

ORIGINAL RESEARCH

Who needs oral care? A study of potential factors associated with the need for oral care among medical patients acutely admitted to hospital

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Abstract

Introduction: Oral health is important in relation to illness prevention, treatment and rehabilitation. The aim of this study was to explore potential risk factors for impaired oral health and subsequent need for oral care among medical patients acutely admitted to hospital.

Methods: Patients were assessed using the Revised Oral Assessment Guide and additional data were collected retrospectively. Logistic regression analysis and Chi square test were used to examine factors associated with the need for oral care.

Results: Age and smoking were significantly associated with the overall need for oral care. Being at nutritional risk, above the age of 79 years and receiving oxygen therapy were significantly related to specific clinical oral areas.

Discussion: The results indicate that medical patients acutely admitted to hospital should routinely receive oral care.

Key words

Oral care, Nursing, Oral assessment, Acute care

1 Introduction

Oral health is important in relation to the patient trajectory as sufficient oral care prevents nosocomial infections among hospitalized patients^[1,2], increase well-being, nutritional intake^[3], and it improves nutritional status^[4]. The prevalence of patients needing oral care has been reported to be between 55% to 86% in geriatric patients upon hospital admission^[5], among patients in long-stay hospitals the numbers are up to 81%^[6], and among patients acutely admitted with medical conditions 91% have one or more oral health problems^[7]. Oral health status has previously been shown to be unrelated to the patients' medical condition^[8], whereas it may be related to one or more sub elements of oral health. Respiratory disease or dehydration can cause dry mouth or tongue^[9-11], insufficient nutrition can be related to tongue alterations^[10] and having a psychiatric disease or taking multiple drugs has been found to have a relation to dry mouth^[11,12]. When patients are acutely admitted to hospital, the patients' condition may be argued to be more important than the tentative

diagnoses in order to recognise conditions that are associated with the need for oral care. Especially as oral care has to be initiated immediately. It has been demonstrated that oral health is significantly lower when teeth need cleaning by nurses^[13], that not all patients who need assistance with oral hygiene get the actual assistance needed^[14], and that nurses need to prioritize this area of care^[15]. Oral care could probably be improved if we were able to identify patients at risk of impaired oral health and initiate timely oral care for these patients.

The aim of this study was therefore to explore potential risk factors for impaired oral health and subsequent need for oral care.

2 Material and methods

2.1 Design

This retrospective cross-sectional study took place in a medium sized university hospital in Denmark. During a 5-week period from March to April 2011, all patients with acute medical health problems admitted to hospital on a weekday were included in the study.

The patients were admitted to one of the two different acute wards at the hospital, either the pulmonary medical ward or the acute medical ward. The most common diagnoses were dehydration, chronic heart disease, gastroenteritis, chronic pulmonary obstructive disease, lung cancer or tuberculosis. The patients came from either their own home or a nursing home. Inclusion criteria were; admitted on a weekday, expected hospitalisation for more than 48 hours, able to understand Danish. A multidisciplinary conference, which took place every morning, discussed every patient, and the consensus here concerning the patient's illness trajectory, including length of hospitalisation, were used to evaluate eligibility for inclusion in the study. Patients unable to give consent because of their medical or mental condition were excluded. Within 24 hours of hospitalization, included patients had their oral health status assessed.

2.2 Data collection

During the 5-week period, 251 patients fulfilling the inclusion criteria were hospitalised, and 161 (64%) of these participated in the study. 39 patients were excluded because of their inability to provide consent, 30 refused to participate and 21 attended medical examinations. Oral assessment took place using the Revised Oral Assessment Guide (ROAG) for patients in a geriatric rehabilitation ward^[16]. Three experienced nurses did the assessments, within 24 hours of admission. ROAG has previously been translated and validated in a Danish version^[7]. The ROAG consists of eight categories: voice, lips, mucous membranes, tongue, gums, teeth, dentures, saliva and swallowing. Each category is graded on a scale ranging from 1 (normal) to 3 (severe oral health problem). Any patient who scored 2 or 3 in one or more category was considered to need oral health care. The nurses doing the initial oral assessment collected additional data retrospectively from patients' medical journals. Additional clinical variables were age, gender, oxygen supply (at the time of oral assessment), smoking (registered as positive if the patients were smoking daily at the time of hospitalization), fever (was assessed at the time of hospitalization, and fever was registered if the temperature (measured by ear or rectal) was above 38°C). Furthermore, nutritional status was assessed using Nutritional Risk Screening 2002 (as described by Kondrup *et al.*)^[17], assessing recent loss of weight, Body Mass Index, nutritional intake during the last week and degree of illness. The nutritional risk of each patient was scored at admission. An nutritional risk score from 4 to 6 indicate risk of malnutrition during the hospital stay.

2.3 Ethical considerations

The study was approved by the Danish Data Protection Agency (number 2007-58-015) and the Ethics Committee of the Capital Region (number H-1-2011-021). All participants were asked to give written consent.

2.4 Statistical analysis

Data were registered and analysed using SPSS version 19.0. In order to analyse factors defining the need for oral health care, a logistic regression analysis was conducted. All patients were divided into two groups, those having no need for oral care and those having 1 or more oral health problems. In this way the outcome was dichotomised using 1 problem as the cut-off point. This was considered the dependent variable.

At first all independent variables (oxygen, smoking, fever, nutrition, gender and age) were tested in univariate analyses, secondly in the multivariate model calculating Odds Ratio and their 95% Confidence Intervals. A p value $< .05$ was considered statistically significant. Thirdly, the impact of age, gender, oxygen therapy, smoking, fever and being at nutritional risk on the need for oral care within individual clinical oral areas comprising the ROAG was tested using the Chi Square test.

3 Results

Patients' characteristics are shown in Table 1. The number of patients having one or more oral problem is shown in Table 2.

Results of the univariable and multivariable analyses are shown in Table 3. In the univariate analyses, no variables were significantly associated with the overall need for oral care; however smoking was borderline significant ($p = .07$). In the multivariate analysis, age and smoking were significantly associated with the need for oral care (for smoking OR 4.55 (95% CI 1.1 – 18.6) and for age OR 1.05 (95% CI 1.0 – 1.1)). In Table 4, the impact of age, gender, oxygen therapy, smoking, fever and being in nutritional risk on the need for oral care within individual clinical oral areas comprising the ROAG is shown. Being at nutritional risk, being above 79 years of age and receiving oxygen therapy impacted the need for oral care within individual clinical oral areas.

Table 1. Characteristics of participating patients

Variable	N = 161 (%)	Mean	SD	95% CI
Gender	Male 73 (45%)			37.2-53.0
	Female 88 (55%)			46.9-62.8
Age		75,0	14,6	72.7-77.2
Use of oxygen	33 (20%)			14.6-27.7
Smokers	30 (19%)			13.0-25.6
Temperature $>38^{\circ}\text{C}$	16 (10%)			5.3-15.0
Being in nutritional risk	24 (15%)			9.8-21.5

Table 2. Number of identified oral problems

Number of oral problems	Number of patients	
	n = 161 (%)	95% CI
0	14 (8.7)	4.3-13.1
1	37 (23.0)	16.5-29.5
2	29 (18.0)	12.1-23.9
3	27 (16.8)	11.0-22.6
4	23 (14.3)	8.9-19.7
5	14 (8.7)	4.3-13.1
6	12 (7.5)	3.4-11.6
7	3 (1.9)	0.0-4.0
8	2 (1.2)	0.0-2.9

Note. CI=Confidence interval

Table 3. Factors associated with overall need for oral health care among patients acute admitted with a medical condition, a logistic regression analysis

	Univariable		Multivariable	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Use of oxygen	1.96 (0.75 – 5.13)	.17	2.12 (0.6 – 7.2)	.229
Smokers	2.85 (0.93 – 8.73)	.07	4.55 (1.1 – 18.6)	.036
Temperature > 38°C	1.92 (0.53 – 6.98)	.32	3.12 (0.5 – 17.7)	.199
Being in nutritional risk	2.67 (0.74 – 9.6)	.13	2.46 (0.6 – 9.2)	.183
Gender	1.57 (0.76 – 3.24)	.22	1.12 (0.4 – 2.7)	.809
Age	1.02 (0.99 – 1.04)	.16	1.05 (1.0 – 1.1)	.011

Table 4. The relation between items in ROAG and selected clinical areas

	Oxygen	Smoking	Fever	Nutritional risk > 3	Age < 79
Voice	0.03	0.56	0.82	0.03	0.03
Lips	0.09	0.11	0.92	0.30	0.27
Mucus	0.90	0.14	0.60	0.01	0.23
Tongue	0.06	0.74	0.85	0.007	0.15
Gum	0.12	0.58	0.97	0.003	0.15
Teeth	0.34	0.57	0.56	0.03	0.03
Saliva	0.05	0.18	0.47	0.005	0.16
Swallow	0.49	0.35	0.91	0.01	0.10
Teeth/dentures	0.36	0.47	0.82	0.64	0.00

* For statistical comparison Chi Square test was used, values below .05 indicate significant relationship

4 Discussion

This study examined potential factors for the need for oral care among medical patients acutely admitted to hospital. Within 24 hours only age and smoking were significantly associated with overall impaired oral health and the need for oral care.

Retrospective collection of data from patients' journals may have influenced the validity of data in different ways. The variables gender and age are considered valid data. Smoking and nutritional status are subjective measurements reported by the patient, and a possible variation in data has to be taken into consideration. Oxygen therapy and fever are highly situational dependent data; the exact status may fluctuate over a short period of time. As this was a retrospective study, variables were limited to those available, meaning those comprising the standard patient assessment in the acute medical ward. A prospective study design would enable collection of more valid data and a wider variety of variables both of which would have strengthened the study. Variables to be considered could be the patients' ability to perform oral self-care and the patients pre-hospital oral care routines and oral health status. In this study, relatively small subgroups of patients did not need oral care, and this might have affected reliability of the results.

Examination of the impact of retrospectively collected baseline characteristics and clinical data on individual areas of oral health was done using relatively small numbers. These results lack sufficient statistical power and are therefore explorative and possibly useful for generating new hypotheses.

Another limitation to consider is the reliability of the oral examinations; as a study has shown only moderate inter-rater reliability when nurses assess the oral cavity using ROAG^[18].

Several studies have shown that oral health was significantly related to age, such as edentulousness^[8] and xerostomia^[19]. As age was not found to be a univariate predictor in this study, the explanation might be that age is a predictor of certain oral conditions, but not a strong predictor of the need for oral care. Not surprisingly, when testing individual oral clinical areas, we confirmed that age was significantly related to teeth/dentures. Furthermore we found significant relations to teeth and voice.

In this study no relation was found between gender and need of oral care. In other studies a relation between edentulousness and being female has been found^[8]. This difference might be caused by the same mechanism as in relation to age. Being edentulousness is an oral health status, and is not necessarily the same as having a need for oral care.

Smoking was not found to be a significant predictor of oral health in the univariate analysis. However, in the multivariate analysis, smoking and age were significant risk factors for need for oral care. Earlier studies have demonstrated that smoking is a predictor of several oral conditions such as tooth loss^[20], and caries^[21]. The effects of smoking increase with the amount of cigarettes smoked and the number of years of smoking^[22, 23]. This is consistent with the finding in the present study, indicating that the influence of smoking on oral health is both dependant on dose and length of exposure. As this study was cross-sectional and merely assessed whether the patient was smoking at the time of hospitalization, the study did not examine the effect of total smoking exposure or the effect of having recently stopped smoking.

In this study, being at nutritional risk was not found to be significant predictor for an overall need of oral care. This has also been found among long-term institutionalised elderly^[24]. Whereas a study including elderly rehabilitation patients found that undernourishment was a predictor of changes in tongue and saliva^[10]. The findings in our study fall in line with this, as we found significant relations between being at nutritional risk and a need for oral care related within the following areas; voice, mucus, tongue, gum, teeth, saliva and swallowing.

Poor oral health has been found to be related to undernourishment^[16, 25]. Likewise persistent oral health problems have shown to be associated with impaired dietary intake^[26]. Again, due to the cross-sectional design of our study, the reasons for being at nutritional risk in the present study were explored.

The authors were surprised that having a need for oxygen therapy did not impact on the overall need for oral care. It is often stated in nursing textbooks that oxygen dries the oral cavity. It should be noted that oxygen therapy did significantly impact on oral status in regard to specifically voice and saliva. Clinical guidelines recommend that only oxygen delivered above 4 l/m needs humidifying^[27, 28]. This despite an earlier study showing a relation between receiving humidified oxygen and developing a dry mouth in conscious patients^[29]. Oxygen did not increase the need for oral care in our study. An explanation might be that patients in this study had a relatively high age which relates to xerostomia. Patients may themselves have experienced a dry oral cavity and therefore drank more to constantly humidify their mouth or perhaps there is simply no relation whatsoever.

5 Conclusion

In this study, possible indicators of the need for oral care among patients acutely admitted to hospital with a medical condition were examined. Only age and smoking were significantly associated with the overall need for oral care. As the need for oral care is high among this patient subgroup, the findings of this study might not indicate that only old and smoking patients need oral care. Being at nutritional risk, above the age of 79 years and receiving oxygen therapy increased the need for oral care within specific clinical oral areas. The results indicate that the identification of factors that increase the need for oral care is complex and that all acutely admitted medical patients might benefit from routine oral care.

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