A Context Analysis on How Oral Care is Delivered in Hospitalised Patients: a Mixed-Methods study

ABSTRACT

Aims and Objectives: To analyse oral care delivery in one hospital through exploring experiences from both nurses' and patients' perspectives and examining patients' oral health.

Background: Oral health problems are associated with undernutrition and other general health outcomes. Although oral care belongs to the essentials of nursing, it is often neglected. Improving oral health may require behaviour change of both nurses and patients. Defining tailored strategies need a clear view on the context.

Design: A context analysis in one hospital using a convergent parallel mixed-methods design was reported following the EQUATOR guidelines using two checklists: COREQ (qualitative research) and STROBE (observational research).

Methods: Semi-structured interviews were conducted with 19 nurses and 11 patients. The topic-list was based on the Integrated Change Model. Prospective oral examination was performed among 91 surgical patients using the Oral Health Assessment Tool (OHAT).

Results: Nurses acknowledged that they did not prioritise oral care in daily practice. Furthermore, they lacked knowledge and skills to identify and provide care for oral problems. Nurses mentioned helpful resources to perform oral care, like standardised language and instruments. However, they had no access to or were unaware of them. Patients admitted that they did not prioritise oral care due to their sickness during hospitalisation, were unaware of the importance of oral care, but felt responsible for their oral care. The most prominent oral problems identified with the OHAT were unclean mouths (n=75, 82%), unhealthy gum and tissues (n= n=55, 60%), and dry mouth (n=42, 46%).

Conclusions: Oral care delivery in one hospital is due to lack of positive attitude and knowledge in both nurses and patients, skills for nurses, and resources.

Relevance to clinical practice: The behavioural factors indicate strategies for development of a multicomponent intervention to improve oral care in this hospital, nutritional status and general health outcomes.

KEYWORDS

IMPACT STATEMENT

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

- This paper describes oral care delivery in one Dutch hospital as a first step to improve oral health. Oral care appeared not to be a priority during daily hygiene care of hospitalised patients. Patients feel responsible, however, do not prioritise it due to their sickness. Furthermore, they lack knowledge about the importance of good oral health. Nurses lack knowledge and skills to identify and treat oral problems and have no access to or are unaware of resources such as standardised language and instruments.

- The most prominent oral health problems in hospitalised patients are unclean mouth, dry mouth, and unhealthy gum and tissues, making these relevant outcomes for future research and quality improvement programs on improving nursing sensitive outcomes in hospitals.

- This paper highlights the importance of oral health as essential nursing care, and identified determinants of current oral care behaviour in one hospital setting that need to be changed in order to improve oral health and subsequent nutritional status and general health outcomes.

INTRODUCTION

Oral care is a neglected part of essential nursing care at home, in nursing homes and hospitals (Coker, Ploeg, Kaasalainen, & Carter, 2017; de Lugt-Lustig et al., 2014; Everaars, Jerkovic-Cosic, van der Putten, Pretty, & Brocklehurst, 2018; Lewis, Edwards, Whiting, & Donnelly, 2018; Miegel & Wachtel, 2009; Sloane et al., 2013). Impaired oral health has a negative impact on nursing sensitive outcomes such as food intake and subsequently undernutrition (De Marchi, Hugo, Hilgert, & Padilha, 2008; Huppertz, van der Putten, Halfens, Schols, & de Groot, 2017; Lindmark, Jansson, Lannering, & Johansson, 2018; Sheiham et al., 2001), perform communication and subsequent quality of life (Coleman, 2002), and infections (Bartzokas et al., 1994; Quinn et al., 2014; Sato et al., 2011; Sjogren, Nilsson, Forsell, Johansson, & Hoogstraate, 2008). To diminish these negative consequences and increase nutritional status and quality of life, oral health should be improved in hospitalised patients. Therefore, signalling oral health problems and performing oral

care of patients is needed and should be promoted among nurses. Nurses are in the key positions to give advice and stimulate or perform oral care in hospitalised patients. Improving oral health in hospitalised patients can be considered as a complex intervention and may require behaviour change of both nurses and patients (Craig et al., 2008). A multi-faceted approach is recommended to remove all barriers within a particular context to change current behaviour into the desired behaviour (Bartholomew et al., 2016; Craig et al., 2008; Miegel & Wachtel, 2009). In order to act upon the experienced barriers for oral care among hospitalised patients a context analysis is needed (Bartholomew et al., 2016; Bleijenberg et al., 2018; Craig et al., 2008). This paper aims to provide insight in the context of oral care among hospitalised patients through exploring experiences in oral care from both nurses' and patients' perspectives in a hospital setting and examining oral health problems among hospitalised patients .

BACKGROUND

According to the World Health Organisation, oral health is defined as 'a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing' (Organization., 2019). To achieve and maintain oral health, oral care is of pivotal importance. Oral care encloses screening and identification of oral health problems, dental treatment and daily oral hygiene (MacEntee, Thorne, & Kazanjian, 1999).Oral hygiene involves inspection of the mouth, removing plaque and biofilm from gums and tissues in the oral cavity and cleaning the oral gums and tissues and cavity (Coker, Ploeg, Kaasalainen, & Fisher, 2013).

Daily oral hygiene prevents dental plaque to evolve to gingivitis and eventually periodontitis (Azarpazhooh & Tenenbaum, 2012; Pace & McCullough, 2010). Besides these direct effects in the oral cavity, impaired oral health can lead to further deterioration of patient's health status. Associations are found with diabetes (Azarpazhooh & Tenenbaum, 2012), cardiovascular diseases (Azarpazhooh & Tenenbaum, 2012; Beck, Garcia, Heiss, Vokonas, & Offenbacher, 1996; Senpuku et al., 2003; Virtanen et al., 2017; Ylostalo, Jarvelin, Laitinen, & Knuuttila, 2006), stroke (Wu et al., 2000), pneumonia (Azarpazhooh & Tenenbaum, 2012; Pace & McCullough, 2010; Quinn et al., 2014; Senpuku et al., 2003; Sjogren et al., 2008) and postoperative infections (Bartzokas et al., 1994; Sato et al., 2011), especially in older patients (Coker et al., 2013; Senpuku et al., 2003; Sjogren et al., 2008). Impaired oral

health limits people's ability to eat, smile and speak, psychosocial wellbeing and quality of life (Coleman, 2002). Furthermore, several studies have shown the association between undernutrition and oral health problems (De Marchi et al., 2008; Huppertz et al., 2017; Lindmark et al., 2018; Sheiham et al., 2001). When patients experience pain or limitations throughout chewing and swallowing, a lower nutritional intake can be a consequence. It is well-known that nutrition is vital for the recovery of patients who are admitted to hospitals for surgery (Bartzokas et al., 1994; Sato et al., 2011; Weimann et al., 2017). Therefore, daily oral care is needed to achieve or maintain good oral health to promote oral intake, prevent undernutrition, and keep patients fed. For this reason, oral care is one of the essentials of nursing care (Kitson, Conroy, Wengstrom, Profetto-McGrath, & Robertson-Malt, 2010; Miegel & Wachtel, 2009; Quinn et al., 2014).

When living independently at home, oral care is the individuals' responsibility. However, in case of hospitalisation one can become care-dependent, and subsequently, oral care will be under the nurses' responsibility. Especially patients who had an emergency hospital admission are in higher need for oral care due to more severe or acute illness that may lead to decreased self-care and longer periods of abstinence of oral intake (Gibney, Wright, Sharma, D'Souza, & Naganathan, 2017; Hanne, Ingelise, Linda, & Ulrich, 2012). Patients who are admitted for surgery need oral care to prevent postoperative infections (Bartzokas et al., 1994; Sato et al., 2011). Furthermore, oral care is needed in older patients since oral health appeared to be hampered in these patients (Coker et al., 2013; Senpuku et al., 2003; Sjogren et al., 2008). To diminish the negative consequences of impaired oral health, patients and nurses should perform daily oral care.

In the Netherlands, a guideline on oral care for patients in nursing homes is available since 2007 for nurses and nursing assistants (NVVA, 2007). However, guidelines do not guarantee the actual implementation of adequate oral care (Miegel & Wachtel, 2009; Weening-Verbree, Huisman-de Waal, van Dusseldorp, van Achterberg, & Schoonhoven, 2013). Moreover, oral care for hospitalised patients may require other strategies than institutionalised care, since these patients are vulnerable due to age and acute illness such as surgery. So far, no hospital guideline on oral care has been developed. Moreover, it is unclear how oral care is delivered in hospitalised patients and no tailored strategies exist to enable behaviour change for promotion of oral health in hospitalised patients. A multi-faceted approach is recommended (Miegel & Wachtel, 2009) to address all barriers within a particular context in order to develop a complex intervention such as improving oral health for inpatients (Craig et al., 2008).

Nursing, and thus oral care, is considered as a complex intervention (Richards & Borglin, 2011). Complex interventions can be developed and evaluated following the four phases of the Medical Research Council (MRC) framework (Craig et al., 2008). The development of an intervention requires a clear view of the context (Bartholomew et al., 2016; Bleijenberg et al., 2018). During an analysis of the context, an health problem is assessed including behavioural and environmental causes (Bartholomew et al., 2016). Furthermore, investigating the needs and perceptions of both providers and recipients of care are crucial during the development of interventions (Bleijenberg et al., 2018). Insight in behavioural and environmental determinants from both providers' and recipients' perspective enable researchers and policy makers to develop tailored strategies in a multicomponent intervention. This paper aims to provide a context analysis of oral care delivery in one hospital through exploring experiences in oral care from both nurses' and patients' perspectives in a hospital setting and to examine oral health problems among hospitalised patients. With insights in the experiences of oral care and oral health problems, specific goals can be defined to improve oral health in these patients.

METHODS

Study design

A context analysis has been performed in a tertiary, university affiliated teaching hospital in the Netherlands between October 2016 and November 2018. The context analysis included a convergent parallel mixed methods design (see figure 1). This design using both qualitative and quantitative methods was appropriate in order to provide a comprehensive analysis on how oral care is experienced in and to hospitalised patients (Creswell, 2014). The qualitative approach included semi-structured interviews with nurses and patients. The Integrated Change Model (I-Change) was used to strengthen the qualitative approach (de Vries et al., 2003; Vries, Mesters, van de Steeg, & Honing, 2005). This model incorporates factors that leads to behaviour. The use of this model will provide insight in the factors that impact both nurses' and patients' behaviour regarding oral care. The quantitative approach included a prospective cross-sectional observational study in order to examine oral health of hospitalised patients. These mixed-methods would adequately purvey the context analysis. Ethical approval was obtained from the local committee for scientific research to collect data of patients (numbers BC/1711-448 and BC/1810-187). Detailed methods are reported with attention to the

Equator Guidelines: the COnsolidated criteria for REporting Qualitative research (COREQ) (Tong, Sainsbury, & Craig, 2007) and the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) agreement (von Elm et al., 2014) (see supplementary file 1).

Qualitative approach

Semi-structured, face-to-face interviews were held by 4th year Bachelor of Nursing students among nurses (students: TS, JB) and among patients (student: FM). Students were supervised by experienced researchers (RdH, HN).

Participants

Nurses were selected from three surgical and seven medical wards. Nursing Managers of each ward were approached by the researcher (HN) to select two nurses of their ward. The nurses included in this study represented a variation in level of education (e.g. vocational, bachelor or master education), age and work experience. All nurses gave informed consent for participation.

Patients were selected from a surgical and a geriatric ward. To obtain maximal variation, patients were purposively recruited based on gender, natural teeth or dentures, and care dependency before hospitalisation. For this qualitative approach, the more vulnerable patients for impaired oral health were included according to these criteria: age was ≥65, were free of language barriers, and gave written informed consent for participation. Patients who had cognitive impairment or were in a terminal stage of disease were excluded from this study because response to the interview questions should be valid answers or to not burden patients with research in this stage.

Data collection procedures

The interviews were guided by a topic list that was based on the Integrated Change Model (I-Change) (de Vries et al., 2003; Vries et al., 2005). After a pilot interview with a nurse, the topic list was adapted with more explicit questions to guarantee optimal input. This final topic list was used for all interviews (see supplementary file 2). The interviews with the nurses took place in a quiet room in the hospital. The interview questions for the patients were also pretested. The order of the questions were rescheduled for a more logic conversation (see supplementary file 3). Patients from the surgical ward were interviewed during the postoperative phase. Interviews with all patients were held at the bedside of the patient in case of a single or quiet room. Otherwise, patients were transferred to another, quiet room for the interview. The data from both pilot interviews were included because of usability.

All interviews took about 10 to 20 minutes of time, and were audio taped and transcribed in text files.

Data analysis

Transcripts from all audio tapes were analysed using open, axial and selective coding (Boeije, 2010). Open coding was independently performed by the students and researchers. Discrepancies were discussed in order to reach consensus for the final codes. Then, axial coding structured the codes. The codes were categorised based on determinants of the interview guide. During the selective coding the major themes were defined in interactive discussion sessions with the students and the researchers (JB, TS, FM, RdH, HN). During the different phases of coding, feedback was given by the researchers and interactive discussions were held in the research team to enable a clear and objective analysis.

Quantitative approach

Participants

Patients were approached from four surgical wards, including oncologic, gynaecologic, gastrointestinal, vascular, traumatologic, orthopaedic or urologic surgery. For the quantitative approach, patients of ≥18 years of age could participate and were included if they did underwent surgery during admission and provided informed consent. Patients were excluded if they were in a terminal stage of their disease and if they refused the oral examination.

Data collection procedures

Two 4th year Bachelor students Oral Hygiene (AT, RO) approached the patients in the postoperative phase, asked informed consent for participation, and examined the mouth. The students were supervised by researchers (BE, HN). Although oral care is part of essential nursing care and should be part of regular daily care, all surgical patients received an information letter the day before the start of the oral examination by a nurse of the ward so they could consider participation. The next day, patients were verbally requested to participate. We intended to evaluate oral health in both patients with and without cognitive impairment. This observational study was approved by the ethical committee of the hospital (number BC/1711-448). Patient with oral health problems were informed about their problems and advised on their oral hygiene. Also, the nursing staff was informed about the results of the oral examination of their patients to enable further investigation or treatment.

Measurements

Data on oral health was collected with the Oral Health Assessment Tool (OHAT) (Chalmers, King, Spencer, Wright, & Carter, 2005). The OHAT determines

oral health on eight items: lips, tongue, gums and tissues, saliva, natural teeth, dentures, oral cleanliness, and dental pain with three possible scores (0: healthy, 1: some changes present and 2: unhealthy condition). The total OHAT score is the sum of the scores for each item. Validation of the OHAT in residential care (Chalmers et al., 2005; Simpelaere, Van Nuffelen, Vanderwegen, Wouters, & De Bodt, 2016) showed adequate inter-rater reliability (interclass correlation coefficient (ICC): 0.74-0.96; Kappa statistic 0.48-0.80 and 0.83-1.00). In this study, a translated version of the OHAT had been used. Translation was done by one of the researchers (BE) (Jansen, 2017) . The examination of the mouth was performed with a bright flashlight, clean hand gloves and a tongue blade and took about 5 minutes of time. Patients' clinical and medical characteristics were derived from the electronic medical patients' files.

Data analysis

Descriptive statistics were used to describe patients' characteristics, individual OHAT items and the OHAT total score. Depending on the distribution of the variables, percentages or mean and standard deviation were estimated. All analyses were carried out with IBM SPSS statistics 25.0.

Synthesis of mixed methods

After separate analysis of the quantitative and qualitative data, findings were compared and integrated in a final comparative analysis (Creswell, 2014). This final step belongs to the convergent parallel mixed-methods design. The themes of the data from nurses were merged with the themes of the qualitative data from the patients and were supposed to indicate the factors of the I-Change Model that have led to oral care behaviour. The quantitative findings were supposed to indicate the result of the current oral care behaviour and explained what oral health components need the highest attention in further oral care improvement in hospitals.

RESULTS

Qualitative results - Nurses

Nineteen nurses were included representing ten different wards. One of these nurses had a master degree in nursing, ten others were bachelors in nursing. The other eight nurses followed secondary vocational education (see supplementary file 4). Analyses of the interviews with these nurses resulted in three themes that were determinants of oral care behaviour: attitude, knowledge and skills, and resources.

Attitude

Due to nursing workload and lack of time, nurses often neglected oral care. Nurses said to prioritise other tasks in nursing care on the ward more than oral care during the daily activities. Some nurses felt that they needed to change patients' oral care behaviour but were unable to do this because of the patients' short hospital stay. Others argued that changing oral health behaviour was not their responsibility during hospitalisation some nurse did not agree with this. Nurses stated that some patients are passive and expect the nurse to take care of the mouth while other patients have their own, sometimes unhealthy, routines but did not expect the nurses to intervene in their routines. Most of the nurses accept these situations, except some nurses:

Some patients will not adhere to the nurses advise and say: I am not used to do so .. This may lead to debate between the nurse and patient. Equal to nurses who are in their routine for years, patients can have habits of their own, which die hard.'
(Nurse 14)
'When a capable 30-year old patient refuses to brush his teeth at night, it is his responsibility.' (Nurse 2)
'I have the intention to provide oral care, but then, being busy I forget it, it is just the time.' (Nurse 13)

Providing oral care had different values for the nurses. Some nurses stated they felt satisfied because they contributed to a clean sensation of the mouth for the patient. Performing oral care was also seen as a moment of personal attention. Other nurses said that providing oral care was difficult and repulsive. However, most of the nurses were empathic for their patients to perform oral care as one of the nurses explained:

'I imagine that receiving oral care while you are sick is a pleasant feeling because your mouth is clean and gives you a better feeling.' (Nurse 8)

Knowledge and skills

In the interviews nurses admitted lacking knowledge or having blind spots for oral care. Along with knowledge, nurses experienced a lack of skills in diagnosing and performing oral care. They did not feel skilled enough to perform oral care for all differences in oral structures (dentures, partial natural teeth and partial prosthesis) or how to use different products. Also, inspecting the mouth was not routinely performed and if they did, they felt not qualified to detect abnormalities. Some nurses who did identify abnormalities did not know how to act in a professional way upon these deficiencies. They stated to mainly recognise oral problems like swallowing problems,

dental pain or small wounds in the mouth. However, they did not know how to intervene on these problems.

'I do not know what products are available and which one are available in the hospital to improve oral care' Nurse 12

According to the nurses, performing oral care is impacted by the condition of the patient, such as history of alcohol abuse, cognitive impairment, diets such as nil-per-mouth or enteral feeding, and patients in need for end-of-life care. For example, patients with cognitive impairment can refuse oral care:

'When the patient bites or closes his/her mouth, you have to be creative and find an alternative way for oral care... Most of the time we succeed.' (Nurse 19)

In this case, the cognitive impairment works as a barrier. However, patients who are on enteral feeding receive extra attention of a nurse which consequently works as facilitator:

Especially for patients who are on enteral feeding and with a nil-per-mouth policy, I plan oral care in our digital task menu' (Nurse 12)

Resources

Several resources were mentioned by the nurses that were supposed to support the performance of oral care. Firstly, most of the nurses endorsed the need of an oral care protocol including the state-of-the-art oral care management. Some of them did know the existence of current protocols and guidelines, while seven nurses did not. Secondly, nurses stated the need for instruments to inspect the mouth, such as a light source or tongue blade, which were mostly unavailable according to participants. Besides these instruments, nurses stated that materials to keep the mouth, the tongue, teeth or prosthesis clean such as tooth brushes and toothpaste were not regularly available. The final resource that nurses mentioned concerned standardised language about oral care. Nurses stated that they did not use a screening tool to identify oral health problems and did not report on oral care in a structural manner. Oral care was not a common topic in communication with other health care professionals, also with professionals outside the hospital. This would help nurses to communicate on oral care with each other and other health care professionals.

'Maybe we should mention oral care in the patient transfer handover when patient leave the hospital.' (Nurse 4)

Besides these practical resources, nurses emphasized the need to further improve their knowledge and skills regarding 'state-of-the-art' oral care, resources to perform oral care, and how to recognize oral diseases like candida. Interactive

methods to upgrade their knowledge and skills were suggested. These included meetings regarding oral care, information on paper, news on the intranet, short educational movies, and training-on-the-job by experts like speech therapists or oral hygienists. Furthermore, there was a need for inter-collegial backup to discuss cases with a dentist or oral hygienist.

Qualitative results – Patients

Eleven patients participated in the interviews. Six of them were male, and the average age was 78.5 years (SD 5.4). Ten of the patients lived at home before hospital admission, and three of them received home care. One patient was admitted to the hospital from a revalidation centre. Four patients had natural teeth, and 10 patients had dentures (see table 1). Three themes that were determinants for healthy oral behaviour were derived from these interviews: knowledge, attitude, and barriers.

Knowledge

Most of the patients stated that they had sufficient general knowledge about oral health and did know how to perform basic oral care. However, they did not know why oral care was important. Moreover, they were unaware of oral health problems and the consequences of an unhealthy mouth while they were ill and hospitalised. The importance to visit a dentist or a dental prosthetican was also not clear for some of the patients.

'We always went to the dentist regularly, however, nowadays I do not see him anymore because I have the same dentures for years and never experience complaints.' (Patient I)

Attitude

All patients considered oral care as important for their health. Some patients stated that oral care is pivotal for the intake of nutrition. Others stated that oral care was important for a good and fresh breath. Respondents of the surgical ward stated that oral care during hospitalisation was just as important as it is at home. Patients of the geriatric ward stated that oral care during hospitalisation was not as important as it was at home. These patients felt too sick or tired and valued oral hygiene not that important during this period.

'Due to the enormous fatigue, you have other priorities. I honestly do not care about it anymore.' (Patient D)

Patients perceived their own role as pivotal in performing oral hygiene. Patients stated that they should do it themselves if they are able to do so and that patients were responsible for their oral health.

'I do not think that you (nurses, ed.) have to check whether or not I brush my teeth after a meal.' (Patient F)

Some patients said that it would be pleasant when nurses assisted wherever needed. Patients who were independent of care stated that nurses had no role or task regarding their oral care. Additionally, some patients stated that nurses did not need to assist in oral care because they thought that the nursing staff is too busy.

Barriers

Several barriers to perform oral hygiene during hospitalisation were derived from the analysis, e.g. physical, material, or environmental. Patients stated that their physical fitness or sickness hampers them to perform oral care. Physical barriers were fatigue, inability to walk to the bathroom, and inability to stand at the sink. Furthermore, some of the patients stated that they did not have materials to perform oral hygiene such as a tooth brush or toothpaste.

'In here, I do not take care of my mouth properly, I do not even have a tooth brush here.' (Patient C)

An environmental barrier was that patients were admitted to the hospital. Some patients stated that they were not able to perform their personal routines as they did at home. Performing oral care was not always possible because patients were away from their confidential surroundings missing their personal paraphernalia.

'At home I feel comfortable, during admission I feel like I am abroad.' (Patient J)

Quantitative results

Participants

A total of 91 (81%) patients participated in the oral examination. Twenty-two patients (19%) were not included because of too severe illness (n=3), refused to participate (n=17) or did not speak the Dutch language (n=2). Included patients were mostly female (n=57, 63%). Their mean age was 65 years old (SD 19.1) and 54% was at least 65 years old (see table 2).

Oral health

Most of the patients had natural teeth (n= 54, 59%). Twenty (22%) of the patients had dental prosthesis (see table 2). The mean total OHAT score for all patients was 6.8 (SD 2.2). The mean total OHAT-score for patients with partially prosthesis was 8.4 (SD 2.1). The main unhealthy categories for each OHAT-item were oral cleanliness (n=75 , 82%), gums and tissues (n=55, 60%) and saliva (n= 42, 46%) (see table 3). Changes were seen in the lips and tongue, which were defined

as dry, fissured and red. Most of the patients were free of dental pain (n=80, 88%). Dentures were mostly qualified as healthy (n=30, 81%).

Synthesis of findings

It belongs to the essential activities of nurses to support their hospitalised patients in daily oral care. Analyses of the interviews showed that attitude, knowledge, skills, barriers, and resources were relevant behavioural factors that contributed to oral care during hospital admission. First, oral care was not a priority for both nurses and patients. Nurses experienced workload or lack of time that inhibited them to perform oral care. Patients themselves felt responsible for personal oral care. However, their role in oral care was hampered by their sickness, and, consequently due to the sickness, patients admitted that they did not prioritise oral care during hospitalisation. Their physical barriers such as fatigue, inability to walk to the bathroom or stand at the sink hampered the performance of oral care. Nurses were aware of the importance to empower patients to perform adequate oral care, but did not know how to take their role or did accept the patient's behaviour regarding oral care. Positive attitude of the nurses and patients is lacking to prioritise oral care.

Second, nurses experienced a lack of knowledge and skills to identify oral problems and did not know how to intervene with these problems. Additionally, most of the patients were unaware of the importance of oral care. The lack of knowledge and skills in nurses hampers them to perform oral care while the lack of knowledge in patients inhibits a positive attitude to prioritise oral care.

Furthermore, performing oral care did face some barriers for both nurses and patients. Nurses complained to lack helpful resources because these were not available or nurses were not aware of the existence of the resources. The resources include a clear oral care protocol, instruments to inspect the mouth, materials to clean, and standardized language and documentation. For patients, oral care was hampered by, besides the physical barriers, the fact that most of the patients did not bring their personal teeth brush or toothpaste to the hospital and that they were unable to perform their routines as at home.

The most prominent oral problems identified with the OHAT were unclean mouths (N=75, 82%), unhealthy gum and tissues (n=55, 60%), and unhealthy saliva (N=42, 46%). These problems may have been occurred during hospital admission, hence, a dry mouth and bad oral hygiene may be results of neglected oral care for a short period of time. Oral problems such as decayed or broken teeth are results of prolonged times of insufficient oral health. Therefore, we argue that the identified oral

problems are the outcomes of the behaviour of nurses and patients regarding oral care during hospital admission.

DISCUSSION

This context analysis of oral care delivery in a single Dutch hospital identified a lack of positive attitude and knowledge of both nurses and patients, a lack of skills and a lack of time for nurses, and unavailability of resources resulting in prominent oral health problems. In the following paragraphs, we discuss the results in relation with the literature and present implications for further improvement of oral care.

Firstly, interviews with nurses revealed that nurses do not prioritise oral care due to workload and lack of time and they lack knowledge and skills to identify and provide care for oral health problems. These barriers for nurses relating to the performance of oral care during hospitalisation are in accordance with previous studies that show how these barriers are experienced by caregivers in primary care (Harnagea et al., 2017) and in nursing homes (de Lugt-Lustig et al., 2014; van der Putten, De Visschere, Schols, de Baat, & Vanobbergen, 2010; Weening-Verbree et al., 2013). Although oral care is fundamental nursing care (Coker et al., 2017) it is often neglected to these barriers. Virginia Henderson, a well-known and respected founder in nursing, already affirmed in 1960 that the quality of nursing care is reflected in a person's oral health status (Henderson, 1960). Therefore, we should address these barriers and encourage nurses to reflect to their professional identity providing fundamental oral care.

In their enhanced basic nursing care program, Quinn et al. provided a multicomponent intervention developed through the Influencer Model™ and participatory action research including structural enhancement of oral care. Main components were increased information dissemination to nurses, patients and family, oral care provision at least four times per day, and monitoring process and outcome indicators. This intervention reduced almost 50% of non-ventilated hospital-acquired pneumonia while oral care provision each shift increased from 27% to 80% (Quinn et al., 2014). As such, developing a theory driven, multicomponent intervention proves to be beneficial. Research also showed improvement of knowledge through educational programs, but such knowledge did not improve skills (de Lugt-Lustig et al., 2014). According to Andersson et al., even when nurses had knowledge and skills, they failed to translate these into clinical practise (Andersson, Wilde-Larsson, & Persenius, 2018). Therefore, to really change nurses' oral care behaviour, we recommend addressing all barriers through theoretical and structural intervention development.

Secondly, interviews with patients revealed that they do not prioritise oral care due to sickness and that they are unaware of oral health problems and its' consequences. Moreover, patients appointed physical limitations, hospitalisation, and unavailability of materials as barriers to perform oral care. The study of Everaars et al. also found similar results, although patients considered performing good oral health care, they lack knowledge about it (Everaars, Jerković-Ćosić, van der Putten, & van der Heijden, 2015). Niesten et al. support also our findings with results that older people stated to discontinue oral health routines due to disorientation, energy preservation for other goals, and lack of social support (e.g., inconvenience asking for help, getting the right help, having to rush nurses) (Niesten, van Mourik, & van der Sanden, 2013). Andersson et al.'s survey on perceptions of patients in short-term centres revealed that nurses have to take the responsibility for older people's oral health (Andersson, Wilde-Larsson, Carlsson, & Persenius, 2018). Accordingly, the empowerment and participation of patients and their family should be addressed in further intervention development (Castro, Van Regenmortel, Vanhaecht, Sermeus, & Van Hecke, 2016).

Thirdly, the OHAT items oral cleanliness, gums and tissues, and saliva were recognised as unhealthy in our population. Uncleanliness and unhealthy gums and tissues may be caused by insufficient oral care behaviour during hospitalisation. Meanwhile, reduced production of saliva resulting in a dry mouth may be due to low intake of liquids or the air conditioning. These oral health problems were also identified in 575 newly-hospitalised patients through the OHAT where unhealthy lips (74.8%) and uncleanliness (75.7%) were found the most common oral health problems (Gibney et al., 2017). In another study, 55 (27.2%) patients scored healthy for cleanliness (Ni Chroinin et al., 2016). In our sample, gums and tissues and saliva appeared to be more often unhealthy compared to both of the studies. Notably, Gibney et al. categorised the OHAT-items as dichotomous variables (i.e. healthy and unhealthy, instead of healthy, changes and unhealthy) and, as such, has different results compared to our findings. Furthermore, our findings regarding experiences of a dry mouth are supported by the findings that 88 (70%) patients had a dry mouth 24 hours after surgery (Robleda, Roche-Campo, Sanchez, Gich, & Banos, 2015). The total OHAT-score was higher in our sample (i.e. mean OHAT-score 6.8 versus 4.0) compared to newly admitted patients (Gibney et al., 2017), however, it was comparable to geriatric inpatients (i.e. median OHAT-score 7.0 versus 6.0) (Ni Chroinin et al., 2016). The oral health problems identified in our study therefore represent relevant health problems in this category of patients.

Using the OHAT provided insight into oral health problems. A recent literature review concluded it is the most complete in its' items and of best methodological quality in comparison to other oral health assessments (Everaars et al.), but, the OHAT is not yet validated in hospitalised patients (Chalmers et al., 2005; Simpelaere et al., 2016). Moreover, the OHAT was categorised on a two-point scale (i.e. healthy/unhealthy) in the study of Gibney et al.(Gibney et al., 2017) while in our study, our evaluation was based on a three-point scale (i.e. healthy / changes / unhealthy). These arguments illustrate the need for consensus regarding evaluation of oral health care behaviour. The OHAT may be a valid tool in daily practice to monitoring adequate oral care behaviour.

Further improvement of oral care

Our study in one hospital facility provides a clear view on the barriers of oral care delivery and oral health problems among patients. As next step in the improvement of oral care, methods such as 'Intervention Mapping' (Bartholomew et al., 2016), the model of Van Meijel (van Meijel, Gamel, van Swieten-Duijfjes, & Grypdonck, 2004) and the Behaviour Change Wheel (Michie, van Stralen, & West, 2011) should be followed to develop an optimal intervention (e.g., an oral care program) for implementation. In this regard we recommend three key themes for further development of an complex intervention on oral care improvement.

Firstly, patient empowerment is very important since they feel responsible for their own oral hygiene. Patients should perform their personal daily oral care. As some hospitalised patients are not capable to do it themselves, we recommend active involvement of their relatives. For example, Activities could include addressing the importance of oral care, overcoming physical inabilities, and keeping at-home - routines alive during hospitalisation. Howerever, research on developing a specific intervention in this population is requiredFurthermore, the timing of empowerment of patients should be addressed while they are hospitalised, during prehabilitation programs, after hospital admission, and while patients receive care in the community or nursing homes. This will increase general awareness of the importance of oral care.

Secondly, nurses should be empowered to integrate oral care in their daily routines. Nurses' attitude to integrate oral care activities in daily routines should be addressed in the behaviour change as our findings illustrate attitude as a barrier for oral care delivery. Moreover, our findings indicate that the following activities are important strategies that can address the barriers: education, information dissemination (i.e. available on paper, intranet, movies and leaflets), on-the-job training by experts, sufficient supply of materials to clean the mouth, and

standardised language to identify and report oral problems. Additionally, we think that hospital management should support nurses' leadership and their work environment. Personal accountability, as one of the characterises of leadership, is associated with missed care (Drach-Zahavy & Srulovici, 2019). In addition to leadership, it is shown that work environment of nurses including patient-nurse ratio and resource adequacy is associated with missed care (Blackman et al., 2018; Park, Hanchett, & Ma, 2018). Therefore, preventing oral care to end up as missed care, also leadership in terms of personal accountability and the work environment should be addressed during the development of an oral care program.

And thirdly, resources to perform oral care should be available structurally. As our findings suggest, consensus is needed on the assessment of oral health. Researchers should validate the OHAT for use by clinical nurses. Then, the OHAT can be used as important outcomes in research and improvement programs. Monthly evaluation on performance has shown to be beneficial (Quinn et al., 2014) and should therefore be included in an oral care program. Also, practical resources to perform oral examination such as a light source or tongue blade and to perform oral hygiene as tooth brushes and tooth paste should be available structurally.

The three key themes derived from this study should be addressed in the intervention design. For example, an oral care program should address empowerment of the patient, the nurses, and availability of resources. To empower the patient, one of the activities could be addressing the importance of oral care. For example, this can be done through pre-hospitalization information about oral hygiene, a chapter in the hospital admission leaflet, and posters within each bathroom containing a slogan on oral care. However, developing these information tools is part of designing the intervention. Initial drafts of each component of the intervention should be codeveloped by the recipient, in this example, the patient. This co-design of the intervention with patients and nurses will strengthen the adoption of the intervention. Once all intervention components are developed it can be piloted and tested for feasibility as second phase in the MRC framework (Craig et al., 2008). As this paper highlight the context analysis only, further research should address the design of the intervention.

Strengths and limitations

This study has some strengths and limitations. First, we used mixed methods to explore oral care behaviour during hospital admission. Data was collected through interviews and oral examinations. The same construct (i.e. the I-Change Model) was used during the interviews with nurses and patients which is characteristic of mixed-model research (Creswell, 2014). This application of triangulation of data sources

(i.e. interviews with patients, interviews with nurses, and oral examinations) strengthened the analysis of the context regarding oral care delivery for hospitalised patients.

Another point to discuss is that we only selected surgical patients for mouth examinations. Although oral health is important for all hospitalised patients, we focus particularly on surgical patients because it is important to increase their physical condition during a surgical treatment to achieve optimal postoperative recovery. Non-surgical hospitalised patients may have had other oral problems. Other studies revealed comparable oral health problems among geriatric and other hospitalized patients based on the OHAT (Gibney et al., 2017; Ni Chroinin et al., 2016).

Furthermore, the mouth examinations were performed on different moments during the day and this may have resulted in different mouth circumstances that affected consequently OHAT scores. Patients may have worse outcomes, for instance, when the examination direct after a meal. Standardised and validated tools and clear instructions on how to evaluate on oral care behaviour are therefore needed. Nonetheless, we gained sufficient insight into the oral health problems.

Our context analysis concerned only one hospital facility. This hampers generalizability of the identified determinants of optimal oral care delivery. Observation of key determinants in other hospitals is needed to confirm our results. However, to successfully implement an complex intervention in its context, the literature suggest to identify the existing practise during the intervention development (Bleijenberg et al., 2018; Moore et al., 2015). Our results are therefore valuable for further intervention development tailored to this hospital facility.

Moreover, the context analysis is strengthened by the participation of a variety of experts and researchers. Participation of experts in the field of interest is recommended when performing a context analysis (Bartholomew et al., 2016). This cooperation enabled us to build our methods and results on different points of view regarding oral care, nursing, and research methodology. For example, during the interviews, patients provided short answers to the questions on the topic list. This problem was examined through discussions with our team of researchers. This problem may have occurred because patients were not familiar with the topic (i.e. oral care) as shown in another sample of patients (Everaars et al., 2015); hence we adjusted our topic list to ensure a more explicit formulation of questions. Considering all methodological issues we opine that we sufficiently analysed how oral care is delivered for hospitalised patients.

CONCLUSIONS

Oral care delivery in a single Dutch hospital appeared not to be a priority, due to the workload and lack of time of nurses and due to the sickness of the patient. Nurses stated that providing oral care is important but they lack knowledge and skills to identify and treat oral problems. Resources are either not available or not used. Patients feel responsible for their oral health, but they lack knowledge regarding the benefits of oral health during periods of other health problems. Nurses' and patients' behaviour result in oral health problems, namely: oral uncleanliness, dry mouth, and unhealthy gums and tissues.

The analysis of oral care delivery among patients admitted to this hospital demonstrates the need to improve oral care according to structural intervention development including behaviour change techniques. Nurses should be able to assess oral health, provide daily oral hygiene, and to evaluate oral health status. Moreover, oral hygiene should be performed in hospitalised patients daily. Tailored strategies can include education, on-the-job-training, reminders, and standardised language. Implementing these strategies can lead to better oral health, (e.g. oral cleanliness and hydrated mouths), and on better nutritional status and general health outcomes. These suggestions should be addressed in further intervention development.

RELEVANCE TO CLINICAL PRACTICE

Uncleanliness, unhealthy saliva, gums and tissues are oral health problems in our setting that indicate the need to improve oral care. The main factors of oral care behaviour among nurses are attitude, knowledge and skills and standardised language for oral care. The factors of oral care behaviour among patients are attitude, knowledge, and barriers (e.g. physical limitations and unavailability of materials). Strategies to improve oral care should therefore address these factors. As the literature affirmed that improving nurses' knowledge and skills does not ensure clinical practice, hence, a multicomponent intervention (e.g. an oral care program), including addressing motivation, could improve the issues. Implementation strategies should be tailored to both nurses and patients to change oral care behaviour. Standardised language and tools are also needed for oral health assessment and evaluation of oral care behaviour.

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