Long-Term Care and Oral Health Knowledge

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Poor oral care correlates with an increase in systemic diseases such as aspiration pneumonia. Lack of education and oral care knowledge in caregivers raises the risk of poor oral care among elderly patients residing in long-term care facilities. This study investigated the results of an education program provided by speech-language pathologists for certified nursing assistants (CNA). Data pre- and post-oral health care knowledge education program were collected. Data on oral health of patients prior to and subsequent to the education were also collected. (J Am Med Dir Assoc 2009; 10: 204–206)

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Long-term care (LTC) residents require various levels of assistance with oral care. Some LTC residents are independent and can care for their own hygiene, while others are totally dependent on the oral care provided by certified nursing assistants (CNA).¹ This dependent population can exhibit cognitive and motor deficits that affect their ability to provide oral self-care. LTC residents with motor planning deficits may be unable to physically place a toothbrush within the oral cavity. Cognitive deficits can result in this population not understanding the consequences and importance of oral hygiene. Memory deficits prevent LTC residents from remembering activities of daily living for self-care.²

LTC residents are placed at a greater risk for oral diseases because LTC institutions often have difficulty providing good oral health care to their residents.³ There are barriers to implementing oral care. Staff may have a lack of knowledge about what comprises good oral care. The oral care performed may not be based on standardized methods of providing oral care. An example of this is the use of lemon glycerin or foam swabs to clean teeth and oral mucosa, instead of a soft bristle brush.⁴ High staff turnover and a high resident to staff ratio make oral care a low priority for nursing staff and the nursing home administration.⁵ LTC facility administrators may not understand the implication of poor oral care/hygiene in the population, so funds may not be allocated to allow for the provision of good oral care.⁶

Good oral health in the LTC population can help protect residents from contracting potentially deadly diseases. Poor oral care correlates with an increase in systemic diseases such as circulatory disease and diabetes, and it is a prime contributor of aspiration pneumonia. Good oral care reduces the incidence of pneumonia.⁷ Dental decay, presence of cariogenic bacteria, and periodontal pathogens, all associated with poor oral care, are risk factors for aspiration pneumonia.

The oral cavity is lined with mucosa, which provides a barrier to inhibit the invasion of endogenous and exogenous microorganisms. The oral flora consists of gram-positive and gram-negative bacteria, fungi, and viruses. For LTC patients with compromised immune systems, the endogenous flora may cause infections or viral lesions. Saliva is secreted to keep the oral mucosa moist, smooth, and clean. The slightly acidic saliva contains bicarbonate and potassium, which aid in maintaining the balance of microbial flora and the mineral integrity of the teeth. Saliva also cleanses the oral cavity and teeth by removing debris, dead cells, and waste products of cellular metabolism.⁸

Older adults who are taking medications that cause xerostomia are at an increased risk for plaque-related oral diseases such as dental caries and periodontal disease. In the presence of xerostomia, the oral bacteria can thrive and are not adequately buffered by the saliva. As a result, bacterial dental plaque is more virulent and the rate of tooth decay increases as the oral environment becomes more acidic.⁹ When bacteria accumulate on the teeth, acids are produced as a byproduct of carbohydrate metabolism. As a result, the dental surface is decalcified and dental caries are formed. Untreated dental caries can cause erosion of teeth and increase the risk of developing infections.⁹

At the present time there are no formal protocols and uniform standards for best practices in oral care in LTC.
facilities. A standardized assessment tool, in addition to intervention guidelines, is imperative because CNAs receive limited education and training on oral care. This study explored the relationship between improving knowledge of oral hygiene and the impact it has on improving the oral health of the patient.

METHODS AND PARTICIPANTS

This study was conducted at an urban long-term care facility with a capacity of 816 residents. This study included the development of a 25-item oral health knowledge test (OHKT) and an educational program for CNAs. Twenty CNAs participated in this study. The mean years of experience of the participants was 9.85 (SD = 6.97). One CNA per long-term care unit was randomly selected, totaling 20 CNAs. Six residents were randomly selected from their caseloads, resulting in a patient pool of 112. Eight residents were removed from the study pool before completion of the study because of patient mortality. The CNAs were blinded to the residents selected.

An oral cavity health assessment of the residents was performed 2 weeks before the CNAs’ participation in the education program. Six areas of the oral cavity were assessed by 2 certified speech-language pathologists (SLPs) using a 4-point severity rating scale (lips, tongue, teeth, dentures, saliva, and gingiva-oral mucosa [GOM]). A 25-item OHKT was assessed for internal consistency reliability and achieved a coefficient alpha of 0.63, which exceeded conventional criteria of acceptable reliability of 0.60. The OHKT was given to all participants immediately before participating in the oral health education program. The education program was a 1-hour PowerPoint presentation with handouts and diagrams that was conducted by 2 SLPs. The education program focused on the definition of oral hygiene, the elements of good oral care, the identification of risk factors, the overlooked patient population (nil per os/nothing by mouth, dysphagic, unresponsive patient), and residents with behavior problems.

The OHKT was readministered to all CNA participants at the completion of the education program to assess the knowledge learned from the education program. The resident population was reassessed using the oral cavity health assessment following the CNA participation in the education program to determine if the health of the residents’ oral cavities improved following education.

RESULTS

Participants in the education program were all CNAs. The mean number of years of experience of the participants was 9.85. The years of experience had no relationship to knowledge outcomes.

The knowledge gained was assessed by comparing pretest and posttest scores of all participants on the OHKT. Participants demonstrated a gain of 5.29 points from pretest to posttest, indicating a significant increase in knowledge (t_{20} = 13.85, P < .01). The descriptive statistics are presented in Table 1.

Patients under the care of the staff who took part in the OHKT participated in an evaluation of their oral health prior to and subsequent to the education program. Patients were evaluated on a 4-point scale on the following oral health characteristics: lips, tongue, teeth, dentures, saliva, and GOM. A score of 1 on the scale indicated good oral health; scores of 2 to 4 indicated abnormalities in increasing severity. For example: lips that were smooth, pink, and moist were rated 1; 2 was assigned to lips that were wrinkled, slightly dry, and red; 3 was given to lips that were swollen, inflamed, and dry, with 1 or 2 blisters; and lips that were very dry, edematous, fully inflamed, ulcerated, and blistered were scored 4.

The distributions were highly skewed with very few 3s and 4s assigned; none of the mean scores on oral health were over 2.00. Therefore, a decision was made to collapse scores into 1 and 2+ and conduct cross-tabular analyses comparing preassessment and postassessment distributions on the 6 oral health criteria. Of 112 patients, 90 were identified as having normal lips (1) and 22 had abnormal lips (2+). Using the postassessment, the number of patients having an abnormality was reduced to 18 ($\chi^2 = 23.37, P < .01$). These findings indicate a significant positive change from preassessment to postassessment. Cross-tabular analysis was conducted on 77 patients for the presence or absence of debris on natural dentition.

On the postassessment, 29 were identified as having clean teeth with no debris (1) and 48 had abnormal teeth (2+). On the postassessment, the number having clean, no debris, teeth increased to 41 ($\chi^2 = 16.28, P < .01$). The cleanliness of teeth increased positively from pretest to posttest. Data analysis was conducted on 32 patients with dentures. On the preassessment, 14 were identified as having smooth, comfortable fit and no debris (1) and 18 had abnormal dentures (2+). On the postassessment, the number having normal dentures increased to 16 ($\chi^2 = 8.13, P < .01$). The number of normal dentures increased positively from preassessment to postassessment.

Cross tabulations for the health of the tongue identified 91 patients as having a healthy tongue (1) on the preassessment and 21 had an abnormal tongue (2+). On the postassessment, the number having a healthy tongue increased to 95 ($\chi^2 = 15.38, P < .01$). The health of the tongue increased positively from preassessment to postassessment.

Cross tabulations for the quality of the saliva identified 85 patients as having normal saliva (1) on the preassessment and 27 had abnormal saliva (2+). On the postassessment, the number having normal saliva increased to 92 ($\chi^2 = 15.38, P < .01$). The quality of the saliva increased positively from preassessment to postassessment. Cross tabulations for health of the gingiva and oral mucosa identified 89 patients as having healthy GOM (1) on the preassessment and 23 had abnormal GOM (2+). On the postassessment, the number having a

| Table 1. Mean Number Correct for Pretest and Posttest OHKT, N = 20 |
|------------------|------------------|
| Knowledge        | M    | SD   |
| Pretest          | 16.65| 2.44 |
| Posttest         | 21.94| 2.23 |

OHKT, oral health knowledge test.
healthy GOM decreased to 85 ($\chi^2 = 26.74, P < .01$). Health of GOM decreased from preassessment to postassessment.

Figure 1 depicts the totals of all patients with a score of (1-normal) for all categories assessed during the pre- and postassessment evaluations.

**DISCUSSION**

The purpose of this study was to assess the relationship of CNA knowledge of oral care to the patients’ overall oral health. This study found that CNA knowledge did improve with participation in an oral health education program, which in turn resulted in an improvement in the patients’ oral health. Of the 6 areas assessed using the oral cavity health assessment, 5 areas showed an improvement in health from the preassessment to postassessment.

Specifically, lips, tongue, teeth, dentures, and saliva all showed a positive improvement following the education of the CNA. The GOM was the only area to show a decline in health. The exact reason for the decline is unknown. One possibility may correlate with the improvement in cleanliness of the natural teeth. Excessive brushing of the teeth may cause irritation and a breakdown in the oral mucosa and gingiva.

**CONCLUSIONS**

To improve the oral health of LTC patients there should be a standardized protocol for the implementation of oral hygiene. Soft bristled toothbrushes remove plaque and stimulate the mucosa, as well as restore tissue tone and stimulate salivation. Sodium bicarbonate toothpaste with fluoride should be used, which can neutralize the oral cavity, and remove debris from tissue and teeth. Floss should be used whenever possible to remove plaque from between the teeth.

Mouthwash with a low alcohol content (less than 6%) is good for rinsing the mouth. If the alcohol content is greater than 6%, the mouthwash should be diluted with water. The use of lemon glycerin swabs should be avoided as they can cause drying of the oral mucosa. A water-soluble moisturizer should be applied liberally to lips and the oral mucosa to maintain hydration. Dentures and removable partials should be removed, rinsed, and brushed with denture cleaner at night to allow the mouth the breathe and placed in a disinfecting denture solution.

Oral problems can lead to needless pain and suffering, difficulty speaking, chewing, and swallowing with loss of self-esteem and higher health care costs. By establishing an oral care plan, following standardized oral care protocols, ensuring interdisciplinary collaboration, and promoting better awareness and understanding, we can overcome the barriers to poor oral health. The awareness about the relationship between good oral care and the general health and well-being of LTC patients is a mutual goal that all members of the team share.

This study looked only at short-term immediate results of an education program. The study indicates that an education program can have immediate results and positive changes and is important for overall patient care and management. Future research is needed to examine the effect education has on carryover and the role that the environment and behaviors play with oral care. Expansion of this study is needed to ensure fidelity of outcome measures and include oral health assessments at 3- and 6-month intervals.

**REFERENCES**