)	11.45 (11)	29.16 (28)	69.79 (67)
Somewhat agree	11.45 (11)	23.95 (23)	36.45 (35)	28.12 (27)	16.66 (16)
Neither agree nor disagree	0	12.5 (12)	9.37 (9)	15.62 (15)	8.33 (8)
Somewhat disagree	2.08 (2)	13.54 (13)	15.62 (15)	16.66 (16)	3.12 (3)
Strongly disagree	0	33.33 (32)	27.08 (26)	10.41 (10)	2.08 (2)

Table IV. Types and frequency of oral care*

	Never	Once a day	Every 12 hours	Every 8 hours	Every 4 hours	Every 1 - 3 hours
Foam swabs	39	8	8	12	16	9
Manual toothbrush	34	12	23	13	8	2
Electric toothbrush	88	2	1	0	1	0
Moisturising agents	44	6	8	5	20	9
Toothpaste	36	12	24	10	10	0
Mouthwashes	9	7	17	20	31	8
Others	0	0	2	1	1	1

*Missing data for 4 participants.

Seven nurses (7.3%) reported that they were self-taught, with no formal education in oral care. The remainder of the sample (20.8%, $N=20$) reported having been exposed to several sources of learning.

Although the majority of the nurses (88.5%, $N=85$) indicated that they would have liked to learn more about oral care, 4 nurses were unsure and 7 expressed no interest in furthering their learning. When asked whether they needed more information on research-proven oral care standards, again the majority (89.6%, $N=86$) indicated that they would, while 5 neither agreed nor disagreed, and a further 5 disagreed. Eighty-one nurses expressed an interest in attending an oral care workshop, while 7 neither agreed nor disagreed, and 8 indicated that they would not be interested.

Hospital supplies and equipment

Nearly 90% of the nurses ($N=86$) reported having adequate time to provide oral care. Eighty-three nurses (86.5%) stated that they have adequate supplies in their unit to provide oral care, but most (81%) responded in the affirmative when asked if they needed better supplies to provide oral care. Forty-three nurses (44.8%) said that they would prefer using an electric to a manual toothbrush, 20 (20.8%) neither agreed nor disagreed, and the remainder (34.4%, $N=33$) said that they would prefer to use a manual toothbrush.

Protocol/guideline

In the final question, participants were asked whether the unit in which they worked had an oral care protocol or guideline available. Thirty-two nurses (33.3%) acknowledged the availability of such a document in their unit, 50 (52.1%) stated that they had no oral care protocol/guideline available, and 14 (14.6%) were unsure as to whether such a document existed in their area.

Discussion

The results of this survey show that nurses are generally aware that aspiration of contaminated secretions is a probable mechanism for the development of VAP. Considering oral care a very high nursing priority for ventilated patients may indicate that nurses are aware that the mouth and oropharynx may harbour pathogens that can cause pneumonia. However, over half the nurses felt that, regardless of their efforts, the mouths of their ventilated patients became worse over time. Having an oral care assessment tool readily available at the bedside provides an objective method for monitoring the effectiveness of interventions, and may help to prevent this problem.⁴

Toothbrushes have been shown to be superior to foam/gauze swabs for plaque removal, with electric toothbrushes being superior to manual brushes.¹¹ Manual toothbrushes were available to nearly two-thirds of the nurses, but only 4.3% had access to an electric toothbrush. In South Africa, it is possible that patients – particularly in public sector hospitals – cannot afford to buy toothbrushes. It has been suggested that supplying patients with a toothbrush on admission could help to prevent complications associated with poor oral care and could effect a cost saving in the ICU.¹⁵ Tooth brushing is carried out more widely in this country, according to surveys in the USA and Europe, which could be because our study is more recent than the aforementioned studies, and nurses are now more aware of the value of brushing ventilated patients' teeth than they were a few years ago.

Toothpaste, which is not essential for plaque removal but does increase the mechanical effects of brushing and leaves the mouth feeling fresh,¹⁶ was available to almost all those using toothbrushes. Most nurses who reported using foam toothettes/gauze used these in combination with mouthwash to keep the patient's mouth fresh and moist between brushing. Almost all nurses reported using mouthwash when providing oral care. Kite and Pearson¹⁶ emphasise that certain solutions used by nurses for oral hygiene are of unproven value, and some are possibly even harmful. The use of mouthwash is of little benefit unless plaque has been mechanically removed from the teeth with a toothbrush prior to rinsing the mouth.¹⁰ The anti-plaque activity of CHD is superior to that of other antiseptic mouthwashes, having better antibacterial properties,^{6,10} making it the agent of choice. In this study, less than half the nurses used CHD, either exclusively or in combination with other mouthwashes. The Canadian Critical Care Trials Group evidence-based clinical practice guidelines for the prevention of VAP recommends that the use of CHD should be considered as this intervention is feasible, safe and cost-effective.¹⁷ Minor side-effects such as mucosal irritation, temporary taste disturbance, burning sensation of the tongue, and tooth staining have been reported with CHD use, but the potential reduction in nosocomial infections outweighs these risks.¹⁸

Many nurses indicated that the only training in oral care they received had been during their basic training. This could be problematic, as oral care for an intubated patient requires a different knowledge and skills base to that required for a ward patient. Less than a quarter of the nurses had received oral care training during their postgraduate ICU training. A minority of nurses indicated that they had learnt about providing oral care to ventilated patients during continuing education activities and hospital in-service training. A number of nurses listed several sources of training, and 7 said that they were completely self-taught. Although most of the nurses felt that they had received adequate training, the majority indicated that they would like to learn more and needed more information on evidence-based oral care standards, and would attend an oral care workshop should the opportunity present itself. It was beyond the scope of this article to evaluate the content of training. Turner and Lawler¹⁹ reviewed 68 nursing textbooks published between 1870 and 1997 and found that the descriptions of actual oral hygiene practices have not significantly changed and only a variation in the types of materials and equipment was noted. There is an increase in the publication of evidence-based oral care articles. However, access to these journals in South Africa is limited to a few nurses who are either students or affiliated to an institution of higher learning. Distributing articles to nurses who are not in a position to retrieve this literature themselves is difficult because of stringent copyright laws. Owing to the cost involved, relatively few nurses can afford to attend congresses, which are another rich source of evidence-based information.

The majority of nurses reported having adequate supplies available in their hospitals to provide oral care but, even so, most stated that they needed better supplies. Approximately one-third did not use either toothbrushes or toothpaste when delivering oral care. It was not ascertained whether this was due to nurse preference or lack of available supplies.

Although the presence of an oral care protocol/guideline does not guarantee compliance with the recommendations, of concern is the large number of units that do not have protocols/guidelines and – of even more concern – is that nearly 15% of participants did not know whether their unit had a protocol/guideline. The presence of a protocol or guideline may influence practice, but ongoing targeted education is needed to increase awareness and knowledge.

Two major factors contribute to the paucity of evidence directing appropriate oral care in the ICU. The first is that there is a need for large well-controlled research upon which practice guidelines can be built, and secondly it is extremely difficult to isolate the influence of oral care in relation to clinical outcome within the context of complex ICU interventions.²⁰ Ongoing research is needed to provide evidence for the generation of practice guidelines.

Limitations

It is acknowledged that this survey on oral care of ventilated patients measured knowledge and reported behaviour and beliefs of ICU nurses and not actual practice, and that a gap may exist between the two. A further limitation of the study was that the provinces were not equally represented, and the Northern Cape had no representation at all. A further bias was that the questionnaire was distributed at educational functions, thereby targeting those most exposed to evidence-based practice.

Conclusion

Oral care is a basic nursing intervention in the ICU, and is one of the 'aspects of basic nursing that need most scrutiny because they have become routine and taken for granted as being satisfactory'.¹⁶ Providing evidence-based oral care may decrease the incidence of VAP in critically ill patients. This survey describes some aspects of

current practice of oral care in South Africa and should be a step towards changing practice in our ICUs.

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