EFFECT OF TOOTH BRUSHING AND CHLORHEXIDINE (0.12%) MOUTHWASH IN HOSPITALIZED ACUTE EXACERBATION (AE) CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) SUBJECTS REFERRED FROM RURAL COMMUNITY CENTRES

ABSTRACT

Background: Gingival inflammation, a loss of connective tissue and bone is characterized by periodontal diseases. If untreated would lead to tooth loss. An interdisciplinary community-based COPD management programme may be required to intercede the exacerbations associated with COPD. This study aimed to assess the intervention of tooth brushing and/ or mouth wash in chronic obstructive pulmonary disease (COPD) subjects on recovery & discharge of subjects referred from various community centres at the tertiary hospital.

Methods: In total, 150 COPD subjects with periodontitis from the rural community centers for pulmonary care at the tertiary hospital were divided into 3 groups. Oral hygiene instructions (modified Bass technique using soft tooth brush and toothpaste containing 1000ppm Sodium Fluoride, NaF) on brushing were introduced along with Chlorhexidine (0.12 %) mouthwash of twice day in Group A, Group B with only mouthwash, & Group C as control with only toothbrushing. This was supervised through trained nurses. The span of hospital stay until recovery from exacerbation stage were assessed & followed-up based on those recovering within 5 days & between 5-10 days with this oral health intervention. Neither oral prophylaxis nor periodontal intervention were not possible because of their acute condition in all these subjects.

Results: A shorter hospital stay (< 5 days) due to faster recovery were noticed in Group A & B of 76% & 72 % respectively as compared with Group C (12% only) which was of tooth brushing alone. This could be attributed due to the possible antiplaque effects from brushing and/ or mouth wash introduced in the Group A & B, which possibly acts in inaccessible interproximal areas in patients where there was a difficulty to practice self-care with regards to oral hygiene due to poor dexterity.

Conclusion: The present findings of the implementation of primary preventive care through the trained nurses at the tertiary hospital can be a feasible model. Similar training to the health auxiliaries can be delivered on the oral hygiene practices & the use of Chlorhexidine mouthwash (0.12%) as a primary preventive program in COPD subjects & may be introduced at the rural community health centres.

KEYWORDS

tooth brushing, mouth wash, COPD, hospital stay

INTRODUCTION:

Oral health has been shown to be an important factor in respiratory diseases such as pneumonia and chronic obstructive pulmonary disease (COPD), characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases, with exacerbation and comorbidities contributing to the overall severity in individual patients.1

Gingival inflammation, a loss of connective tissue and bone are characteristic features of periodontal diseases. If untreated would lead to tooth loss. An interdisciplinary community-based COPD management programme may be required to intercede the exacerbation associated with COPD. COPD is fourth leading cause of death globally. Despite rising morbidity and mortality, there are few new treatments for COPD.2 There are several mechanisms that may potentially link respiratory disease with periodontitis – Aspiration of potentially pathogenic bacteria, the entry of periodontal bacteria into the vasculature during eating and tooth brushing can trigger an acute-phase response in the systemic circulation as evidenced by elevated serum levels of inflammatory mediators. Respiratory infection results from aspiration of oropharyngeal flora into the lower respiratory tract, failure of host defence mechanisms to eliminate them, multiplication of the microorganisms, and subsequent tissue destruction. It has been suggested that dental plaque may serve as a reservoir for respiratory pathogens, especially in high risk patients with poor oral hygiene. Institutionalized subjects appear to be more prone to oral colonization by these bacteria than ambulatory, non-institutionalized subjects. However, little is known about the effect of poor oral health on oral respiratory pathogen colonization and lung infection in ambulatory, non-institutionalized populations.3

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. (WHO). Acute exacerbations of chronic obstructive pulmonary disease (chronic bronchitis and emphysema) also be provoked in part by bacterial infection, which may require hospital admissions in some cases. Hospital admissions account for over 60% of the direct cost of the management of COPD. Possible influences on the LOS (length of stay) of COPD admissions include age, socioeconomic deprivation, comorbidities, disease severity and hyperglycaemia. Health care provider factors that have predicted LOS include the provision of social care within the community the day of the week of hospital admission, and the configuration of hospital units. Our hypothesis is that an introduction of oral hygiene care may reduce hospital stay in COPD patients. This study aimed to assess the intervention of tooth brushing and/ or mouth wash in chronic obstructive pulmonary disease (COPD) subjects on recovery & discharge of subjects.

Methods

Study design and data source

This was an observational study of a group of AE COPD patients admitted at JSS Hospital for an acute exacerbation.

Inclusion criteria:

• COPD with acute exacerbations
• Age group-35-65 years
• COPD with periodontitis
• AE COPD > 1

Exclusion criteria:

• Severe COPD
• Patients with history of hepatitis, AIDS
• Pregnancy
• Patients with other lung diseases

Stay duration:

The duration of stay was assessed from day of patient admission in the social care within the community the day of the week of hospital admission, and the configuration of hospital units. Our hypothesis is that an introduction of oral hygiene care may reduce hospital stay in COPD patients. This study aimed to assess the intervention of tooth brushing and/ or mouth wash in chronic obstructive pulmonary disease (COPD) subjects on recovery & discharge of subjects.

Outcomes:

In total, 150 COPD subjects with periodontitis from the rural community centers for pulmonary care at the tertiary hospital were divided into 3 groups. Oral hygiene instructions (modified Bass technique using soft tooth brush and toothpaste containing 1000ppm Sodium Fluoride, NaF) on brushing were introduced along with Chlorhexidine (0.12 %) mouthwash of twice day in Group A, Group B with only mouthwash, & Group C as control with only toothbrushing. This was supervised through trained nurses. The span of hospital stay until recovery from exacerbation stage were assessed & followed-up based on those recovering within 5 days & between 5-10 days with this oral health intervention. Neither oral prophylaxis nor periodontal intervention were not possible because of their acute condition in all these subjects.

Results: A shorter hospital stay (< 5 days) due to faster recovery were noticed in Group A & B of 76% & 72 % respectively as compared with Group C (12% only) which was of tooth brushing alone. This could be attributed due to the possible antiplaque effects from brushing and/ or mouth wash introduced in the Group A & B, which possibly acts in inaccessible interproximal areas in patients where there was a difficulty to practice self-care with regards to oral hygiene due to poor dexterity.

Conclusion: The present findings of the implementation of primary preventive care through the trained nurses at the tertiary hospital can be a feasible model. Similar training to the health auxiliaries can be delivered on the oral hygiene practices & the use of Chlorhexidine mouthwash (0.12%) as a primary preventive program in COPD subjects & may be introduced at the rural community health centres.

KEYWORDS

tooth brushing, mouth wash, COPD, hospital stay

INTRODUCTION:

Oral health has been shown to be an important factor in respiratory diseases such as pneumonia and chronic obstructive pulmonary disease (COPD), characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases, with exacerbation and comorbidities contributing to the overall severity in individual patients.1

Gingival inflammation, a loss of connective tissue and bone are characteristic features of periodontal diseases. If untreated would lead to tooth loss. An interdisciplinary community-based COPD management programme may be required to intercede the exacerbation associated with COPD. COPD is fourth leading cause of death globally. Despite rising morbidity and mortality, there are few new treatments for COPD.2 There are several mechanisms that may potentially link respiratory disease with periodontitis – Aspiration of potentially pathogenic bacteria, the entry of periodontal bacteria into the vasculature during eating and tooth brushing can trigger an acute-phase response in the systemic circulation as evidenced by elevated serum levels of inflammatory mediators. Respiratory infection results from aspiration of oropharyngeal flora into the lower respiratory tract, failure of host defence mechanisms to eliminate them, multiplication of the microorganisms, and subsequent tissue destruction. It has been suggested that dental plaque may serve as a reservoir for respiratory pathogens, especially in high risk patients with poor oral hygiene. Institutionalized subjects appear to be more prone to oral colonization by these bacteria than ambulatory, non-institutionalized subjects. However, little is known about the effect of poor oral health on oral respiratory pathogen colonization and lung infection in ambulatory, non-institutionalized populations.3

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. (WHO). Acute exacerbations of chronic obstructive pulmonary disease (chronic bronchitis and emphysema) also be provoked in part by bacterial infection, which may require hospital admissions in some cases. Hospital admissions account for over 60% of the direct cost of the management of COPD. Possible influences on the LOS (length of study) of COPD admissions include age, socioeconomic deprivation, comorbidities, disease severity and hyperglycaemia. Health care provider factors that have predicted LOS include the provision of social care within the community the day of the week of hospital admission, and the configuration of hospital units. Our hypothesis is that an introduction of oral hygiene care may reduce hospital stay in COPD patients. This study aimed to assess the intervention of tooth brushing and/ or mouth wash in chronic obstructive pulmonary disease (COPD) subjects on recovery & discharge of subjects.

Methods

Study design and data source

This was an observational study of a group of AE COPD patients admitted at JSS Hospital for an acute exacerbation.

Inclusion criteria:

• COPD with acute exacerbations
• Age group-35-65 years
• COPD with periodontitis
• AE COPD > 1

Exclusion criteria:

• Severe COPD
• Patients with history of hepatitis, AIDS
• Pregnancy
• Patients with other lung diseases

Stay duration:

The duration of stay was assessed from day of patient admission in the social care within the community the day of the week of hospital admission, and the configuration of hospital units. Our hypothesis is that an introduction of oral hygiene care may reduce hospital stay in COPD patients. This study aimed to assess the intervention of tooth brushing and/ or mouth wash in chronic obstructive pulmonary disease (COPD) subjects on recovery & discharge of subjects.

Methods

Study design and data source

This was an observational study of a group of AE COPD patients admitted at JSS Hospital for an acute exacerbation.

Inclusion criteria:

• COPD with acute exacerbations
• Age group-35-65 years
• COPD with periodontitis
• AE COPD > 1

Exclusion criteria:

• Severe COPD
• Patients with history of hepatitis, AIDS
• Pregnancy
• Patients with other lung diseases

Stay duration:

The duration of stay was assessed from day of patient admission in the
hospital to the day of discharge. They were divided as lesser/greater than 5 days of recovery/discharge.

Study population:
A total of 150 patients were included in the study, who were grouped in 3 groups: Group A, B, C based on duration of admission. Since they were all in-patients, all 150 patients participated in the study group. They were allocated in 3 groups as Group A as Tooth brushing (TB), Toothpaste (TP), Chlorhexidine (CHX) (0.12%) group, Group B as only CHX group, Group C as only TP. Modified Bass technique using soft tooth brush and toothpaste containing 1000ppm Sodium Fluoride (NaF). The patients were monitored by nursing staff in maintaining the oral hygiene practices. The nursing staff were trained by the dentist regarding tooth brushing and mouthwash use.

A cronbach alpha of .07 was obtained among the trained nurses. The formula used was:

$$\alpha = \frac{N \cdot C}{N^2 - (N - 1) \cdot C^2}$$

Methodology flow chart

Results:

Graphical representation of the Groups and hospital stay

Statistical analysis:
The association between the groups for hospital admission is found to be sig. with the CV value of 0.587 and P value of 0.001 in other words in groups A & B we find less number days to be stayed, whereas in group C more no of days to be stayed. However independently, we find significant between no of days of hospital stays <5 days where all the Chi sq values were found to be significant @ 0.001 level.

DISCUSSION:
Chronic obstructive pulmonary disease (COPD) remains a major public health problem. It is the fourth leading cause of chronic morbidity and mortality in the United States, and is projected to rank third in 2020 in burden of disease worldwide, according to a study published by the World Bank/World Health Organization.⁵ GOLD 2017 defines acute exacerbation of COPD as “an acute worsening of respiratory symptoms that results in additional therapy.” Such patients may require hospital admission requiring emergency care, nebulization and antibiotics. Oral aspiration of a 0.12% solution of Chlorhexidine does not prevent respiratory tract infections among ICU patients, although it may retard their onset.⁶ This study was done in hospitalised patients in a tertiary centre. This study evaluates whether oral hygiene interventions, tooth brushing and chlorhexidine reduced hospital admission. They were followed up for total number of hospital admission. They were categorised as hospital admission into less than or greater than 5 days. Scannapieco⁷ described four modes by which oral pathogens play a role in the pathogenesis of respiratory infections.

Oral pathogens such as P. gingivalis and Aggregatibacter actinomycetemcomitans are aspirated into the lungs. It is conceivable that in subjects having periodontal disease and elevated levels of periodontic bacteria such as P.gingivalis and spirochetes, protease activity may alter the mucosal epithelium to increase the adhesion and colonisation of respiratory pathogens. Another mechanism is by the destruction of protective salivary pellicles by oral bacteria. Dental biofilm can be colonised by pulmonary pathogens, it can therefore be hypothesized that in high risk patients, aspiration pneumonia could be a sequelae as oral cavity acts as a reservoir for pathogens. Therefore, there is a need for good oral hygiene practices in this group of patients. Munro CL et al investigated and demonstrated that effectiveness of oral chlorhexidine in reducing nosocomial respiratory tract infections in patients having elective cardiac surgery. Importantly, in each of these studies, the intervention was begun preoperatively (before intubation) and was continued throughout the ICU stay. However, cardiac surgery patients who have elective surgery most likely have different comorbid conditions and better physiological status at the time of intubation than do patients in the general adult ICU population. Studies in patients having elective cardiac surgery focused broadly on nosocomial infection (including surgical infection and tracheobronchitis) rather than on ventilator associated Pneumonia (VAP). Chlorhexidine, but not tooth brushing, reduces early ventilator-associated pneumonia in patients without pneumonia at baseline.⁸ In contrast to our study, Lorente L et al⁹ in his study concluded that when compared to manual tooth brushing and chlorhexidine, oral care does not help to prevent VAP in critical care patients on mechanical ventilation. Bardia A et al²⁰ conducted a study among the patients receiving preoperative chlorhexidine mouthwash, the risk of postoperative pneumonia is reduced by approximately one half; its adoption in preoperative protocols could help improve patient outcomes.¹⁰ Rodrigues FR et al in a research study which was a double-blind, randomized, placebo-controlled trial reported that oral application of a 0.12% solution of chlorhexidine does not prevent respiratory tract infections in ICU patients. They concluded that it may retard their onset.

A prospective, randomized, case-controlled clinical trial design was done using Periexid (0.12% chlorhexidine gluconate) as the experimental drug along with Listerine. They concluded that although rates of nosocomial pneumonia were lower in patients treated with Periexid than in patients treated with Listerine, the difference was significant only in those patients intubated more than 24 hours who had the highest degree of bacterial colonization.¹¹ Niclosi et al in a quasi-experimental study in patients undergoing heart surgery were enrolled in a protocol for controlling dental biofilm by proper oral hygiene (toothbrushing) and oral rinses with 0.12% chlorhexidine gluconate and were compared with a control group. They concluded that oral hygiene and mouth rinses with chlorhexidine under supervision of a dentist proved effective in reducing the incidence of VAP. In contrast to our study, Deschepper and colleagues¹² reported in their single-centre, retrospective, hospital-wide, observational cohort study in adult hospitalized patients that indiscriminate use of chlorhexidine oral care may be harmful.

In our study, group A, B showed lesser hospital study as compared to group C, inferring that the combined use of tooth brushing with tooth paste and chlorhexidine use had lesser stay as compared to tooth brushing alone. The group with tooth brushing alone. A combination of both chlorhexidine and toothbrushing control microorganisms in dental plaque, while chlorhexidine has bactericidal activity, whereas toothbrushing mechanically reduces the number of organisms without residual activity on the organisms remaining in the mouth.

CONCLUSIONS:
This study emphasizes the role of preventive and in house oral hygiene care in patients hospitalized for acute exacerbation of COPD patients.

Future Scope:
A routine oral hygiene regimen needs to be introduced and emphasized for hospitalized patients to reduce risk of any exacerbations.

REFERENCES:


