

ORAL CARE IN THE INTENSIVE AND INTERMEDIATE CARE UNITS IN RIYADH AND QATEEF

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ABSTRACT

The aim of the study was to assess the oral care provided for patients in Intensive and Intermediate Care Units in King Khalid University Hospital (KKUH), Riyadh and Qateef Central Hospital (QCH), Qateef, Saudi Arabia. Questionnaires were completed by the bedside nurses, dentists and doctors treating these patients. Results showed that in both hospitals, there was no oral examination as part of the admissions assessment and no comprehensive protocol for oral care.

INTRODUCTION

The Intensive Care Unit (ICU) provides care for patients in critical condition requiring continuous medical, surgical and nursing care. Intermediate Care Unit (IMC) can be utilized as an extension to the main ICU for patients that are not fit to be transferred to the wards and need only close monitoring and no mechanical ventilation¹. Many patients who fall critically ill, are nursed in the ICUs and require highly specialized care from the health care team. Frequently, life saving nature of ICU means that the patient's oral care takes low priority².

The subject of oral hygiene in intensive care patients has been described as an area with a low priority among critical care nurses³. Individual requirements for oral care should be considered as part of the admission assessment^{4,5}, however, this does not always occur. It is the nurse's responsibility to assess, plan, implement, and evaluate each patient's oral care needs⁴.

Oral intubation may be required by ICU patients. With severe illnesses, the bacterial strains that are naturally present in the mouth can shift from being predominately gram-positive normal flora to being anaerobic negative strains⁶. Pathogens commonly responsible for nosocomial pneumonia in intensive care patients were colonized in the dental plaque and oral mucosa of these patients⁷. Therefore, good oral hygiene measures may prevent the spread of infection from the oral cavity to the lower respiratory tract³.

Another aspect of maintaining oral health in intubated patients is that, many of the drugs they require to treat their condition have a detrimental effect on the oral cavity³. Examples are those that cause xerostomia⁸. Also, intubated patients are forced to keep their mouths open and this may lead to dryness of the mucosa^{2,4,9}. It is also common practice in intensive care units to keep patients dehydrated in order to improve respiratory and cardiac functions⁹ which may also exacerbate xerostomia and increase the possibilities of oral infections³. There is also the problem of accessing

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the oral cavity in intubated patients¹⁰. The endotracheal tube itself and the tapes used to secure it can obscure the view of the oral cavity and hinder the actual process of cleaning³.

Despite the availability of tools that can be used for oral assessment, they are often not used in clinical practice, perhaps due to lack of time or knowledge, and do not assist the nurse in identifying particular problems such as candida or herpes simplex¹¹. Hayes and Jones' recommended the use of the "BRUSHED" Assessment Model (Table 1). This model was made to prompt nurses to check for particular clinical signs during an oral assessment.

The practice of using a toothbrush is not widespread with orally intubated patients³. Nurses have not been formally trained in assessing the oral status of patients in intensive care units and no oral care protocols for these patients are usually available¹². It has been recommended that dental hygienists are involved in nurses' education programmes¹³. Fitch et al.¹² recommended implementation of a well-developed oral care protocol by bedside nurses as this can improve oral health of patients in the intensive care unit.

Tooth brushing with fluoride toothpaste is advised for almost all patients^{2,4}. Only a small minority of intubated patients should not have a toothbrush used as those with severe ulceration or profound clotting disturbances that cause gingival haemorrhage¹⁴. Edentulous intubated patients should have their tongue gently brushed to help maintain healthy mucosa. Some patients may need suction therapy. The aggressive use of rigid plastic suction tips during oral care should be discouraged to avoid oral trauma²¹.

For ease of use in intubated patients a small headed toothbrush may be beneficial. Special autoclavable toothbrushes with in-built suction devices are available¹⁵, as are electric toothbrushes¹⁶, although these devices have not been tested with intubated patients. When tooth brushing is not possible a foam stick soaked in chlorhexidine mouthwash can be effective in reducing plaque¹⁴. A foam stick is also most useful for moistening the mouth between brushings¹⁷. Furthermore, it has been reported that 0.9% saline or water are just as effective as mouthwashes^{4,8,10}. Disposable cotton swabs are often used for cleaning and moistening the patients' mouths and teeth in critical care units.

Many such swabs contain acids (usually citric acid) to stimulate salivary flow and give a fresh taste. However, acids can cause erosion of teeth¹⁸ and therefore choosing less erosive products is important. An in-vitro study¹⁹ reported that Lemon-Glycerine Swabsticks^R and Lemon Glycerine Swabs^R caused dental erosion, while Dentiswab cotton swabs^R and Cassisal^R tablets did not, and therefore, these last products could be recommended for mouth cleaning.

The use of substances like sodium bicarbonate (used for its mucosolvent properties) and hydrogen peroxide is now not recommended⁹. Sodium bicarbonate has the effect of burning the mucosa if incorrectly diluted, and altering pH with the potential to upset the normal oral flora. In one study²⁰, when using hydrogen peroxide, significant mucosal abnormalities were reported and numerous subjective complaints were made.

The frequency of oral hygiene routine for intubated patients is an area of controversy. Day⁵ and Jenkins⁴ suggest the frequency is based upon the scores from an "at risk" calculator, whereas Trenter, Roth and Creason²² recommend anywhere between two and four hours, depending on the patient's condition. The oral hygiene protocol used by Barnason et al.¹⁷ was brushing twelve hourly and oral moistening at least every two hours while the patient remained intubated.

As could be seen from the above review, patients in ICUs may have below optimum oral care. In Saudi Arabia, there has been no studies on the oral care of ICU patients. Therefore, the aim of the present study was to assess the oral care provided for ICU and IMC patients in major governmental hospitals in two cities of Saudi Arabia, and provide oral care guidelines.

MATERIALS AND METHODS

Two major governmental hospitals; King Khalid University Hospital (KKUH), Riyadh (the capital city) and Qateef Central Hospital (QCH), Qateef (a city in Eastern province), were approached for the study, that was carried out in Autumn 2001.

Three questionnaires were prepared. First for the nurses in-charge of the general care of ICU and IMC unit patients and the second for the dentists/doctors that were treating these patients. The third questionnaire was regarding specific information about each

patient in ICU and IMC which were completed by the nurses or doctors.

The questionnaires were designed to assess the following areas:

- At what stage the ICU and IMC unit patients were examined orally starting from time of admission and by whom.
- What was the oral care provided to these patients.
- The reasons that the nurse would refer a patient to the doctor/dentist for an oral problem.
- Whether the patient or the care-taker got any information on specific oral hygiene procedures the patient may need.
- Approximate number of admissions to their unit per month (for nurses only).
- The number and type of cases they had treated during their previous working year (for doctors only).
- All people approached were also asked for recommendations to improve the oral services provided for these patients.

In intra-oral examination of the number of teeth present in these ICU and IMC unit patients was done.

RESULTS

A total of 38 patients were seen in the ICU and IMC units in KKHU in Riyadh. A total of 25 patients were seen in QCH in Qateef. The nurses in-charge of these patients, the dentist and the doctor in-charge completed the questionnaires in both hospitals.

The ICU and IMC units in KKHU

The ICU in KKHU is divided into Medical ICU, Surgical ICU and Pediatric ICU. The Medical ICU has one head nurse and 21 bedside nurses (one nurse per patient in shifts) for a total of eight patients. The Surgical ICU has one head nurse and 33 bedside nurses (one nurse per patient in shifts) for a total of eight patients. The Pediatric ICU has one head nurse and 20 bedside nurses (one nurse per patient in shifts) for a total of 7 patients.

Admission assessment

When patients are admitted to these units they have an admission assessment. There was no oral examination included in it for the patient's individual requirements for oral care.

Dentists' Questionnaire

There were three dentists that worked by shifts and provided oral treatment for ICU and IMC unit patients. Although all three dentists were sent questionnaires, only one answered it. The dentist that answered the questionnaire had a long time experience of working in the hospital. On asking if they had a dental hygienist in the hospital, he reported they had, but no services were provided for the ICU and IMC unit patients. In the previous year, the dentist reported seeing approximately 60 patients from the ICU. The patients mainly had suffered from candidal infection, dental caries, periodontal abscess and dental abscess. The treatment he had provided included; drainage of abscess, extractions and restorations. He recommended for the improvement of oral care and that the ICU and IM patients should have a follow-up every 2-3 months to find out whether they had an oral problem.

Nurses' Questionnaire

The nurses chose to answer the questionnaire as a group. In the Medical ICU, they reported seeing approximately 46-50 patients a month. Their age ranged usually from approximately 40-70 years. In the Surgical ICU, they reported seeing approximately 20-30 patients a month. Their age range was 15-65 years. The Pediatric ICU reported seeing approximately 10-20 patients a month. Their age range was birth to 10 years.

The nurses reported that they had in the past a written protocol for oral care, but at present they have nothing mentioned on oral care in their new protocol at the time of the study. The bedside nurses reported providing the oral hygiene care for ICU and IMC unit patients. They reported that they provided daily oral care for all patients. For patients that can spit out, they gave 0.2% chlorhexidine gluconate mouth wash to the patient. For conscious patients, if they can brush their teeth, then they were encouraged to do so if they had a toothbrush.

For the unconscious patients the bedside nurses reported cleaning the patients' mouth with 0.2% chlorhexidine gluconate mouthwash diluted in water and glycerine lemon-swab stick. They reported using gauze for cleaning the mouth with the tongue also being wiped. For all edentulous patients the daily oral care was similar to that of the dentate patient.

For the frequency of oral cleaning for both dentate and edentulous patients if they were conscious they reported that the patient cleaned their mouth as many time as they wanted to, however, for unconscious patients they reported doing for them oral cleaning after each meal in addition to at least one oral cleaning in the morning. They reported that mouth care is normally done along with general morning care for the patients and for conscious patients mouth rinsing is done after meals. For the unconscious patients, mouth care was every four hours. The only difference in the Surgical ICU compared to the Medical ICU and Pediatric ICU is that they reported placing the mouthwash in the mouth by a syringe then the mouth is cleaned with gauze. If the patient has dry lips or a dry mouth they were given white paraffin and glycerin

When asked if they had any problems related to oral care (oral hygiene and dental care) they reported no problem. They were asked what type of oral problems would they refer to the doctor/dentist, they answered if the patient had bleeding, white areas, ulcers, pus and mobile teeth.

The bedside nurse was the person that checked if the patient had any oral health problem and did that on a daily assessment. If the nurse found any problem, then she would refer the case to the doctor. The doctor would check the case and treat the patient, as prescribing antifungal treatment for patients that may have candidal infection in the mouth or otherwise refer the patient to the dentist if the doctor felt it was needed. When asked if the patient/care-giver gets any information on the oral hygiene care that should be provided for the patient, the nurses answered yes, it was done by the nurses and doctors.

On asking if they had any suggestions on how to improve the oral care service for the ICU patients they answered that they would like if an oral care kit could be provided for each patient by the hospital, as most

patients do not bring with them a toothbrush and toothpaste.

The ICU and IMC units in Qateef

The nursing staff in the ICU in Qateef has one head nurse and 25 bedside nurses assigned by shifts one per patient for eight patients. The IMC unit has nine nurses doing shift work on three patients.

Admission assessment

When patients are admitted to the unit they have an admission assessment. There was no oral examination included in it for the patient's individual requirements of oral care. "The Policy and Procedure in the Intensive Care" document was given to the examiners on its request from the ICU of Qateef in 2001¹. In the section of duties of the nurse under "basic nursing care" the document states that oral hygiene should be given 2-hourly to unconscious or ventilated patients.

Dentists' questionnaire

There was one dentist that was asked to fill in the questionnaire. The dentist reported several years experience of working in the hospital. He reported they had no dental hygienist service for the ICU and IMC unit patients. He reported treating approximately 4-5 of these patients in the past year. The type of problem the patients had were mobile teeth which he extracted. When asked for recommendations to improve oral care given to these patients, he advised mouth irrigation with normal saline by the nurses for their patients.

Doctors' questionnaire

The doctor in-charge reported that the oral problem he has mostly treated was angular cheilitis. When asked for recommendations to improve oral care given to these patients, he recommended the involvement of the dentist in the examination of ICU patients periodically.

Nurses' Questionnaire

The nurses chose to answer the questionnaire as a group. They reported seeing approximately 10-20 ICU patients a month. They reported that there was no written protocol providing detailed instructions to fol-

TABLE 1: THE "BRUSHED" ASSESSMENT MODEL².

B- Bleeding? Gums, mucosa, coagulation status?
R- Redness? Gum margins, tongue? Antibiotic stomatitis?
U- Ulceration? Size, shape, herpetic? Infected?
S- Saliva? Xerostomia, hypersalivation, characteristics?
H- Halitosis? Character? Acidotic? Infected?
E- External factors? Angular cheilitis? Endotracheal tapes?
D- Debris? Visible plaque? Foreign particles?

low for the oral care of these patients. However, they were given instructions by the head nurse for the oral care procedures they provide to these patients.

They reported to orally clean both dentate and edentulous patients using 0.2% chlorhexidine gluconate with gauze and some water. When possible they tried to do the full mouth cleaning or as much as possible as in some patients it was only possible to do partial mouth cleaning. If the patient was unable to open their mouth they used a tongue depressor and artery forceps. If the patient had dentures they put them in a water container or gave them to the patient's family. If the patients were conscious they were given mouthwash to do by themselves. For the frequency of oral cleaning they reported it was done at every shift which was every eight-hours.

They bedside nurses reported that they have had no problems related to oral care. They were asked what type of oral problems would make them refer the patient to the doctor/dentist. They answered if the patient had bleeding, white areas, ulcers and/or pus. The bedside nurses reported checking if the patient had any oral problems and if there was one then they would tell the doctor who would check the problem and decide whether to call a dentist. None of the patients/care-givers were given any information on oral hygiene care for the patient.

The nurses did not feel that they had the facilities to improve oral care provided to their patients at the present time, however they had several suggestions on how to have it improved in the future. They wanted better facilities for the patients such as providing toothbrushes and toothpastes for conscious patients, and a mouth prop or other suitable instruments/equipments to open the patient's mouth if needed so that they could provide better oral hygiene for the patients. They also wanted the dentist to have a greater responsibility such as doing an oral check-up for these patients.

Questionnaire for ICU and IMC unit patients in both hospitals (KKUH and QCH)

In KKUH there were 24 male and 14 female patients at the time of study, while in QCH there were 17 male and 8 female patients (Table 2). In KKUH 33 patients were in ICU and 5 patients in IMC unit. In QCH 22 patients were in ICU and 3 were in IMC unit.

TABLE 2: PATIENTS' GENDER, UNIT, STATE, AGE RANGE, PROGNOSIS AND NUMBER OF PATIENTS WITH TEETH IN ICU AND IMC UNITS.

City	Gender		Unit		Uc	State		Age range and mean	Prognosis			Teeth	
	M	F	ICU	IMC		C	Sc		G	F	P	D	Ed
Riyadh	24	14	33	5	22	15	1	2m-95y mean50.9y (±28.99)	6	16	15	24	11
Qateef	17	8	22	3	19	6	0	10y-85y mean50.4y (± 24.24)	4	12	9	16	9
Total	41	22	55	8	41	21	1		10	28	24	40	20

M=male, F=female, C=conscious, Uc=unconscious, Sc=semiconscious, G=good, F=fair, P=poor, D=dentate, Ed=edentulous, m=months, y =years

TABLE 3: MOUTH CARE PROTOCOL¹².

1. Wash hands and put on gloves
2. Explain to the patient that his/her mouth will be cleaned with the toothpaste and mouthwash and that petroleum jelly will be applied to the lips.
3. Using a soft, pediatric toothbrush, brush the patient's teeth, gums, and tongue with Biotene antibacterial dry mouth toothpaste.
4. If the patient has no teeth, brush his/her gums and tongue gently.
5. If an airway (or Bite block) is present, remove, clean, and replace it after mouth care is completed.
6. If the patient is unresponsive and/or has clenched the mouth shut, use a mouth prop to gently open the mouth.
7. Rinse toothpaste from the patient's mouth with Biotene antibacterial alcohol-free mouthwash (use a syringe or a swab) and suction the mouth with Yankauer (oral suction) as needed.
8. Apply Oral Balance moisturizing gel to gloved finger and gently massage into the mucosa membranes of the patient's mouth.
9. With gloved finger, apply petroleum jelly to the patient's lips.

In KKUH 22 patients were unconscious, 15 patients were conscious and one patient was semiconscious. In QCH 19 patients were unconscious and 6 were conscious (Table 2). In KKUH the patients were from 2 months to 95 years old (Table 2), with the mean age of 50.95 ($\pm$ 28.99) years. In QCH the patients age ranged from 10 years to 85 years with the mean age 50.4 years ($\pm$ 24.24) (Table 2).

The general health prognosis of patients seen in KKUH was good for 6 patients, 16 had fair prognosis, 15 had poor prognosis and for one patient the prognosis was not known. In QCH 4 patients had good prognosis, 12 had fair prognosis and 9 had poor prognosis. In KKUH there were 24 patients that were dentate and 11 patients that were edentulous (Table 1). The number of teeth in dentate patients ranged from 5 - 28 teeth. There were 2 month old, 5 month old and 9 month old babies that had no erupted teeth yet, one patient was eight years old and had both primary and permanent teeth and one 38 year-old patient could not be orally examined. In QCH there were 16 patients that were

dentate and 9 patients that were edentulous (Table 2). The number of teeth in dentate patients ranged from 16 - 32 teeth. Two patients could not be examined for number of teeth present.

In KKUH the length of stay in the ICU or IMC unit ranged between one day to 66 days with the mean number of 6.8 days (SD $\pm$ 11.17). In QCH the length of stay in the ICU and IMC unit for these patients ranged from just a couple of hours to 30 days with the mean of 6.1 days (SD $\pm$ 6.6). In KKUH, when patients were asked if they may have any mental or physical disability on leaving the unit, 11 patients would, 16 patients would not, for 10 patients they did not know and for one patient this information could not be obtained. In QCH, when patients were asked if they may have any mental or physical disability on leaving the unit the response was for patients in QCH, 8 patients would, 10 patients would not and for 7 patients they did not know. None of the patients during the time of the study from either hospital thought to have a physical or mental disability had any specific oral hygiene instructions given to them or to their care-giver. Also, none of these patients in the study from either hospital were referred to the dentist or had been seen by the dentist.

DISCUSSION

This study looked at a specific group of hospital patients that were in a critical condition and required continuous medical and nursing care. Doctors and nurses put in great efforts to provide highly specialized care for these patients. In both the hospitals, ICU admission assessment is routinely carried out, however assessing the patient's requirements for oral care was not considered as part of it. The reason for this could be the life saving nature of ICU that puts patient's oral care at a low priority². This should change, as oral care needs must be seen as an integral part of total patient care with the initial assessment of the patient's oral condition made at the time of admission to the ICU. The aim should be to prevent oral disease that may cause discomfort and pain, as it is easier and less expensive to prevent a problem from occurring than it is to treat it²³.

It has been documented that nurses are not formally trained in assessing the oral status of patients in ICU, and no oral care protocols are usually available for these patients¹². However, there is evidence that good

oral hygiene measures may prevent the spread of infection from the oral cavity to the lower respiratory tract³. Therefore, its importance should be stressed. The dental hygienist is the clinical expert in practical oral care,² and preventive oral health care needs of ICU patients can be met quickly, safely and effectively by utilizing a collaborative approach by the dental hygienists and nurses².

The bedside nurses in KKHU reported using (for the unconscious patients) 0.2% chlorhexidine gluconate diluted in water and gauze to clean the oral cavity, as well as a glycerine lemon-swab stick. It is advisable that they stop using this type of swab stick for dentate patients as it may cause erosion of teeth^{24,25}. In QCH the nurses clean for both dentate and edentulous patients with Clorasept mouthwash (0.2% chlorhexidine gluconate) with gauze and some water. For both hospitals it would be preferable that the bedside nurses brush patients' teeth. There is strong evidence to support that use of a toothbrush is effective in control of plaque and its associated complications; and is recommended as the tool of choice for mouth care⁹.

Teloar and Stechiller⁶ reported that oral care practice varies among institutions and even among units within institutions. In certain instances, selection of the protocol is left to the judgment of the nurse. Oral hygiene practices may be inconsistent and highly variable⁶. Therefore, it is suggested that a comprehensive protocol is followed such as that used by Fitch et al¹². The protocol suggested by Fitch et al¹² differed from routine oral care in many ways. First, a pediatric toothbrush was used which had the advantage of being small enough to remove plaque yet not disturb oral tubes and its soft bristles reduce potential for trauma and bleeding. Additionally, the products selected were alcohol-free and antibacterial, enhancing the mechanical effects of oral care without drying mucous membranes. Moisturizing gel applied to the lips reduced tissue drying. The nurses were able to complete the entire protocol in less than 5 minutes and preferred this mouth care protocol to previous methods in use in the unit. They¹² also reported that the experimental protocol was effective in reducing inflammation, whereas routine oral care had minimal effect on inflammation.

In both KKHU and QCH a doctor was the first line of referral for the patients that had an oral problem.

Therefore, the doctor mostly treated the patient without a dentist being involved. None of the patients in our study from either hospitals were referred to the dentist or had been seen by the dentist although the examiners had observed poor oral hygiene, heavy calculus, mobile teeth, white areas in the mucosa, bleeding gums and caries in some of the patients in both hospitals during the period of the study. Ideally, a more collaborative approach between doctors, dentists, bedside nurses and the dental hygienists would provide better oral care for the patients.

Finally, the majority of patients seen in this study were over the age of 45 years, dentate, had fair or poor prognosis and around one third would have a mental or physical disability on leaving the unit. Therefore, it would be beneficial if the bedside nurse or dental hygienist could provide useful oral care instructions for these patients to prevent oral/dental disease or instructions a care-giver could follow after the patient is discharged from the unit. Furthermore it would be beneficial for the patient if there was a system where these patients could have regular dental check-ups after being discharged as they are considered at high risk of getting oral and dental disease that could further affect the quality of their lives. A further longitudinal study on the effects of oral care provided for ICU and IMC patients on their oral and general health is recommended.

RECOMMENDATIONS

- A patient's individual requirements for oral care should be considered as part of the admission assessment.
- The "BRUSHED" Assessment Model (Fig 1) may be appropriate. This model was made to prompt nurses to check for particular clinical signs during oral assessment (bleeding, redness, ulceration, saliva, halitosis, external factors, debris).
- Nurses should have better training in oral assessment and provision of oral care for their patients. Implementation of a well-developed oral care protocol by bedside nurses can improve oral health of patients in the intensive care units.
- A dental hygienist could be involved in assessing ICU and IMC unit patients and providing oral hygiene prophylaxis as well as giving the patient or care-giver oral hygiene instructions. The dental

hygienist can also teach the bedside nurse to improve his/her oral assessment skills and oral hygiene care for the patients.

- Soft toothbrush with a small amount of fluoride toothpaste is advised for almost all patients. For ease of use in intubated patients a small headed toothbrush may be beneficial. Special autoclavable toothbrushes with in-built suction devices are available. Only a small minority of intubated patients should not have a toothbrush used as those with severe ulceration or profound clotting disturbances that cause gingival haemorrhage.
- Edentulous intubated patients should have their gums and tongue gently brushed to help maintain healthy mucosa. Dentures should be kept clean in readiness for the patient following extubation. A mouth prop may be useful for some patients to keep their mouth open. Lips should be kept adequately moisturized with Vaseline to prevent them becoming sore and cracked.
- When toothbrushing is not possible a foam stick soaked in chlorhexidine mouthwash can be effective in reducing plaque. Otherwise, a foam stick is most useful for moistening the mouth between brushings.
- The use of substances like sodium bicarbonate and hydrogen peroxide is now not recommended. Some patients may need suction therapy. The aggressive use of rigid plastic suction tips during oral care should be discouraged to avoid oral trauma.
- It is recommended to brush twelve hourly using a small quantity of fluoride toothpaste and oral moistening at least every two hours while the patient remained intubated.

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