A DENTAL HEALTH EDUCATION
PROGRAM FOR CAREGIVERS OF ELDERLY
PEOPLE IN NURSING HOMES

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A treatise submitted in partial fulfilment
of the requirements for the degree of

MASTER OF DENTAL SURGERY

Department of Preventive Dentistry
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1992
SUMMARY

Traditionally, there has been a lack of interest in investigating the dental needs of the elderly; however, more recently, dental issues of ageing are receiving greater attention in the dental literature. Similarly, it is only recently that nurse assistants in nursing homes in Australia have been offered any formal education in learning the procedures of their jobs. A recognition of the needs of elderly people in nursing homes and the observation that nursing assistants in nursing homes did not receive any training in dental health led to the intention to design an education program to develop the knowledge, attitudes and behaviour of caregivers of elderly people in nursing homes that would prevent dental disease in their clients.

The education program was designed using strategies to ensure that the program objectives were relevant to those particular caregivers, that the information was based on an up-to-date understanding of dental disease and that the learning opportunities in the program used high quality materials and were arranged to maintain the interest of the group for the duration of the program.

The education program was implemented in six nursing homes in Western Sydney and evaluated using a process and impact evaluation to make some measurement of the acceptability and value of the program.

The process evaluation established that in general the participants of the program were satisfied with the program and that the materials and components of the program were of good quality.

The impact evaluation indicated that participants had favourable attitudes towards the dental needs of their clients before the program and that these attitudes were maintained after the program. Of the ten behaviours tested in
the impact evaluation, seven were improved after the program to a statistically significant level. Of the five questions used to test the knowledge of caregivers in the impact evaluation, two were answered better after the program to a statistically significant level.

Recommendations have been made as to the possible uses of this program through the Community Dental Health Department of Westmead Hospital Dental Clinical School, other regional health services, and in the form of a video through the Training and Resource Centre for Residential Aged Care.
ACKNOWLEDGMENTS

Firstly, I would like to thank my supervisor, Associate Professor Peter Barnard, for his encouragement and advice in the preparation of this treatise.

My colleagues in the Community Dental Health Department of Westmead Hospital Dental Clinical School have helped me by proof reading this treatise. I would particularly like to thank Dr Vern-Barnett for the large amount of time that he dedicated to proof reading.

Mrs Eve Otmar and Mrs Jenny Lo have been a tremendous help in their advice and assistance in the preparation of this treatise.

Ms Michelle Gomel and Dr Ocky Brand kindly gave their time to assist me in the preparation of the process and impact evaluations.

Finally, I thank my parents for their support and my wife, Domini, for her encouragement and patience during the preparation of this treatise.
DEDICATION

In memory of Zonie Meadowcroft
# TABLE OF CONTENTS

Summary  .................................................................................................................. ii  
Acknowledgements ................................................................................................. iv  
Dedication .................................................................................................................. v  
Table of contents ...................................................................................................... vi  
List of tables and figures .......................................................................................... viii  

1. **INTRODUCTION** ............................................................................................. 1  
   1.1 Dental needs of the elderly ........................................................................... 1  
   1.2 Dental issues of ageing .............................................................................. 2  
   1.3 The elderly in Australia ............................................................................. 5  
   1.4 Problems related to the delivery of dental care to the elderly .................. 6  
   1.5 The need for dental health education of elderly people ......................... 7  

2. **DEVELOPMENT OF THE PROGRAM** ........................................................... 9  
   2.1 Setting the aims of the program ................................................................. 9  
   2.2 Setting the objectives of the program ....................................................... 11  
       2.2.1 Cognitive objectives ........................................................................... 12  
       2.2.2 Behavioural objectives .................................................................... 19  
   2.3 Setting the strategies of the program ....................................................... 22  
   2.4 Design of the process and impact evaluation ......................................... 25  
   2.5 Implementation of the program .............................................................. 26  

3. **EVALUATION** ............................................................................................... 27  
   3.1 Process evaluation ...................................................................................... 27  
   3.2 Impact evaluation ...................................................................................... 29  
       3.2.1 Knowledge of caregivers .................................................................. 29  
       3.2.3 Behaviour of caregivers .................................................................. 30  
       3.2.3 Attitudes of caregivers ...................................................................... 32  

   vi
4. DISCUSSION .................................................... 34

4.1 The development of the program .................................. 34
4.2 Process evaluation ................................................ 38
4.3 Impact evaluation .................................................. 39
  4.3.1 Attitudes of caregivers ................................... 39
  4.3.2 Knowledge of caregivers .................................. 41
  4.3.3 Behaviour of caregivers .................................. 41
4.4 Recommendations .................................................. 45

5. CONCLUSIONS .................................................. 47

6. REFERENCES ....................................................... 49–51

7. APPENDICES ...................................................... 52
   Appendix 1 The proposed program .................................. 53
   Appendix 2 Responses to the proposed program ................. 66
   Appendix 3 Project for caregivers of elderly people .......... 84
   Appendix 4 Responses of caregivers to the project .......... 93
   Appendix 5 Dental care .......................................... 103
   Appendix 6 "Dental Care of the Elderly" ......................... 104
   Appendix 7 Process evaluation of dental health program ... 107
   Appendix 8 Impact evaluation .................................. 108
   Appendix 9 Finalised program .................................. 111
   Appendix 10 Data tables ........................................ 123
LIST OF FIGURES AND TABLES

Figure 1 Process Evaluation ........................................ 28
Figure 2 Attitudes of caregivers ................................... 33
Table 1 % Responses from 65 caregivers ....................... 27
Table 2 % Responses - Questions 1-5
for Likert scale of attitudes ................................. 32
1. INTRODUCTION

1.1 DENTAL NEEDS OF THE ELDERLY

Demographic studies around the world indicate that the number of elderly people in the world has increased greatly in the last thirty years. This trend is expected to rise even more during the next decade. Many reports confirm that the oral health of elderly people is far from satisfactory even in countries with comprehensive welfare services and available resources for oral health (FDI 1986).

There has been a lack of interest in investigating the dental needs of the elderly. This was highlighted by Sinkford (1988) in his research recommendations for oral health promotion in the elderly. He stated that:

"there are simply no recent national data on the scope of dental caries, periodontal disease, oral cancer and other soft tissue lesions, chronic facial pain, salivary disorders and tooth attrition, abrasion and loss in the elderly. Without information on the magnitude and nature of oral health problems in the elderly, it is difficult to formulate a set of priorities for research aimed at providing oral health in the aged."

It is important to note that there is no research evidence to suggest that tooth loss or specific oral diseases are a necessary concomitant of the ageing process (Gift 1988). The combination of genetic predisposition, lifestyle and socio-economic environment, exposure to fluorides, oral hygiene and home and dental visit behaviours throughout life contribute to an individual’s state of oral health in their later years. However, the ageing process can affect the many factors involved in oral diseases. More recently, dental issues of ageing are receiving more attention in dental literature and are worthy of review.
1.2 DENTAL ISSUES OF AGEING

Caries in the elderly is predominantly recurrent caries around failing restorations, cervical caries or root caries (Gift 1988). In a study conducted by Katz et al (1982) 473 caucasians of ages between 20 and 64 were examined. It was found that subjects entered their thirties with one in one hundred of their exposed root surfaces decayed and left their fifties with one in five of their exposed root surfaces decayed. The prevention of root caries by appropriate use of fluoride and dietary advice is very important since restorative approaches to root carious lesions are difficult. While fluoride traditionally has been associated with prevention of dental caries in children, evidence now exists that adults with lifelong histories of fluoridated water consumption have less root caries than those in non-fluoridated areas (Gift 1988). In addition to fluoride dentifrice, fluoride mouth rinses are recommended for groups such as institutionalised elderly who are known to be at high risk of dental caries (Leverett 1989).

The prevalence of periodontal disease appears to increase with age. This may reflect an accumulation of disease over time rather than enhanced susceptibility. The number of teeth that need to be extracted due to periodontal disease increases with age. Whether periodontal disease is episodic or steadily progressive is still undecided but evidence suggests that those persons who have retained their teeth to old age have a type of periodontitis that at any given site usually progresses slowly (Gift 1988).

Although ageing is often assumed to be associated with a reduction in salivary flow rates, there is little scientific evidence to support this (Drummond 1988). However, xerostomia is a problem faced by the elderly due to the common use of medications that cause xerostomia.
Introduction

The symptoms and effects of xerostomia are:
Generalised burning sensation of the mouth and tongue.
Generalised oral soreness.
History of repeated oral abrasions or ulcerations associated with the wearing of dentures.
Difficulty with retention of complete maxillary dentures.
Dryness of the mouth with difficulty in speaking and swallowing.

(Ettinger 1981)

Diseases of the salivary glands increase with age, especially local inflammatory diseases and Sjogrens Syndrome (Gift 1988).

The progressive impact of smoking and drinking on the development of soft tissue lesions is more apparent in older adults. The prevalence of oral cancer increases with age (Gift 1988).

There is a trend away from edentulousness in the elderly. Currently in Australia 44 per cent of the 65 years and over age group are edentulous (NOHSA 1987-88). While edentulousness is on the decrease, the fact remains that many elderly people rely on prosthesis to restore the aesthetics and function of their mouths after tooth loss. In Australia, 82.7 per cent of the population over the age of 65 years, wear a removable prosthetic appliance (NOHSA 1987-88). The use of dentures introduces the risks of angular cheilitis, denture stomatitis, ulceration, denture hyperplasia and inconvenience if dentures are fractured or lost.

In Smith and Shaharn's (1979) study of 254 elderly people, 30 per cent of subjects felt that they were limited in their ability to eat. While there was no direct correlation between the ability to chew and the fit and retention of dentures, the study did confirm that unsatisfactory dentures detract from the pleasure of eating. Food is often one of the few pleasurable experiences that older people can anticipate every day. It often plays an important social or
Introduction

religious role and is vital to psychological health (Epstein 1987). Difficulty in eating resulted in altered food selection and there were many social effects associated with this problem. Of the 254 subjects 41 per cent said that they took a long time to complete a meal which was a source of embarrassment and deterred them from eating with others. Social embarrassment was also caused by poor appearance of teeth and dentures and difficulties experienced when talking, singing and kissing. Hence, an adequate dentition, while not proven to be necessary for adequate nutrition, is important for a person to feel accepted socially.

Selected oral conditions such as lip posture, masticatory muscle function and tongue dysfunction, appear to be related to ageing. Functional problems that relate to these are labial spill of saliva, inability to prepare food for swallowing, altered speech, dysphagia, traumatic bite injury and increased mouth breathing (Homan 1988).

There are some conditions that have been attributed to ageing in the past that are in fact more related to polypharmacy, inadequate nutrition and systemic disease. These conditions are notably diminution of parotid fluid output, structural changes in epithelium, atrophic changes of oral mucosa and a generalised decrease in taste acuity and perception (Giff 1988).

Australian dental literature has also been giving more attention to dental issues of elderly people. In 1987, in the Australian Dental Association News Bulletin, there appeared the first article in what was to become an extended series under the general title of "The greying of Australia". Twenty articles spread over 4 years were then used to compile a publication of the series in a book form edited by Fred Widdop and called "The greying of Australia, Impact on dental services". Furthermore, epidemiological studies of dental disease in elderly people in Australia have appeared with some paying particular attention to the institutionalised elderly in Australia.
1.3 THE ELDERLY IN AUSTRALIA

In the Mount Olivet complex in Brisbane, a study was conducted of 238 geriatric patients and residents (Stockwell 1987). The aim of the study, which involved both interviews and clinical examination, was to determine the prevalence of oral diseases in the residents; to determine the needs and demands for treatment and to recommend an appropriate dental delivery system. The interviews revealed that oral pain was a problem for 12 per cent of the group. Difficulty with chewing affected one in every four persons. Functional problems including chewing, swallowing and speaking were identified in 49 per cent of the examinees. The complaint of loose teeth, either natural or artificial, came from 31 per cent of the group which obviously contributed to the functional problems identified. Of the group, 33 per cent felt that they needed dental treatment. In a South Australian survey of 1,658 homebound and institutionalised persons, the felt need for treatment was 22 per cent (Vowles et al 1977).

The clinical examination of the Mt Olivet patients and residents found that 41 per cent of patients with some of their own natural teeth had dental caries. Stomatitis was present in 8 per cent of denture wearers and oral ulcers in 5 per cent. The hygiene of dentures was assessed as not satisfactory in 65 per cent of denture wearers. Oral hygiene was assessed to be not satisfactory in 93 per cent of the Mt Olivet group. It was also stated that 60 per cent suffered from periodontal disease. Bergman et al (1991) suggest that periodontal health in the elderly needs to be redefined in terms such as "an adequate functional dentition". In their study of 303 aged persons in Melbourne, the need for complex periodontal treatment was demonstrably lower than expected. However, 90 per cent of subjects required scaling or removal of overhangs on restorations. In a Western Australian study of 1,144 elderly patients in institutions, 56 per cent of patients who were dentate required scaling and 17 per cent needed complex periodontal treatment (Stockwell 1987).

However, many of the dental needs of the elderly remain untreated. The FDI has investigated the reasons behind this apparent neglect.
1.4 PROBLEMS RELATED TO THE DELIVERY OF DENTAL CARE TO THE ELDERLY

In 1986, the FDI presented a report on a working group that had been appointed to study problems that related to the delivery of oral health care to the elderly. Their international survey of dentists and other health care workers revealed many issues.

Problems related to elderly individuals were that there is a lack of perceived need for oral care and that they do not value oral health. Also, problems with their health or activity in daily life can impair the delivery of dental care.

Problems related to the dentist were insufficient training for geriatric dentistry and lack of experience in treating elderly people. Furthermore, inadequate recall systems, difficult access to the dental office and lack of domiciliary care were noted.

Problems that related to society were a lack of public support for programs promoting oral health for the aged and insufficient support for research on oral health needs of the elderly.

Those elderly people who live in nursing homes are often frail, have poor manual dexterity and rely on the knowledge and skills of their caregivers to control and prevent dental disease in their mouths. Hence, programs promoting oral health for the aged in nursing homes need to focus on educating the caregivers of these people.
1.5 THE NEED FOR DENTAL HEALTH EDUCATION OF CAREGIVERS

Nurse assistants provide 70 per cent to 90 per cent of direct care to clients in nursing homes in Australia (Maguire 1991). However, until recently, nurse assistants have been denied any form of education or understanding of their job. Teaching basic procedures and development of understanding attitudes towards the problems associated with the elderly improves the quality of care as well as the morale of the staff. Most nurse assistants learn the procedures of their jobs by "baptism of fire" since usually the one and only registered nurse on duty is too busy to undertake a total induction program, or financial resources have been too limited to provide supernumary orientation. With little or no training they receive haphazard on the job training (Maguire 1991).

It is explicit in the mission of nursing homes for the elderly that the facility provides assistance in the performance of activities of daily living: partially, if possible or totally if the client is unable to participate in a useful fashion (Shay 1990). The care of teeth, dentures, and soft tissues of the mouth requires a level of manual dexterity that many elderly people in nursing homes do not possess. Ostwald et al (1989) reporting on a group of institutionalised Nuns in Minnesota showed that poor manual dexterity was a stronger predictor for placement into a dependent care situation than age or mental status. The oral state of partially dentate elderly people includes tipped teeth, bone loss, concave root surfaces and restorations with extensive margins. Plaque control for dentitions with these features requires skills that may be difficult for even persons with intact hand skills (Shay 1990).

Hoad-Reddick et al (1990) conducted a survey among 223 elderly people as to their attitudes and practices about denture cleaning. Subjects were drawn from a long term hospital, an elderly peoples nursing home, a community group with social services assistance and a similar group without assistance.
By questionnaire and examination, the effectiveness of cleaning was determined. The authors concluded that most elderly people do not know how to keep their dentures clean. Better cleaning is practised in long stay facilities than in elderly homes where residents are expected to clean their own dentures. The prevalence of denture stomatitis and angular cheilitis was twice as great in patients with dirty dentures as those with clean dentures.

The need for dental health education of caregivers of elderly people is widely acknowledged and strongly recommended by investigations into the dental needs of elderly people. In the Australian Dental Association Policy Statement on National Dental Health (1984), the dental care of the institutionalised aged was considered. One recommendation stated that:

"staff in institutions should have an appreciation of the need for dental care of the aged and should be able to assist in the maintenance of oral hygiene of the aged patient."

More recently, Dr Paterson (1991), principal dental officer of the New England Health Region, prepared a report on the dental care for aged persons. One of his recommendations was to establish an education program for caregivers of elderly people. In the United States, an oral health working group was formed to make recommendations for oral health promotion activities with older adults (Oral Health Working Group 1988). In the area of education, they recommended that:

"educational programs for current and future health care providers should improve their knowledge, attitudes and behaviour regarding primary preventive, treatment, and educational needs of older adults."

This treatise is a response to the need for a dental health education program for caregivers of elderly people.

The aim of the treatise is to design an education program for caregivers of elderly people in nursing homes to develop the knowledge, attitudes and behaviour needed for the prevention of dental disease in their clients.
2. DEVELOPMENT OF THE PROGRAM

The development of the program has been considered in the treatise in the following order.

- Setting the aims of the program.
- Setting the objectives of the program.
- Setting the strategies of the program.
- Design of the process and impact evaluations.
- Implementation of the program.

2.1 SETTING THE AIMS OF THE PROGRAM

Initially, the treatise aimed to design an education program for caregivers of disabled and elderly people that would develop the knowledge, attitudes and behaviour needed for the prevention of dental disease in their clients and to seek regular dental care for their clients. However, prior to finalising the objectives and subject material of the program, a proposed program was written and comments were sought from caregivers, dental surgeons, education officers, behavioural scientists, a dietitian and a dental therapist (Appendix 1).

The aim of the treatise was included in the proposed program and this attracted a great deal of comment. The comments that related to the aim of the treatise are recorded in Appendix 2. In view of the repeated advice that the program should not attempt to deal with both caregivers of elderly people and caregivers of disabled people, the aim of the treatise was altered. The finalised aim of the treatise is to design an education program for caregivers of elderly people in nursing homes to develop the
knowledge, attitudes and behaviours required for the prevention of dental disease in their clients.

The reason for choosing to educate caregivers of elderly people in preference to those of disabled people are:

- Caregivers of elderly people are a more easily defined group.
- The project can be aimed at nursing assistants in nursing homes.
- Nursing assistants in nursing homes are a more homogeneous group of people than caregivers of disabled people.
- The response from caregivers in nursing homes to the proposed program issued by the writer was more enthusiastic than that received from caregivers of disabled people.

Hence, the aim of the program is to develop the knowledge, attitudes and behaviours of caregivers of elderly people in nursing homes to prevent dental disease in their clients.
2.2 SETTING THE OBJECTIVES OF THE PROGRAM

The objectives of the program were finalised after using two surveys. Firstly, proposed objectives were sent to caregivers, dental surgeons, education officers, behavioural scientists, a dietitian and a dental therapist. These people were encouraged to make amendments, exclusions and additions for the purpose of finalising the objectives (Appendix 1). The comments that related to the objectives of the program are recorded in Appendix 2. Secondly, a project was designed to be completed by caregivers of elderly people in nursing homes to determine their current opinions, practices and understanding of dental issues that relate to the elderly (Appendix 3). The results of this project with qualitative comments about the short answer questions are recorded in Appendix 4.

The third factor that influenced the finalised objectives of the program was that the program would have to take the form of a one hour inservice session since this was the form used by nursing homes to train their caregivers. Hence, the proposed objectives required condensing from a practical point of view.

The proposed objectives of the program were divided into cognitive objectives and behavioural objectives. The cognitive objectives were divided into sub-sections.
### 2.2.1 Cognitive Objectives

#### Tooth decay

<table>
<thead>
<tr>
<th>Proposed objectives suggested caregivers understand:</th>
<th>Finalised objectives are that caregivers should understand:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. The combined effect that plaque and sugar have on teeth over time.</td>
<td>1a. What root decay is and why the elderly have a higher incidence of root decay.</td>
</tr>
<tr>
<td>1b. The composition of plaque.</td>
<td>1b. The value of fluoride in the control and prevention of tooth decay.</td>
</tr>
<tr>
<td>1c. What foods are considered &quot;sugary foods&quot;.</td>
<td></td>
</tr>
<tr>
<td>1d. What root decay is and why the elderly have a higher incidence of root decay.</td>
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</tr>
<tr>
<td>1e. How to identify the signs and symptoms of tooth decay.</td>
<td></td>
</tr>
<tr>
<td>1f. The value of fluoride in the control and prevention of tooth decay.</td>
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</table>

After consideration of responses, proposed objectives 1a, 1b, 1c, and 1e, which related to dental caries were deleted. These were deleted since in the project completed by caregivers, 91 per cent answered correctly that tooth decay is caused by plaque and sugar on a tooth over a period of time, and the short answers to questions testing their knowledge on dental plaque, signs of tooth decay and which foods are cariogenic, were well answered.

Proposed objective 1d was included in the final objectives since in the project completed by caregivers 69 per cent of caregivers thought that the roots of teeth could resist tooth decay as much as the crowns of teeth.

Proposed objective 1f was included in the finalised objectives since in the project completed by caregivers 47 per cent of caregivers thought that fluoride was most important for children but has little effect on the natural teeth of elderly people and 22 per cent were unsure about this concept.
Diet

<table>
<thead>
<tr>
<th>2a. The way that the mouth's acidity is affected by eating different types of foods.</th>
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<tr>
<td>2b. General dietary advice that will reduce the number of acid attacks and the duration of those acid attacks.</td>
</tr>
<tr>
<td>2c. The effect that saliva has in neutralising acids in the mouth.</td>
</tr>
<tr>
<td>2d. Why some patients have a poor flow of saliva and how to help them minimise the detrimental effects of dry mouth.</td>
</tr>
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</table>

The proposed objectives in relation to diet remained relatively unchanged other than simplifying objective 2a. In the project completed by caregivers only 30 per cent of caregivers ever made suggestions to their clients about how to modify their diets. Hence, one of the finalised behavioural objectives includes implementation of general dietary advice that aims to prevent tooth decay.

When asked about advice to offer clients with dry mouths, drinking regularly was well recorded, however, the use of artificial saliva was not noted by any of the caregivers.
**Gum disease and oral hygiene**

<table>
<thead>
<tr>
<th>3. Re: gum diseases, the proposed objective suggested that caregivers should understand:</th>
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<tbody>
<tr>
<td>3a. What supports a tooth in the mouth.</td>
</tr>
<tr>
<td>3b. What gingivitis and periodontal disease are.</td>
</tr>
<tr>
<td>3c. What causes these diseases and how they can be prevented and treated.</td>
</tr>
<tr>
<td>3d. The signs and symptoms of gum diseases.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>4. Re: oral hygiene, the proposed objective suggests that caregivers should understand:</th>
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<tbody>
<tr>
<td>4a. How to assess if a client is not carrying out adequate oral hygiene.</td>
</tr>
<tr>
<td>4b. A correct technique of toothbrushing.</td>
</tr>
<tr>
<td>4c. What toothbrush aids are available and when they are indicated.</td>
</tr>
<tr>
<td>4d. Bathroom design to make toothbrushing an accessible activity.</td>
</tr>
<tr>
<td>4e. How to overcome the problems involved in carrying out toothbrushing on clients who are unable to clean their own mouths adequately.</td>
</tr>
<tr>
<td>4f. How to decide which toothpaste to buy.</td>
</tr>
<tr>
<td>4g. The need to clean the soft tissues of the mouth where no teeth are present.</td>
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</table>

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<thead>
<tr>
<th>3. Re: gum diseases and oral hygiene, the finalised objectives are that caregivers should understand:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a. What causes gum diseases and how they can be prevented and treated.</td>
</tr>
<tr>
<td>3b. How to overcome the problems involved in carrying out toothbrushing on clients.</td>
</tr>
<tr>
<td>3c. That tooth brushing is a difficult procedure and elderly people in nursing homes will all require assistance to do a thorough job.</td>
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</table>

In the project completed by caregivers, responses to short answer questions indicated an awareness that gum problems are a major cause of tooth loss in the elderly, that failure to remove plaque is a major factor in the occurrence of gum problems, that bleeding gums are a sign of gum disease, that tooth brushing helps prevent gum disease and that the term gingivitis is a description of a type of gum disease. In light of their existing understanding of gum diseases and the time permitted to run the program, the proposed cognitive objectives relating to gum problems were condensed into one simple finalised objective, 3a.
Only 52 per cent were sure that the statement "if the gums bleed during brushing, the gums should be avoided when brushing" was false. Hence, it is important that this misconception be pointed out in the material used to satisfy finalised objective 3a.

The proposed objectives for oral hygiene were written when the aim of the proposed program included reaching caregivers of disabled and elderly people. Since the aim of the program was changed to reach caregivers of elderly people in nursing homes, the objectives in relation to oral hygiene have been altered considerably. The program will suggest that all elderly people in nursing homes require assistance to thoroughly clean their teeth, dentures and soft tissue since lack of dexterity is one of the primary factors that leads to the institutionalisation of elderly people. Hence, proposed cognitive objectives 4a and 4b, are represented in the finalised cognitive objective 3c and finalised behavioural objective 2. It should be noted that the proposed cognitive objective 4g is represented in the finalised behavioural objective 6. All caregivers surveyed said that they are willing to clean the natural teeth of all their clients.

Proposed objective 4e was included in the finalised objectives as 3b since the survey of caregivers revealed 8 different difficulties that caregivers experienced when attempting to brush client's teeth.

Proposed objectives 4c, 4d, and 4f, are also not significant in light of the fact that the program will be directed to caregivers in nursing homes, rather than caregivers of disabled people who would have needed to teach the use of adapted tooth brushes, influenced bathroom design and determined which toothpaste they should buy.
Denture care

<table>
<thead>
<tr>
<th>5. Re: care of dentures, the proposed objectives are that caregivers should know:</th>
<th>4. Re: care of dentures, the finalised objectives are that caregivers should know:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a. A correct technique for cleaning dentures.</td>
<td>4a. A safe technique for cleaning dentures.</td>
</tr>
<tr>
<td>5b. Which cleaning aids are recommended.</td>
<td>4b. Which cleaning aids are recommended.</td>
</tr>
<tr>
<td>5c. The problems denture wearers can suffer and solutions to these problems. eg. sore spots, ill-fitting, thrush.</td>
<td>4c. The problems denture wearers can suffer and the need for regular dental examination for denture wearers.</td>
</tr>
<tr>
<td>4d. The need to have all dentures marked with the client's name or initials.</td>
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Proposed objective 5a, was altered to "a safe technique for cleaning dentures". The suggestion to use a safe technique comes from the recommendation from a dental surgeon working in the Community Dental Health Department of Westmead Hospital Dental Clinical School (Appendix 2). Furthermore, in the caregivers surveyed few took any precautions against breaking the denture when cleaning beyond being careful. However, in the project completed by caregivers 88% were aware that dentures are fragile and can break if they are dropped into a porcelain basin or sink. The proposed objective 5b was retained as finalised objective 4b since the majority of the caregivers surveyed use toothpaste which is too abrasive to brush the dentures of their clients. The importance of marking dentures was emphasised by a nurse educator on the proposed objectives (Appendix 2) so it was added to the list of objectives, however, in the project completed by caregivers 94 per cent said that their clients dentures were marked with their initials. However, this objective was included since the importance of this practice for institutionalised people is great and should be reinforced.

In the project completed by caregivers only one caregiver was not willing to clean the dentures of all their clients; however, 48 per cent do not ensure that the soft tissues of the mouth are cleaned. The need for these practices were included in the finalised behavioural objectives 5 and 6.
6. Proposed objective that caregivers should understand the nature of other dental problems such as pericoronitis, temporomandibular joint pain, discoloured anterior teeth, worn teeth and oral cancer.

This objective was deleted from the finalised objectives since the concepts were thought to be very complicated by a nurse education course co-ordinator (Appendix 2) and the restriction of presenting the program in one hour requires condensing the objectives of the program. Oral cancer will be dealt with in finalised cognitive objective 4c.

7. Proposed objective that caregivers should understand the importance of having a thorough medical history of the client when the client presents for a dental appointment.

This objective was changed to finalised behavioural objective 7. Dental surgeons in the Community Dental Health Department of W.H.D.C.S. are frequently impeded by unavailable information from caregivers who bring clients to dental appointments.
In summary, the finalised cognitive objectives are

1. **In relation to tooth decay,**
caregivers should understand:
   a. What root decay is and why the elderly have a higher incidence of root decay.
   b. The value of fluoride in the control and prevention of tooth decay.

2. **In relation to diet,**
caregivers should understand:
   a. General dietary advice that will reduce the risk of tooth decay in the elderly.
   b. Why some patients have a poor flow of saliva, the importance of saliva and how to help them minimise the detrimental effects of dry mouth.

3. **In relation to gum diseases and oral hygiene,**
caregivers should understand:
   a. What causes gum diseases and how they can be prevented and treated.
   b. How to overcome the problems involved in carrying out toothbrushing on clients.
   c. That tooth brushing is a difficult procedure and elderly people in nursing homes will all require assistance to do a thorough job.

4. **In relation to the care of dentures,**
caregivers should know:
   a. A safe technique for cleaning dentures.
   b. Which cleaning aids are recommended.
   c. The problems denture wearers can suffer and the need for regular dental examination for denture wearers.
   d. The need to have all dentures marked with the client’s name or initials.
2.2.2 Behavioural objectives

<table>
<thead>
<tr>
<th>The Proposed behavioural objectives were that caregivers will:</th>
<th>The finalised behavioural objectives are that caregivers will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Seek professional dental care for new clients and organise annual dental check-ups for all clients.</td>
<td>1. Seek professional dental care for new clients and organise regular dental check-ups for all clients.</td>
</tr>
<tr>
<td>2. Teach their clients how to perform thorough oral hygiene on a daily basis if the clients are capable of doing this.</td>
<td>2. Carry out thorough tooth brushing using a fluoride toothpaste on a daily basis for clients who have some remaining teeth.</td>
</tr>
<tr>
<td>3. Carry out thorough oral hygiene on a daily basis on those clients who are not able to clean their mouths adequately.</td>
<td>3. Implement the use of a fluoride mouthrinse or spray during the day for clients who have some of their own natural teeth.</td>
</tr>
<tr>
<td>4. Employ the use of plastizote or electric tooth brushes when indicated.</td>
<td>4. Implement general dietary advice that aims to prevent tooth decay.</td>
</tr>
<tr>
<td>5. Select a toothpaste appropriate to the client's need.</td>
<td>5. On a daily basis, thoroughly clean the dentures of clients</td>
</tr>
<tr>
<td>6. Implement general dietary advice that aims to prevent tooth decay.</td>
<td>6. On a daily basis, thoroughly clean the soft tissues of the mouth where no teeth are present.</td>
</tr>
<tr>
<td>7. Identify those clients that suffer from dry mouth. Encourage these clients to follow the dietary advice suggested for dry mouth patients.</td>
<td>7. Ensure that a thorough medical history accompanies all clients when they attend a dental appointment.</td>
</tr>
<tr>
<td>8. Teach those clients who are able to clean their dentures how to do a thorough job on a daily basis.</td>
<td>8. Adopt an attitude such that they:</td>
</tr>
<tr>
<td>9. On a daily basis, thoroughly clean the dentures of those clients that are not able to do this themselves.</td>
<td>a. Believe that their clients are susceptible to dental disease.</td>
</tr>
<tr>
<td>10. Identify clients that are having problems with their teeth, oral soft tissues, dentures or temporomandibular joint, and to seek help for their problems.</td>
<td>b. Believe that dental disease is severe enough to interfere with some aspect of their clients' lives.</td>
</tr>
<tr>
<td>11. Ensure that a thorough medical history accompanies all clients when they attend a dental appointment.</td>
<td>c. Believe that the benefits of taking preventive action outweigh the difficulties involved in implementing preventive action.</td>
</tr>
<tr>
<td>12. Adopt an attitude such that they:</td>
<td></td>
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</tbody>
</table>
Proposed behavioural objective 1 was retained in the finalised objectives even though in the project completed by caregivers 84% recorded that their nursing home has a system to ensure all clients received regular dental check-ups. It was retained as an objective since it is a practice that is important to endorse.

Proposed behavioural objective 2 and 3 have been removed in the finalised behavioural objectives and replaced with finalised behavioural objective 2. This is consistent with the change in aim of the program from one directed to caregivers of elderly and disabled people to one directed at caregivers of elderly people in nursing homes where the advice offered by the course in relation to the cleaning of teeth, dentures, and soft tissues is that all clients require assistance. Hence, for the same reason, proposed behavioural objective 8 and 9 were replaced by finalised objectives 5 and proposed behavioural objectives 4 and 5 were not included in the finalised program at all as they were more appropriate for caregivers of disabled people.

Finalised behavioural objective 3 has been added since the project completed by caregivers indicated an awareness of fluoride mouthrinses; however, on questioning the matrons of each nursing home used in the projects, none had fluoride mouthrinses available for their clients although other types of mouthrinses such as Ultrafresh were available. Furthermore, the project completed by caregivers indicated that while 40 per cent thought that clients should have their teeth brushed more than twice a day, only 9 per cent recorded this occurring in their nursing home. Hence, the program will encourage nursing homes to use a fluoride mouthrinse for clients with some of their own teeth after lunch if toothbrushing with fluoride toothpaste is not possible.
Proposed behavioural objective 6 was included in the finalised behavioural objectives for the reasons discussed previously under cognitive objectives in relation to diet.

Proposed behavioural objective 7 was not included in the finalised behavioural objectives since an understanding of this problem in elderly people was demonstrated in the project completed by caregivers and the important advice referring to the dry mouth client will be covered by the finalised cognitive objective 2d.

Proposed behavioural objective 10 was excluded for the reasons discussed under proposed cognitive objective 6 and proposed behavioural objective 11 was included for the reasons discussed under proposed cognitive objective 7.

Behavioural objective 12 was included in the finalised objectives since it is the basis of the health belief model that preventive action will not be taken unless these attitudes exist. A preliminary assessment of these attitudes was taken in the project completed by caregiver and from viewing the results in Appendix 4 it can be seen that the caregivers already have favourable attitudes that imply a preparedness to implement preventive dental care for their clients. The program will aim to endorse these attitudes and to use these attitudes to encourage changes in their knowledge and behaviour.
2.3 SETTING THE STRATEGIES OF THE PROGRAM

Traditionally, nursing homes educate their nursing assistants by on the job training and inservice courses. The inservice courses are usually given on a weekly basis. The most common time for inservice courses are at the change of shift in midafternoon. Inservices for assistants in nursing are one hour long. In light of these restrictions it was apparent that the program was required to be less than 50 minutes long with 10 minutes prior to the inservice used for the caregivers to complete the pre-test to be used for evaluating the program. Furthermore it must be able to keep the attention of one group of caregivers that had just completed one shift and another who were about to begin a shift starting in the afternoon.

In an effort to maintain the attention of the group the program was designed to move between the use of slides, discussion, activity and audiovisual material.

Resources used for the audiovisual material and the slide series were:

Part thereof the video "It's a mouthful", produced by Westmead Hospital Dental Clinical School.


Slides generated using 35mm software.

Slides from the Community Dental Health Department Slide Collection, Westmead Hospital Dental Clinical School.
Summary of final program

The format of the program is as follows:

Introduction of the program and request of participants to fill out a pre-test (Appendix 8). Participants were told that they would be asked to redo this test in one month from that date for the purpose of evaluating the program. (10 minutes)

A slide series with accompanying lecture on tooth decay, diet, fluoride, oral hygiene and gum problems. (15 minutes)

Encouragement of discussion on the slide series with suggested discussion points. (5 minutes)

A video teaching the care of dentures. (10 minutes)

Encouragement of discussion of the audiovisual with suggested discussion points. (5 minutes)

An activity to make the caregivers aware of how to hold and brush dentures correctly. (5 minutes)

A slide series with accompanying lecture on problems denture wearers experience. (5 minutes)

Participants were asked to fill out a process evaluation of the program (Appendix 7).

After the inservice the matron of the nursing home is given a set of recommendations on dental care to be included in the procedures manual.
of the nursing home (Appendix 5). It was suggested that a second copy of these recommendations be displayed in a place accessible to the caregivers.

If the matron did not attend the inservice, the matron is referred to the article "Dental Care of the Elderly" by Dr. P.L. King in the 1992 Spring edition of Geriaction (Appendix 6). Geriaction is commonly subscribed to by matrons of nursing homes.

One bottle of Colgate Dentamint topical fluoride solution was given to the matron of each nursing home as a sample of a fluoride mouthrinse that could be used for dentate clients. These samples were donated by Colgate.

The finalised program can be found in Appendix 9 with each part of the program recording which of the objectives it is aimed to fulfil. Amendments, exclusions and additions made to the proposed subject material by dental surgeons, education officers, behavioural scientists, a dietitian and a dental therapist (Appendix 3) were used to ensure the accuracy of the content in the finalised program.
2.4 DESIGN OF THE PROCESS AND IMPACT EVALUATION

A process evaluation was designed to assess whether the caregivers are satisfied with the program and whether they find the components and materials of the program of good quality or not. (Appendix 7)

An impact evaluation was designed to assess the impact that the program has on the knowledge, behaviours and attitudes of the caregivers. A lesser emphasis was placed on testing knowledge since the time required to test all of the cognitive objectives of the program would have hindered the ability to present the program in the time permitted by the nursing home.

Both the impact and process evaluation requested that the caregivers did not write their name on the evaluations. This instruction was included to encourage honest responses from the caregivers.

The process and impact evaluation were designed with the assistance of Ms Michelle Gomel, Research Officer, Department of Health promotion and Dr Ocky Brand of the University of Witwatersrand.
2.5 IMPLEMENTATION OF THE PROGRAM

Arrangements were made at 6 nursing homes to pre-test the caregivers and present the program. A total of 65 caregivers attended the program. All nursing homes were requested to have a VCR and a television screen available as well as a wall available to be used for the projection of slides. The program was presented by the writer in every nursing home, introducing himself as a dental surgeon who works in the Community Dental Health Department of Westmead Hospital Dental Clinical School. In the first 10 minutes of the program, after a brief introduction, the caregivers each filled out the pre-test which is the first part of the impact evaluation (Appendix 8). At the end of the 45 minute program the caregivers were asked to fill out a process evaluation (Appendix 7). One month later the writer returned to each nursing home and each of the caregivers who attended the program filled out the post-test; the second part of the impact evaluation. The post-test contained identical questions to the pre-test. Four of the caregivers had left their jobs leaving 60 caregivers. All of the remaining 60 caregivers completed the post-test one month after they had received the program.

There is a discrepancy in the number of caregivers who filled in the process evaluation (65) and the number who filled in the pre-test (64). This is simply due to the fact that one caregiver arrived too late to fill in the pre-test; however, attended the program and thus was able to fill in the process evaluation at the conclusion of the program.
3. EVALUATION

In the process evaluation 65 caregivers gave responses. In the impact evaluation 64 caregivers were pre-tested, and 60 caregivers were post-tested after one month had lapsed after the dental health education program. Appendix 10 contains the data tables used to analyse these results. The 4 caregivers that were not post-tested had resigned from their jobs. The results have been grouped into 4 sections. Firstly, the process evaluation; secondly, five questions dealing with the knowledge of caregivers; thirdly, ten questions dealing with the behaviours of caregivers and finally; five questions dealing with the attitudes of caregivers.

3.1 PROCESS EVALUATION

The results of the process evaluation are displayed in the Table 1 and graphically represented in Figure 2. A score of 5 is the most favourable response except for the response to "Too short/too long" where 3 is the best response.

Table 1 % Responses from 65 caregivers

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical</td>
<td></td>
<td></td>
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<td>Too long</td>
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<tr>
<td>Encouraging</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Well done</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Informative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Good visual aids</td>
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</tbody>
</table>

27
Figure 1  Process Evaluation

Not practical/Practical

Too short/Too long

Discouraging/Encouraging

Poorly done/Well done

Not informative/Informative

Poor visual aids/Good visual aid
3.2 IMPACT EVALUATION

3.2.1 Knowledge of caregivers

Of the 5 true/false questions used to test the knowledge of caregivers, two were answered significantly better in the post-test compared with the pre-test.

These questions were:

*Question 1. Fluoride is most important for children but has little effect on the natural teeth of elderly people.*

50% improvement in the correct response, from 61% answering false in the pre-test to 92% in the post-test.

Significant, \( t = 4.4 \)

*Question 3. Toothpaste is the recommended cleaning agent for dentures.*

47% improvement in the correct response, from 50% answering false in the pre-test to 73% in the post-test.

Significant, \( t = 2.7 \)

The remaining three questions did not show a significant difference in the correct response in the post-test compared with the pre-test.

These questions were:

*Question 2. The roots of teeth decay more easily than the crowns of teeth.*

Answered correctly as true by 50% in the pre-test.

Answered correctly as true by 48% in the post-test.

Not significant, \( t = 0.2 \)

*Question 4. Where no natural teeth are present, the mouth does not require any cleaning.*

Answered correctly as false by 98% in the pre-test.

Answered correctly as false by 97% in the post-test.

Not significant, \( t = 0.3 \)
Question 5. If the gums bleed during tooth brushing, they should not be brushed. Answered correctly as false by 84% in the pre-test.
Answered correctly as false by 88% in the post-test.
Not significant, t=0.5

3.2.2 Behaviour of caregivers

Of the ten yes/no questions used to assess the behaviours of caregivers, seven were significantly different in the post-test compared to the pre-test. All seven indicated an improvement in behaviour.
These were:

Question 6. I actively discourage clients from eating lollies throughout the day.
125% improvement in the best response from 28% answering yes in the pre-test to 63% in the post-test.
Significant, t=4.2

Question 7. I actively encourage clients to use artificial sweeteners in their tea or coffee.
240% improvement in the best response from 18% answering yes in the pre-test to 60% in the post-test.
Significant, t=5.2

Question 8. I ensure that a fluoride toothpaste is used every time a client’s teeth are brushed.
31% improvement in the best response from 65 % answering yes in the pre-test to 85% in the post-test.
Significant, t=2.6

Question 9. I clean the natural teeth of all my clients for them.
32% improvement in the best response from 58% answering yes in the pre-test to 76% in the post-test.
Significant, t=2.2
Question 11. Every time I clean a client's dentures over a sink, I place a facewasher in the sink or fill the sink with water.
86% improvement in the best response from 48% answering yes in the pre-test to 90% in the post-test.
Significant, t=5.7

Question 14. I use fluoride mouthrinse to apply fluoride to my client's teeth.
334% improvement in the best response from 16% answering yes in the pre-test to 68% in the post-test.
Significant, t=6.8

Question 15. I clean the gums of those clients who have full dentures.
58% improvement in the best response from 51% answering yes in the pre-test to 80% in the post-test.
Significant, t=3.6

The remaining three questions did not show a significant difference in the best response in the post-test compared with the pre-test.

They were:

Question 10. When I accompany a client to a dental visit, I ensure that a thorough medical history of the client is available for the dentist.
Answered yes in the pre-test by 84%
Answered yes in the post-test by 84%
Not significant, t=0

Question 12. I sometimes clean clients' dentures in the shower receptacle during their shower time.
Answered no (best response) in the pre-test by 52%
Answered no in the post-test by 65%, a 24% improvement.
Not significant, t=1.4

Question 13. I clean all of my client's dentures for them.
Answered yes in the pre-test by 73%
Answered yes in the post-test by 73%
Not significant, t=0
3.2.3 Attitudes of caregivers

The results of each of the five questions testing the attitudes of caregivers are shown in Table 2 and graphically presented in Figure 2. The total weighted score for attitudes in the pre-test was 1309. The total weighted score for attitudes of caregivers in the post-test was 1258. With a chi value of 5.7 this difference in total weight was not significant.

Table 2  % Responses- Questions 1-5 for Likert scale of attitudes

<table>
<thead>
<tr>
<th>Quest</th>
<th>SAg</th>
<th>Ag</th>
<th>UDe</th>
<th>DA</th>
<th>SDA</th>
<th>SAg</th>
<th>Ag</th>
<th>UDe</th>
<th>DA</th>
<th>SDA</th>
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<td>0</td>
<td>75</td>
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<tr>
<td>3</td>
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<td>39</td>
<td>9</td>
<td>25</td>
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<td>25</td>
<td>2</td>
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<tr>
<td>4</td>
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<td>46</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>28</td>
<td>55</td>
</tr>
</tbody>
</table>

Questions

1. Dental disease can be severe enough to interfere with aspects of your clients’ lives.

2. It is important for elderly people in nursing homes to get preventive dental care.

3. Caregivers require special skills to maintain oral health for their clients.

4. Since most elderly people in nursing homes who have some teeth will eventually lose those teeth, regular dental check-ups are not important.

5. For those elderly people in nursing homes who have none of their own natural teeth, regular dental check-ups are not important.
Figure 2  Attitudes of caregivers

Question 1

Question 2

Question 3

Question 4

Question 5

Fig 2
4. DISCUSSION

4.1 THE DEVELOPMENT OF THE PROGRAM

An education program for caregivers of elderly people in nursing homes has been designed to develop the knowledge, attitudes and behaviour needed for the prevention of dental disease in their clients. In designing the education program, strategies were adopted to ensure that: the program objectives were relevant to these particular caregivers; the information was based on an up to date understanding of dental diseases and the learning opportunities in the program used high quality materials and were arranged to maintain the interest of the group for the duration of the program.

The use of a proposed program to obtain qualitative comments from caregivers, education officers, dental surgeons, behavioural scientists, a dietician and a dental therapist proved to be very useful. Some 18 individuals made comments on the aim, proposed objectives and subject material of the program. One group of 12 caregivers from the Department of Family and Community Services also made comments. The comments had a large impact on finalising the aim of the program and those made by dental surgeons about the subject material ensured that the information in the program was an accurate and contemporary understanding of dental disease. The dental surgeons chosen for comment were either specialists, training to be specialists, had experience in the dental needs of elderly people, or experience in dental health education.

The use of the questionnaire to gain an insight into the current knowledge, behaviours, and attitudes of caregivers of elderly people, (Appendix 3) proved useful. Of the 50 questionnaires distributed between 3 different nursing homes, 33 were returned. This response rate of 66 per cent is only
satisfactory. Since the people who respond to invitations to co-operate with a survey are generally different from those people who refuse, a 65 per cent or better response rate should be aimed for (Hawe et al 1990). The length of the questionnaire may have been a deterrent to many caregivers. There were 3 demographic questions, 19 short answer questions, 38 questions requiring the caregiver to tick a box in response to a statement and 6 statements that required responses using the Likert scale for attitudes. Subsequent users of this strategy to assist in dental health program planning may need to consider how many questions the group being surveyed are prepared to answer in order to improve the response rate. The second difficulty encountered with the questionnaire was that the nursing homes were slow to recover the completed questionnaires from the caregivers or the caregivers were slow to complete the questionnaires. It would be advisable to include in the covering letter a particular date that the completed questionnaires would be collected. This may help to overcome this problem. The third difficulty encountered with the questionnaire was the qualitative assessment of the answers to the short answer questions. It was difficult to make general comments from 33 different questionnaires.

Since the program was required to fit into a one hour period to gain acceptance in nursing homes, it was important to exclude material that was already understood by the caregivers or deemed to be of little importance. Furthermore, the questionnaire highlighted misconceptions that caregivers had in relation to dental health which could be addressed in the program. The finalised objectives were largely determined by this questionnaire.

The section testing the attitudes of caregivers was useful to predict the likely acceptance of the program by the caregivers. A positive acceptance of the program was predicted since 84 per cent of the caregivers questioned either agreed or strongly agreed that a dental health education
program for caregivers of elderly people should be a compulsory component of their education. Furthermore, their attitudes reflected positive attitudes towards the components of the health belief model which states that people are unlikely to take health action unless they believe that they are susceptible to the disease, that they believe that the disease has serious effects on their lives, that there is benefit in taking preventive action and that the problems of taking action are not greater than those of the disease itself (Locker 1989). Based on these results, it was anticipated that caregivers of elderly people would be prepared to change their behaviour if they were given an appropriate learning opportunity.

Important demographic information was also obtained using the questionnaire. The majority of the caregivers (94 per cent) were female, and all age groups were represented from late teens onwards. Half of the caregivers had no educational qualification past the school certificate. This is consistent with expectations based on the experience of community dental health officers who visit nursing homes and interact with caregivers who accompany nursing home clients to the clinic in Westmead Hospital Dental Clinical School.

Once the aims and objectives of the program had been established, high quality teaching resources were sought to make the presentation of the program interesting and engaging. A strong emphasis on moving between slide presentation, discussion, video, and activity was made to ensure the attention of the caregivers was maintained. Most nursing homes requested that the program be presented in the afternoon on the change of shift which is a time when many of the caregivers may be tired. Materials of established acceptance were used including the video "It's a Mouthful" and slides from the series "The dental problems of the elderly" by John Christensen. It would be more ideal to have created a video presentation specifically designed to meet the objectives of the program; however,
resources would not permit this at the time. Instead, the video "It’s a mouthful" was edited and any unmet objectives in relation to the care of dentures and the edentulous were covered using the slide series.

The teaching materials were compiled in a presentable format and a check was made that all the objectives of the program had been given attention in the finalised program’s presentation. This was ensured by recording which objective was being dealt with by each part of the finalised program in Appendix 9.

All of the 6 nursing homes visited with the program were well organised since inservice training in the nursing homes is a regular feature. All nursing homes had a video facility. The program was always presented within the one hour restriction, including ample time for discussion, pre-testing and process evaluating. The program was presented by the writer at each nursing home and the writer introduced himself as a dental surgeon working in the Community Dental Health Department of Westmead Hospital Dental Clinical School.
4.2 PROCESS EVALUATION

The process evaluation consisted of 6 pairs of words or phrases with numbers 1 to 5 between them. The scale was used to determine the caregivers’ responses to the program immediately after its completion.

The process evaluation of the program indicates a positive view of the program by the caregivers. Over 90 per cent of all caregivers scored 4 or 5 on a scale of 1 to 5 to describe the course as encouraging, well done, informative, and having made good use of visual aids. Most scored 4 or 5 to describe how practical the course was (84 per cent) and 6 per cent scored 1 to describe the course as impractical. Most of caregivers scored 3 to describe whether the program was too long or too short (65 per cent) which indicates that the majority found the length of the program to be just right. There were more caregivers who found the program too long than those who found it too short. The program lasted one hour which included time to fill out the pre-test and the process evaluation. The use of this program will not always require the pre-testing which will reduce the time of the program by 10 minutes.

The process evaluation deals with whether the program is reaching the target group, whether participants are satisfied with the program, whether all the activities of the program are being implemented and if all the materials and components of the program are of good quality (Hawe et al 1990). The nature of this program being designed to go to the target group and address them in their place of work ensures that the intended group of people is being reached by the program. It was recommended that the matron include the handout “DENTAL CARE” (Appendix 5) in their procedures manual and that a copy is displayed in the nursing home in a place accessible to the caregivers. There was no check done to see if this recommendation was adopted. The process evaluation did establish that in general the participants were satisfied with the program and that the materials and components of the program were of good quality.
4.3 IMPACT EVALUATION

4.3.1 Attitudes of caregivers

Using the Likert scale to test the attitudes of caregivers, questions 1 and 2 indicate positive attitudes about the need for preventive care and the impact of dental disease. In the pre-test, 7 per cent of the caregivers were either undecided or disagreed that dental disease can be severe enough to interfere with aspects of their clients' lives. In the post-test all caregivers either agreed or strongly agreed with the statement. Hence the majority started the program with this positive attitude and one month after the program all caregivers had this favourable attitude. The second question addressed the importance of clients receiving preventive dental care. In the pre-test a positive attitude towards preventive care was indicated with all caregivers either agreeing or strongly agreeing with the statement. This attitude was maintained in the post-test.

However, the need for regular dental check-ups was not as well supported in both the pre-test and the post-test. Questions 4 and 5 addressed this issue. In regards to regular dental check-ups for clients with some of their own teeth, 24 per cent of the caregivers were either undecided, agreed or strongly agreed that check-ups were not important. This attitude remained unchanged by the program since 26 per cent responded in the same way in the post-test. Furthermore, 18 per cent of the caregivers were either undecided, agreed or strongly agreed that for clients who had none of their own natural teeth left, regular dental check-ups are not important. This attitude remained unchanged by the program since in the post-test 17 per cent responded in the same way.

Some inconsistencies were revealed in the results. Firstly, a strong positive response to the importance of preventive dental care for the elderly was not met by an equally strong positive response to their need for regular dental check-ups. Secondly, more caregivers agreed that regular dental check-ups were not important for clients with some of their natural teeth
compared with those with no natural teeth. One possible explanation for these inconsistencies is that some of the caregivers did not understand that questions 4 and 5 were written as a negative attitude unlike questions 1 and 2. In the project completed by caregivers (Appendix 4), half of the caregivers did not have an educational qualification past the school certificate. Hence, it is possible that the complication of the Likert scale combined with the presentation of a statement made in the negative may have confused some of the caregivers' responses. Alternatively, the inconsistency between question 2 and those of questions 4 and 5 may indicate that regular dental check-ups are not considered a part of preventive dental care by the caregivers.

The third question asked if caregivers require special skills to maintain oral health for their clients. In the pre-test 37 per cent were either undecided, disagreed or strongly disagreed that caregivers require special skills to maintain oral health for their clients and in the post-test 32 per cent responded in the same way. While the discussion about the behaviours of caregivers will highlight the fact that caregivers did change their behaviour after the program, it appears that they do not perceive these new behaviours as being special skills.

Caregivers entered the program with favourable attitudes and these attitudes were maintained after the program. The attitudes of the caregivers reflect a belief that dental disease is a significant problem for the elderly and that it is important for elderly people in nursing homes to get preventive dental care. In conjunction with the attitudes test given to caregivers in the project prior to finalising the program, it can also be said that caregivers believe that they should receive dental health education and that their response to advice on how they can change their behaviours to improve the dental health of their clients should be favourable.
4.3.2 Knowledge of caregivers

Five questions testing knowledge were included on the impact evaluation. This is not an adequate number to make a general comment about the effect that the program had on the knowledge of caregivers. The time required to test all of the cognitive objectives of the program would have hindered the ability to present the program in the time permitted by the nursing home. Furthermore, there is no guarantee that a change in knowledge will result in a change in behaviour. Hence, an emphasis on asking about behaviours is present in the impact evaluation. The questions testing knowledge will be discussed concurrently with those testing behaviour so that the consistencies of knowledge and behaviour can be seen.

4.3.3 Behaviour of caregivers

Tooth decay

The concept that fluoride is most important for children but has little effect on the natural teeth of elderly people showed a 50 per cent improvement in the correct response. This is consistent with an increase (334 per cent) in the number of caregivers who said in the post-test that they used a fluoride mouthrinse to apply fluoride to their clients' teeth. Furthermore, it is consistent with the 31 per cent increase in the number of caregivers in the post-test who ensure that a fluoride toothpaste is used every time a client's teeth are brushed. These results indicate a good response to the information stressing the importance of fluoride for the elderly and the value of toothpaste as well as mouthrinses to apply the fluoride.

It was hoped that caregivers would learn that the elderly are at a high risk of dental decay due to the susceptibility of the roots of teeth to tooth decay. The question used to test this knowledge showed that 50 per cent
did not know that the roots of teeth decay more easily than the crowns of teeth and in the post test 52 per cent answered the same way.

When asked which caregivers ensured that a thorough medical history of the client accompanied them to a dental visit, 84 per cent responded yes in both the pre-test and the post-test.

In relation to tooth decay the program had the impact of:
- improving the knowledge of the caregivers about the value of fluoride for elderly people.
- improving the behaviour of caregivers in the application of fluoride using mouthrinses and toothpaste.

Oral hygiene and gum disease

The majority of caregivers (84 per cent) were already aware prior to the program, that the statement "If the gums bleed during toothbrushing, the gums should not be brushed" was false. However, there was a 32 per cent increase in the post-test in the number of caregivers who clean the natural teeth of all their clients for them. Also, there was a 58 per cent increase in the number of caregivers who clean the gums of those clients who have full dentures. This is consistent with the 98 per cent correct response in the pre-test to the statement "Where no natural teeth are present, the mouth does not require any cleaning".

In relation to oral hygiene, the program had the impact of caregivers taking more responsibility for the oral hygiene of their clients; both dentate and edentulous clients.
Diet

While there were no questions used to test the knowledge of caregivers about their understanding of how diet affects teeth, the two questions that asked about their behaviour showed significant change in the post-test. There was a 125 per cent increase in the number of caregivers who actively discourage their clients from eating lollies throughout the day and a 240 per cent increase in the number of caregivers who encourage clients to use artificial sweeteners in their tea and coffee. Hence, the general dietary advice that aims to prevent tooth decay in the elderly was used by many of the caregivers after the program. However, even with this large improvement, 40 per cent of caregivers in both questions still do not encourage the use of artificial sweeteners and 37 per cent fail to discourage clients from eating lollies throughout the day.

In relation to diet, the program had the impact of substantially increasing the number of caregivers who implement dietary advice to their clients to improve their clients' dental health.

Dentures

There was a 43 per cent improvement in the correct response to the knowledge question "Toothpaste is the recommended cleaning agent for dentures." The program emphasised that toothpaste was too abrasive for denture acrylics and that soap was a better alternative.

The behaviour that changed in the post-test in relation to the care of dentures was that more caregivers said that they take the precaution of placing a facewasher in the sink or fill the sink with water when cleaning a client's denture over a sink. There was an 86 per cent improvement in the number of caregivers taking this safety precaution in the post-test.
While this indicates a greater understanding and practice of a safe technique for cleaning dentures, the other question testing safety precautions did not change as significantly. The cleaning of clients' dentures in the shower receptacle was discouraged and while the percentage of caregivers who did not carry out this practice rose from 52 per cent to 65 per cent the increase was not statistically significant. The information that relates to this concept in the program requires alteration. The video "It's a mouthful" shows an elderly male cleaning his dentures in the shower receptacle. The discussion points after the video includes mentioning this practice in the video followed by an explanation that this is actually a practice that we want to discourage. The segment in the video that displays this practice should be removed. Clients' dentures were cleaned for them by 73 per cent of caregivers and there was no change in this figure in the post-test.

In relation to the care of dentures, the program had the impact of:

- improving the caregivers knowledge about what cleaning agents are recommended.
- increasing the number of caregivers who take precautions to prevent the fracture of dentures when they are being cleaned over a sink.
4.4 RECOMMENDATIONS

The education program in its current form can be of immediate value by implementation through the Community Dental Health Department of Westmead Hospital Clinical School. The department is involved with the care of clients in 70 different nursing homes in the Western Sydney Area. Implementation through the department would ensure minimal changes to the presentation format. Slide projectors are available and dental surgeons with experience in treating elderly people would be available to present the program.

Similarly the education program could be sent to the other regional health services and implemented through the dental team. Dr Alan Paterson (1991), Principal Dental Officer of the New England Health Region has already recommended that a health education program be designed for caregivers of elderly people in his report on the dental care for elderly people, prepared for the Australian Dental Association.

The Training and Resource Centre for Residential Aged Care (TARCRAC) is an organisation that is affiliated with the Queensland University of Technology. TARCRAC has developed and implemented two training programs for nursing and personnel staff in over 97 per cent of all Commonwealth funded nursing homes throughout Australia. In addition they have been successful with their tender to conduct the National Training Strategy for Staff in Aged Persons' Hostels over the next two years. Part of their contract with these projects has been the establishment of a national resource centre for inservice training. After correspondence with TARCRAC their operations coordinator responded "We would be very interested to preview your training program and obtain costings so that we can determine its suitability for our resource centre." Since the format of slide presentation, discussion, activity and video cannot be used by TARCRAC, the Westmead Hospital Dental Clinical School Audio Visual Department
Discussion

has used the education program as a basis for a video that addresses all of the finalised objectives of the education program. TARCRA will be sent the video for their consideration.

The video production of the education program will also be advertised through the usual channels of Westmead Hospital Audio Visual Unit. This includes the Australian Dental Association.

Currently, the video consists of; part of the video "It's a mouthful", graphics to describe the Stephan curve and the effect of fluoride, and part of the slide series used in the education program developed by the writer. A recommendation has been favourably considered that it would be of value to produce a video with film specifically shot to meet the objectives of the writer's education program since the use of still slides on the current video is not ideal.

The methodology used to design the education program would be useful as a basis to design an education program for caregivers of disabled people.
5. CONCLUSIONS

An education program for caregivers of elderly people in nursing homes has been designed to develop the knowledge, attitudes and behaviour needed for the prevention of dental disease in their clients.

The process evaluation established that in general the participants were satisfied with the program and that the materials and components of the program were of good quality.

Caregivers entered the program with favourable attitudes and these attitudes were maintained after the program. The attitudes of the caregivers reflect a belief that dental disease is a significant problem for the elderly and that it is important for elderly people in nursing homes to get preventive dental care. Caregivers believe that they should receive dental health education.

In relation to tooth decay the program had the impact of:
   improving the knowledge of the caregivers about the value of fluoride for elderly people.
   improving the behaviour of caregivers in the application of fluoride, using mouthrinses and toothpaste.

In relation to oral hygiene, the program had the impact of:
   caregivers taking more responsibility for the oral hygiene of their clients; both dentate and edentulous clients.

In relation to diet, the program had the impact of:
   substantially increasing the number of caregivers who implement dietary advice to their clients to improve their clients' dental health.
In relation to the care of dentures, the program had the impact of:
    improving the caregivers knowledge about what cleaning agents are recommended.
    increasing the number of caregivers who take precautions to prevent the fracture of dentures when they are being cleaned over a sink.

The dental health education program for caregivers of elderly people made a significant impact on the behaviours of the caregivers who attended the program and favourable attitudes towards the dental needs of their clients were maintained.

The program can be of immediate use by its implementation through the Community Dental Health Department of Westmead Hospital Dental Clinical School and through dental teams of other regional health centres. It will also be made available for possible use in video form through TARCRAC and other interested agencies.
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7. APPENDICES

<table>
<thead>
<tr>
<th>Appendix Number</th>
<th>Title</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The proposed program</td>
<td>53</td>
</tr>
<tr>
<td>2</td>
<td>Responses to the proposed program</td>
<td>66</td>
</tr>
<tr>
<td>3</td>
<td>Project for caregivers of elderly people</td>
<td>84</td>
</tr>
<tr>
<td>4</td>
<td>Responses of caregivers to the project</td>
<td>93</td>
</tr>
<tr>
<td>5</td>
<td>Recommendations for the procedures manual</td>
<td>103</td>
</tr>
<tr>
<td>6</td>
<td>KING PL (1992) Dental Needs of the Elderly, Geriaction, Spring</td>
<td>104</td>
</tr>
<tr>
<td>7</td>
<td>Process evaluation</td>
<td>107</td>
</tr>
<tr>
<td>8</td>
<td>Impact evaluation</td>
<td>108</td>
</tr>
<tr>
<td>9</td>
<td>Finalised program</td>
<td>111</td>
</tr>
<tr>
<td>10</td>
<td>Data Tables</td>
<td>123</td>
</tr>
</tbody>
</table>
Dear

The Community Dental Health Department of Westmead Hospital Dental Clinical School provides services for the dental needs of the disabled and frail elderly in the Western Sydney Area. I am the Registrar in that department and am currently designing an education program for caregivers of disabled and elderly people. The aim of the program is to develop the knowledge, attitudes and behaviour needed for the prevention of dental disease in their clients, and to seek regular dental care for their clients.

Prior to finalising the objectives and subject material of this education program it is essential that I have comments from people in relevant fields. The opinions and recommendations of caregivers, education officers, dental surgeons, a dental therapist, dietitian and behavioural scientist will be used to formulate the final objectives and subject material.

I have enclosed two documents for your consideration.

The first lists the aim and objectives of the proposed education program.

The second document contains the subject material required to meet the objectives.

I am relying on your comments to formulate the final objectives and subject material, your attention to detail will be greatly appreciated. Please make amendments, exclusions and additions that seem relevant from your point of view.

Make these alterations on the document and feel free to mark the document in any way you choose in order to make your point clear.

Emphasis should be placed in those areas in which you have particular expertise. Please return the amended documents by August 31st, 1991.

Your comments will be of great assistance in formulating the final objectives and subject material.

Thanking you.

PETER KING
Registrar
Community Dental Health Department
Westmead Hospital Dental Clinical School
AIM

To design an education program for caregivers of disabled and elderly people that would develop the knowledge, attitudes and behaviours needed for the prevention of dental disease in their clients and to seek regular dental care for their clients.

It will be necessary to implement and evaluate the program and to locate opportunities for educational interventions to reach caregivers.

... 

Prior to establishing the final objectives and subject material of this education program comments are sought from caregivers, education officers, dental surgeons, dental therapists and a dietitian. Amendments, additions, and exclusions to the objectives and subject material can be marked on the document. Please mark the pages in any way you wish to make your point of view clear. Emphasis should be placed in those areas in which you have particular expertise.
The objectives required to achieve this aim are subdivided into cognitive objectives and behavioural objectives.

**COGNITIVE OBJECTIVES**

1. **In relation to tooth decay,**
   *caregivers should understand:*
   
   a. The combined effect that plaque and sugar have on teeth over time.
   b. The composition of plaque.
   c. What foods are considered "sugary foods".
   d. What root decay is and why the elderly have a higher incidence of root decay.
   e. How to identify the signs and symptoms of tooth decay.
   f. The value of fluoride in the control and prevention of tooth decay.

2. **In relation to diet,**
   *caregivers should understand:*
   
   a. The different ways that the mouth's acidity is affected by eating different types of foods.
   b. General dietary advice that will reduce the number of acid attacks and the duration of those acid attacks.
   c. The effect that saliva has in neutralising acids in the mouth.
   d. Why some patients have a poor flow of saliva and how to help them minimise the detrimental effects of dry mouth.

3. **In relation to gum diseases,**
   *caregivers should understand:*
   
   a. What supports a tooth in the mouth.
   b. What gingivitis and periodontal disease are.
   c. What causes these diseases and how they can be prevented and treated.
   d. The signs and symptoms of gum diseases.
4. **In relation to oral hygiene, caregivers should understand:**
   a. How to assess if a client is not carrying out adequate oral hygiene.
   b. A correct technique of toothbrushing.
   c. What toothbrush aids are available and when they are indicated.
   d. Bathroom design to make toothbrushing an accessible activity.
   e. How to overcome the problems involved in carrying out toothbrushing on clients who are unable to clean their own mouths adequately.
   f. How to decide which toothpaste to buy.
   g. The need to clean the soft tissues of the mouth where no teeth are present.

5. **In relation to the care of dentures, caregivers should know:**
   a. A correct technique for cleaning dentures.
   b. Which cleaning aids are recommended.
   c. The problems denture wearers can suffer and solutions to these problems. eg. sore spots, ill-fitting, thrush.

6. **Caregivers should understand the nature of other dental problems such as pericoronitis, temporomandibular joint pain, discoloured anterior teeth, worn teeth and oral cancer.**

7. **Caregivers should understand the importance of having a thorough medical history of the client when the client presents for a dental appointment.**
BEHAVIOURAL OBJECTIVES

That caregivers will:

1. Seek professional dental care for new clients and organise annual dental check-ups for all clients.

2. Teach their clients how to perform thorough oral hygiene on a daily basis if the clients are capable of doing this.

3. Carry out thorough oral hygiene on a daily basis on those clients who are not able to clean their mouths adequately.

4. Employ the use of plastizote or electric tooth brushes when indicated.

5. Select a toothpaste appropriate to the client’s need.

6. Implement general dietary advice that aims to prevent tooth decay.

7. Identify those clients that suffer from dry mouth. Encourage these clients to follow the dietary advice suggested for dry mouth patients.

8. Teach those clients who are able to clean their dentures how to do a thorough job on a daily basis.

9. On a daily basis, thoroughly clean the dentures of those clients that are not able to do this themselves.

10. Identify clients that are having problems with their teeth, oral soft tissues, dentures or temporomandibular joint, and to seek help for their problems.

11. Ensure that a thorough medical history accompanies all clients when they attend a dental appointment.

12. Adopt an attitude such that they:
   a. Believe that their clients are susceptible to dental disease.
   b. Believe that dental disease is severe enough to interfere with some aspect of their clients’ lives.
   c. Believe that the benefits of taking preventive action outweigh the difficulties involved in implementing preventive action.
The subject material required to achieve the cognitive and behavioural objectives is expanded under eight subheadings.

**SUBJECT MATERIAL**

1. **Dental Decay**

Describe the combined effect of micro-organisms and sugary food over time on a susceptible tooth. Use a diagram to illustrate that all four factors are required for dental decay to occur.

Describe the composition of plaque.

- Plaque is the white furry substance that develops on teeth. It contains the micro-organisms that are involved in the decay process. In addition to these micro-organisms, plaque also contains sticky substances that hold the plaque onto the tooth.

Explain the significance of "time" by introducing the concept of the Stephan curve. Use the diagram to explain that micro-organisms breakdown sugary food to form acids which bring the pH of the oral cavity down to a critical point where tooth decay can occur. The longer the pH remains below the critical level and the more often the mouth is subject to an acid attack, the more likely tooth decay will occur.

Describe root decay and explain why there is a high prevalence in elderly populations. When gums recede the roots of teeth becomes exposed and these roots are more susceptible to decay than the crown.

The incidence of root decay is increased when:

a. The capacity for maintaining meticulous oral care is decreased.

b. Dietary habits that involve the regular intake of sugary food or drink develop. eg. Sipping sugared tea throughout the day, sucking boiled lollies, eating sugary snacks regularly throughout the day.
Describe the signs and symptoms of dental decay:

a. Pain when eating hot, cold, or sweet foods.
b. Complaint of tooth ache or facial pain.
c. In later stages the tooth appears broken down.
d. Abscess can result and an associated swelling of the face may occur.
e. Fever.
f. Unexplained change in behaviour in clients who have difficulty expressing their needs.

Discuss the significance of fluoride in preventing tooth decay. Regular low doses of fluoride are useful in the prevention of dental decay, fluoridated water supplies and toothpastes are a readily available source of fluoride. Regular consumption of water and use of fluoride toothpaste should be encouraged.

2. Dietary advice

Refer to the Stephan curve. Explain how our dietary advice aims to reduce the number of acid attacks and the duration of acid attacks experienced in the oral cavity each day. Stimulating salivary flow reduces the duration and intensity of an acid attack. Saliva is a natural buffer against acid.

General dietary advice:

a. Restrict the consumption of sweet foods to mealtimes.
b. Reduce the number of sugary between meal snacks.
c. Replace sugary between meal snacks with nuts, cheese, or vegetable sticks.
d. Stimulate salivary flow after consuming food. eg. cheese and nuts stimulate salivary flow. Chew sugarless gum for twenty minutes after eating.
e. Identify bad habits such as sucking boiled lollies, sipping sugared tea or soft drinks throughout the day. Modify those habits.
f. Consider the use of sugar substitutes.
Define xerostomia.

- Xerostomia refers to a reduced salivary flow causing a dry mouth.

Explain why many elderly and disabled people have dry mouths.

- Many medications have the side effect of causing dry mouth. Explain the effects of dry mouth. Saliva is very effective in neutralising the acid produced in the mouth after a meal. Without a good flow of saliva, the teeth will be subjected to a more acid environment for longer periods after eating.

Additional dietary advice for the dry mouth patient:

a. Drink water and low sugar beverages regularly and avoid caffeinated drinks.

b. Chew sugarless gum for twenty minutes after eating.

c. Use a cherry pit or a piece of lemon skin in the mouth to stimulate salivary flow.

d. Avoid tobacco and alcohol.

e. Avoid spicy, salty, and highly acidic foods.

f. Consider using artificial saliva under a dentist’s supervision.

3. Periodontal Disease

Describe the structures that give the tooth support.

a. Bone

b. Periodontal ligament

c. Gingiva

Describe periodontal disease as a disease that results in the destruction of the tissues that support the teeth.

Describe the role of plaque in the disease process.

- The bacteria in plaque causes the gums to become inflamed. The gums look red, swollen, and bleed if you brush the gums. We call this condition gingivitis.

- The bacteria in plaque can also affect the other structures that give the tooth support. When the periodontal ligament and bone are affected, the condition is called periodontitis. As the condition progresses, the bone resorbs and the tooth becomes loose. Periodontitis is a common cause of tooth loss.

Emphasise the significance of oral hygiene to control
and prevent periodontal disease.

Describe the signs and symptoms of periodontal disease:

a. Bleeding gums.
b. Mobile teeth
c. Pain if abscesses develop in the supporting structures.
d. Tooth loss
e. Halitosis

4. Oral Hygiene

If oral hygiene is not adequate, plaque is retained on the teeth. Over time the plaque can calcify to form tartar, also known as calculus.

Oral hygiene should be carried out with a toothbrush and a fluoridated toothpaste daily. All tooth surfaces need to be brushed. A circular motion that cleans the teeth and gums is recommended. Discuss with the caregivers appropriate times for toothbrushing in an attempt to establish a regular routine that is not hurried. The most appropriate time for brushing may be different for different groups.

Each patient’s ability to carry out thorough oral hygiene should be assessed by a dentist and caregiver. If plaque is still present after brushing or if the gums continue to bleed when the teeth and gums are brushed, oral hygiene is inadequate.

If oral hygiene is inadequate:

a. Oral hygiene techniques should be carried out by the caregiver on the client in addition to the client’s own cleaning habits.

b. Where possible a teaching skills program for tooth brushing by the client should be implemented.

c. Consider including tooth brushing on the client’s individual skills program.
Discuss problems that caregivers face when they are required to carry out oral hygiene techniques on their patients and possible solutions:

a. Bleeding. Use gloves.
b. Clenching. Use a mouth prop.
c. Vision and access. Describe the head cradling technique.
d. Technique. Discuss a systematic simple approach to tooth brushing.
e. Other problems? Ask the caregivers to express their views.

Available aids include plastizote and electric tooth brushes. Plastizote is a foam tube that can be slipped onto a toothbrush handle to make the toothbrush easier to grip. Electric toothbrushes may be useful for clients or caregivers with dexterity problems when attempting tooth brushing.

Discuss bathroom design to make tooth brushing an easily accessible activity. Ensure that the toothpaste and brush are accessible. The client should be able to see their face in the mirror.

Describe the nature of tooth pastes available. i.e. Fluoride tooth paste, Sensodyne, Floran H.P., Floran NaF. Recommend Floran NaF as the toothpaste with the most available form of fluoride. Emphasise the importance of the client’s acceptance of the toothpaste and that the pastes taste will be a significant factor. If clients are concerned about the presence of blood when they rinse out after brushing, the use of a red paste such as Close-Up may be of use until the gingivitis is resolved. Suggest putting a safety pin through the cap of the toothpaste if clients find it difficult to open the tube.

Where no teeth are present, soft tissues of the mouth should be cleaned daily with a soft toothbrush or an oral gauze swab.

5. Caring for dentures

Every night and if possible after every meal dentures should be removed for cleaning. Brush the inside and outside surface with a nail brush or a soft tooth brush using soap and water. Do not use abrasive cleaners. Clean dentures over a basin of water so that if they are dropped they will not break. Dentures should not be worn overnight.

When cleaning partial dentures care should be taken not to bend the metal clasps. Always keep dentures in water when they are out of the mouth. Add one cap full of Miltons solution to the water.
Appendix 1

Denture problems and solutions:

a. Sore spots. Remove the denture, rinse with warm salty water, see a dentist for denture adjustment. New dentures should only be worn for short periods at a time until the wearer is used to them.

b. Ill-fitting dentures. Adhesive substances available from pharmacies should not be used. See a dentist to see if there is a solution to the problem.

c. Thrush. Thrush, also known as candidiasis, can occur under dentures. Thrush can appear in different forms. One type leaves the denture bearing area red and inflamed and causes pain and discomfort. Other thrush infections are painless and present as a white film on the denture bearing area. The denture should be cleaned and soaked in a dilute solution of Milton's solution overnight. The client should be encouraged to leave the denture out of their mouth every night on a regular basis. A prescription from a dental surgeon may be required if it persists.

6. Dental problems that have not been discussed.

a. Pericoronitis.
This refers to infection of the soft tissues around the wisdom teeth. Symptoms include pain, ear ache, swelling, fever. Dental treatment needs to be sought immediately.

b. Temporomandibular joint pain.
Clicking T.M.J. in association with pain from the ear or near vicinity may require treatment of the joint condition.

c. Discoloured anterior teeth.
People suffering from diseases that cause fitting can sometimes damage the nerves of teeth if they fall or suffer a blow. The tooth can lose its vitality and will require dental treatment to ensure its longevity.

d. Worn teeth.
People can develop a grinding habit that is difficult to modify. A dentist's advice should be sought.
e. Oral cancer. Oral cancer often presents as an ulcerated lesion that does not respond to efforts to resolve the ulcer over time. Correct diagnosis requires dental examination and biopsy. There is a correlation between oral cancer and smoking.

7. The importance of regular dental check-ups and the significance of a thorough medical history when attending a dental appointment.

All new clients should have a professional dental examination within one month of their arrival. Annual dental check-ups should be mandatory for all clients.

Dental procedures can be invasive and stressful. Medical emergencies can result from a dental procedure if a patient’s medical history has been overlooked. eg. Bacterial endocarditis after dental procedures carried out on patients with heart defects where an antibiotic was not prescribed pre-operatively.

8. Encouraging attitudes of caregivers that will motivate them to take preventive action

1. All people are susceptible to dental disease and those who are disabled or elderly may be subject to factors that increase their susceptibility to dental disease.

These factors include:

a. Inability to maintain meticulous oral hygiene.

b. Lack of discernment in the choice of dietary habits.

c. Dry mouth from medications, stress, or diabetes.

d. Difficulty in communicating their need for treatment at the early stages of dental disease.

e. Specific dental problems. eg. People with Down syndrome are immunosuppressed. People with cerebral palsy have a higher incidence of hypocalcification of their teeth.
f. Crowded teeth are difficult to treat orthodontically if the patient is uncooperative and makes thorough tooth brushing difficult.

g. Financial restraints.

h. Difficulties in being able to organise dental treatment.

2. Dental disease in their clients is severe enough to interfere with some aspect of their clients’ lives.

a. Dental disease can be painful causing behavioural changes and eating difficulties.

b. Dental disease can cause halitosis.

c. Dental disease can cause tooth loss making eating difficult. Tooth loss also alters the appearance of a person and can effect their speech.

d. Dental disease left untreated can lead to systemic disease. eg. pericoronitis can cause a severe infection.

3. The benefits of taking preventive action outweigh the difficulties involved in implementing preventive action.

The difficulties involved in implementing preventive action are:

a. maintaining oral hygiene and denture hygiene.

b. controlling the frequency of the consumption of sugary food.

c. organising regular dental visits.

The benefits of taking preventive action are:

a. the prevention of pain, halitosis and tooth loss.

b. minimising the amount of restorative treatment required in the dental surgery.

c. the maintenance of good oral health which effects speech, eating and appearance.
RESPONSES TO THE PROPOSED PROGRAM

All comments made about the proposed program have been recorded. At the end of each comment, the initials of the person who made the comment can be found. A guide to these initials is recorded below.

Guide to Participants in Program Planning

Dental Surgeons
All Dental Surgeons are from Westmead Hospital Dental Clinical School.
(R.B) Dr. Robert Butler, Director of Dental Services, Westmead Hospital Dental Clinical School
(B.R) Brian Roberts, Prosthodontist
(F.M) Dr. Francis Maloof, Oral Surgery Registrar
(B.P) Dr. Braham Pearlman, Periodontist
(K.T) Dr. Kong Tang, Dental Officer in Community Dental Health
(M.Y) Dr. Mean-Fong Yee, Head of Department of Community Dental Health
(S.Y) Dr. Steven Yeung, Periodontist

Dental Therapist
(J.S) Jane Stannard, Dental Therapist, Auburn Community Services

Education Officers
Department of Family and Community Services. At a meeting of twelve staff development officers, the program was considered and comments made. Each of the officers are currently or have been caregivers in group homes for disabled people.
(B.H) Brenda Huntley, Regional staff development officer for New England
(S.I) Sandra Linsley, Course co-ordinator for Baptist community services
(H.M) Helen McLaughlan, Nurse Educator, Seven Hills Nursing Home

Dietitian
(M.M) Maria Moutzouris, Dietitian, Westmead Hospital

Caregivers
(L.B) Lyn Boswel, Assistant Nurse, Seven Hills Nursing Home
(M.O'R) Matron O’Roarke, Aminya Nursing Home
(NUM) Nursing Unit Manager, Marsden Hospital
(PGN) Psycho-geriatric Nurse, Auburn community Services

Behavioral Scientists
(S.H) Susan Hayes, Head of Department of Behavioral sciences in Medicine, Univ. of Syd.
(C.J) Christine Johnston, Behavioral scientist, University of Sydney
Comments that related to the aim of the program.

All comments are followed by the initials or name of the person making the statement. These people can be more fully identified using the "Guide to participants in program planning."

.Is there going to be an education package geared for caregivers of the frail elderly or is it a combined effort of frail elderly and disabled. The needs of the elderly may be similar but caregivers need to be aware of specific problems. (Matron O’Roarke)

.At the meeting with the staff development officers of the developmental disability service, concern was expressed at the intention of dealing with the needs of disabled people and those of elderly people in the one program. Other people who suggested that the needs of these two groups be treated separately were Dr M.F. Yee, Susan Haynes and Chris Johnson.

.Chris Johnson commented that the needs of the disabled(particularly children) may be very different to those of the elderly- is it possible to design a program to meet both needs?

.You haven’t really defined what you mean by "disabled". I’m not at all sure that if you are including children that you could combine the two groups—there would be a lot that would be irrelevant to one of the groups. Secondly, you need to define caregiver. By your use of "client" I presume you are aiming this program at professionals. If so why? What of relatives caring for both groups? If you do intend to include them the use of "client" is inappropriate.(S.H)

. Define caregivers, I initially thought you were including family members but this does not seem to be, given some of the behavioural objectives.(C.J)

General comments made with additional suggestions or support.

.The concept of training the caregiver to impart dental health promotion knowledge and implement preventive measures is a sound one. This approach has been taken in other dental health education programs, in the United states in particular, although the ones related to school children have failed primarily because they were targeted incorrectly.... I am particularly impressed with the quality of your outline on subject material.(R.B)

.It is both an interesting and worthwhile project.(C.J)

.I will be very interested to have some inservice for my staff.(S.L)
I'd be delighted to have someone present this material to my staff. (M.O'R)

I found the subject material well-balanced in its educational content and the objectives realistic to the target group. Visual aids are a great asset and when incorporated in an educational program seem to assist greatly in understanding the material. I have included some of the overhead stencils which I have found to be of use. (J.S)

At the end of the session encourage the caregivers to formulate their own plan of action and make a commitment to their plan. Use simple terminology. Make sure that the behavioural objectives are measurable. (M.W)

I wish to emphasise the importance of your teaching strategies or in other words teaching methods that I have found more effective with our staff i.e. lecture presentation kept to a minimum, emphasis on visual aids, practical demonstrations, small groups work, brainstorming. The assistants in nursing and personal care assistants who are our main "caregivers" have had little or no medical training so medical terminology will need to be explained very carefully. Also, these people are very practically orientated and really appreciate practical tips that they can utilise in the workplace. They also have a wonderful attitude and are keen to learn. I am sure they will greatly benefit from your session. (S.L)

The objectives are fine, except that there is in fact very little behavioural content. What is to be learnt and what is to be taught to clients is clearly stated but not the how? Perhaps some consideration of behaviour modification, modelling and self efficacy approaches is needed. (C.J)

Following consultation with area staff development officers throughout the department, I wish to advise you that your proposed dental education program has been endorsed by all concerned. Some specific feedback included:
1. Medical terminology used during introduction would need to be clarified and kept to a minimum.
2. Participants would benefit from handout material specifically relating to course content.
4. Some discussion on teaching skills and task analysis in relation to dental hygiene may be beneficial.
5. Socio-economic considerations such as pensioner entitlements, hospital clinics, access etc., may also be useful. (Dept. of Family and Community Services)
Comments that related to the objectives of the program

All comments have been recorded in italics. All comments are followed by the initials of the person making the statement. These people can be more fully identified using the "Guide to participants in program planning."

The objectives required to achieve this aim are subdivided into cognitive objectives and behavioural objectives.

COGNITIVE OBJECTIVES

1. In relation to tooth decay, caregivers should understand:
   a. The combined effect that plaque and sugar have on teeth over time.
   b. The composition of plaque.
   c. What foods are considered "sugary foods".
   d. What root decay is and why the elderly have a higher incidence of root decay.
   e. How to identify the signs and symptoms of tooth decay.
   f. The value of fluoride in the control and prevention of tooth decay.

2. In relation to diet, caregivers should understand:
   a. The different ways that the mouth's acidity is affected by eating different types of foods.
   b. General dietary advice that will reduce the number of acid attacks and the duration of those acid attacks.
   c. The effect that saliva has in neutralising acids in the mouth.
   d. Why some patients have a poor flow of saliva and how to help them minimise the detrimental effects of dry mouth.

   a. Too difficult for caregivers to understand. (PGN)
   c. Not important. (PGN)
   d. Explain medications. (PGN)
3. In relation to gum diseases, caregivers should understand:
   a. What supports a tooth in the mouth.
   b. What gingivitis and periodontal disease are.
   c. What causes these diseases and how they can be prevented and treated.
   d. The signs and symptoms of gum diseases.

Discuss medications that cause gums to grow. (NUM)

b. Periodontal disease should read periodontitis. (B.P)

4. In relation to oral hygiene, caregivers should understand:
   a. How to assess if a client is not carrying out adequate oral hygiene.
   b. A correct technique of toothbrushing.
   c. What toothbrush aids are available and when they are indicated.
   d. Bathroom design to make toothbrushing an accessible activity.
   e. How to overcome the problems involved in carrying out toothbrushing on clients who are unable to clean their own mouths adequately.
   f. How to decide which toothpaste to buy.
   g. The need to clean the soft tissues of the mouth where no teeth are present.

Discuss the importance of fluoride dentifrices in conjunction with mechanical plaque removal. (R.B)

If a patient has minimal gingivitis and no periodontitis in the presence of plaque accumulation, then one ought to ask the question if plaque control is a relevant issue in the health care of this patient. Plaque control should be looked at in the context of oral diseases. (S.Y)

b. A selection of techniques, not one correct technique. (B.P)

What and how to instruct clients to improve care, follow up procedures. (NUM)

How to get clients to open their mouths for examination and tooth brushing. How to identify clients who are experiencing pain or discomfort but who are non-verbal and cannot express this. (S.H)

b. and c. should be given first priority in this section. (FGN)
I feel that most nursing home clients need their mouths attended to after each meal as these people are not aware of particles caught in and around their teeth. However, until their are more nursing hours and personnel to adequately care for clients the above problems will continue. (H.M)

5. In relation to the care of dentures, caregivers should know:
   a. A correct technique for cleaning dentures.
   b. Which cleaning aids are recommended.
   c. The problems denture wearers can suffer and solutions to these problems. eg. sore spots, ill-fitting, thrush.

   How to label dentures. (S.L)
   Emphasis as a safe technique. (K.T)

6. Caregivers should understand the nature of other dental problems such as pericoronitis, temporomandibular joint pain, discoloured anterior teeth, worn teeth and oral cancer.

   Substitute facial pain for temporomandibular joint pain. (F.M)

   No need to explain in depth. (PGN)

7. Caregivers should understand the importance of having a thorough medical history of the client when the client presents for a dental appointment.

   Bring a list of the client's medications and the phone number of their general practitioner. (F.M)
BEHAVIOURAL OBJECTIVES

That caregivers will:

1. Seek professional dental care for new clients and organise annual dental check-ups for all clients.

   Annual may be appropriate for many but perhaps more or less frequent attendance would be appropriate for others. (R.B)

   Ensure a system is put into place. (S.H)

2. Teach their clients how to perform thorough oral hygiene on a daily basis if the clients are capable of doing this.

   How to teach, what techniques are needed, make behavioural suggestions. (S.H)

   How to teach their clients is not covered. Perhaps some consideration of behaviour modification, modelling, and self-efficacy approaches is needed. (C.J)

3. Carry out thorough oral hygiene on a daily basis on those clients who are not able to clean their mouths adequately.

4. Employ the use of plastizote or electric tooth brushes when indicated.

5. Select a toothpaste appropriate to the client’s need.

   Insert fluoride before "toothpaste". (R.B)

6. Implement general dietary advice that aims to prevent tooth decay.
7. Identify those clients that suffer from dry mouth. Encourage these clients to follow the dietary advice suggested for dry mouth patients.

    **Very important. (PGN)**

8. Teach those clients who are able to clean their dentures how to do a thorough job on a daily basis.

    **How to teach? (C.J)**

9. On a daily basis, thoroughly clean the dentures of those clients who are not able to do this themselves.

10. Identify clients that are having problems with their teeth, oral soft tissues, dentures or temporomandibular joint, and seek help for their problems.

    **How to identify. (C.J)**

11. Ensure that a thorough medical history accompanies all clients when they attend a dental appointment.

12. Adopt an attitude such that they:

    a. Believe that their clients are susceptible to dental disease.
    b. Believe that dental disease is severe enough to interfere with some aspect of their clients' lives.
    c. Believe that the benefits of taking preventive action outweigh the difficulties involved in implementing preventive action.

    *Most of these objectives presuppose verbal ambulant clients with no memory problems, no attention seeking behaviour etc. You have to begin at the beginning and get both patient and caregiver into the bathroom with an open mouth, no struggle and a toothbrush. Ditto motivation on both parts. (S.H)*

    *Add another behavioural objective. 13. Management of difficult patients - the need for persistence in dental health care delivery. (K.T)*

    *This is the most important of all the objectives and should be listed as the first not the twelfth. (B.R)*
The subject material required to achieve the cognitive and behavioural objectives is expanded under eight subheadings.

**SUBJECT MATERIAL**

1. **Dental Decay**

   Describe the combined effect of micro-organisms and sugary food over time on a susceptible tooth. Use a diagram to illustrate that all four factors are required for dental decay to occur.

   Describe the composition of plaque.

   - Plaque is the white furry substance that develops on teeth. It contains the micro-organisms that are involved in the decay process. In addition to these micro-organisms, plaque also contains sticky substances that hold the plaque onto the tooth.

       *Describe plaque as an invisible film that can develop into a white substance on the teeth if not removed. (M.Y)*

   Explain the significance of "time" by introducing the concept of the Stephan curve. Use the diagram to explain that micro-organisms breakdown sugary food to form acids which bring the pH of the oral cavity down to a critical point where tooth decay can occur. The longer the pH remains below the critical level and the more often the mouth is subject to an acid attack, the more likely tooth decay will occur.

   Describe root decay and explain why there is a high prevalence in elderly populations. When gums recede the roots of teeth becomes exposed and these roots are more susceptible to decay than the crown.

   The incidence of root decay is increased when:

   a. The capacity for maintaining meticulous oral care is decreased.

   b. Dietary habits that involve the regular intake of sugary food or drink develop. eg. Sipping sugared tea throughout the day, sucking boiled lollies, eating sugary snacks regularly throughout the day.
c. Clients suffer from xerostomia. Discuss relevance of drugs, radiotherapy, and hormonal conditions. (K.T) (F.M) (B.P) Depression can cause hyposalivation. (M.Y)

Describe the signs and symptoms of dental decay:

a. Pain when eating hot, cold, or sweet foods
b. Complaint of tooth ache or facial pain.
c. In later stages the tooth appears broken down.
d. Abscess can result and an associated swelling of the face may occur.
e. Fever
f. Unexplained change in behaviour in clients who have difficulty expressing their needs.

How are these detected if the client is non-verbal, non-English speaking or not co-operative? How can the unexplained behaviour be related to dental problems? (S.H)

Unexplained behaviour is too general. (C.J)

Give examples of unexplained behaviour. eg. Refusing activity when they have previously enjoyed activity, wrestles when going to bed since symptoms often appear more severe at this time. (M.Y)

Do certain diseases or medications make patients more susceptible to tooth decay, gum diseases or dry mouth. (L.B)

Discuss the significance of fluoride in preventing tooth decay. Regular low doses of fluoride are useful in the prevention of dental decay, fluoridated water supplies and toothpastes are a readily available source of fluoride. Regular consumption of water and use of fluoride toothpaste should be encouraged.

Dispel the myth that apples after meals decreases tooth decay. (R.B)
2. Dietary advice

Refer to the Stephan curve. Explain how our dietary advice aims to reduce the number of acid attacks and the duration of acid attacks experienced in the oral cavity each day. Stimulating salivary flow reduces the duration and intensity of an acid attack. Saliva is a natural buffer against acid.

....and also provides minerals for remineralisation once the pH rises. (M.M)

General dietary advice:

a. Restrict the consumption of sweet foods/drinks (M.M) to mealtimes.

b. Reduce the number of sugary between meal snacks.....especially those that remain in the mouth such as dried fruit and sweet sticky food. (M.M)

c. Replace sugary between meal snacks with nuts, cheese, or vegetable sticks.....or fruit or plain yoghurt. (M.M)

d. Stimulate salivary flow after consuming food. eg. cheese and nuts stimulate salivary flow. Chew sugarless gum for twenty minutes after eating.

e. Identify bad habits such as sucking boiled lollies, sipping sugared tea or soft drinks throughout the day. Modify those habits.

f. Consider the use of sugar substitutes.

Define xerostomia.

- Xerostomia refers to a reduced salivary flow causing a dry mouth.

Explain why many elderly and disabled people have dry mouths.

- Many medications have the side effect of causing dry mouth.

Explain the effects of dry mouth. Saliva is very effective in neutralising the acid produced in the mouth after a meal. Without a good flow of saliva, the teeth will be subjected to a more acid environment for longer periods after eating.
Additional dietary advice for the dry mouth patient:

a. Drink water and low sugar beverages regularly and avoid caffeinated drinks.
b. Chew sugarless gum for twenty minutes after eating.
c. Use a cherry pit or a piece of lemon skin in the mouth to stimulate salivary flow.
d. Avoid tobacco and alcohol.
e. Avoid spicy, salty, and highly acidic foods.
f. Consider using artificial saliva under a dentist's supervision.

Replace "low sugar beverages" with sugarless beverages. (R.B)

Include dairy products in the diet since they:
- buffer plaque acids.
- deposit a protein film on the enamel, protecting it from demineralisation.
- have a high calcium and phosphate level which enables remineralisation at lower pH levels than usual.
- contain casein and whey which block the plaques pH response to sugary foods. (M.M)

This section may have more appeal if it were given a more holistic approach. Low sugar, fat and salt diet are important for general health and good teeth are a part of general health. (B.H)

Discuss the diet of the elderly - foods that are difficult for denture wearers to eat. eg. nuts, carrots. Gum chewing may not be viewed as an acceptable practice amongst elderly populations. Many different cultural groups see gum chewing as socially unacceptable. Discuss the nature of sugar substitutes with their precautions. (M.Y)

3. Periodontal Disease

Describe the structures that give the tooth support.

a. Bone
b. Periodontal ligament
c. Gingiva

Describe periodontitis as a disease that results in the destruction of the tissues that support the teeth.
Describe the role of plaque in the disease process.

- The bacteria in plaque causes the gums to become inflamed. The gums look red, swollen, and bleed if you brush the gums. We call this condition gingivitis.
- The bacteria in plaque can also affect the other structures that give the tooth support. When the periodontal ligament and bone are affected, the condition is called periodontal disease. As the condition progresses, the bone resorbs and the tooth becomes loose. Periodontal disease is a common cause of tooth loss.

Emphasise the significance of oral hygiene to control and prevent periodontal disease.

Describe the signs and symptoms of periodontal disease:

a. Bleeding gums.
b. Mobile teeth
c. Pain if abscesses develop in the supporting structures.
d. Tooth loss
e. Halitosis

*Use a simpler term than halitosis.* (J.S)

Delete "periodontitis is a common cause of tooth loss". (S.Y)

As the condition progresses from gingivitis to periodontitis, the signs of inflammation in the gums may decrease and the gums may look pink and healthy. This may mask the disease process occurring further down the tooth surface. At this stage the disease may look symptomless and may need a thorough dental examination for diagnosis. (B.P)

4. Oral Hygiene

If oral hygiene is not adequate, plaque is retained on the teeth. Over time the plaque can calcify to form tartar, also known as calculus.

Oral hygiene should be carried out with a toothbrush and a fluoridated toothpaste daily. All tooth surfaces need to be brushed. A circular motion that cleans the teeth and gums is recommended. Discuss with the caregivers appropriate times for toothbrushing in an attempt to establish a regular routine that is not hurried. The most appropriate time for brushing may be different for different groups.

Each patient's ability to carry out thorough oral hygiene should be assessed by a dentist and caregiver. If plaque is still present after brushing or if the gums continue to bleed when the teeth and gums are brushed, oral hygiene is inadequate.
If oral hygiene is inadequate:

a. Oral hygiene techniques should be carried out by the caregiver on the client in addition to the client’s own cleaning habits.
b. Where possible a teaching skills programme for tooth brushing by the client should be implemented.
c. Consider including tooth brushing in the client’s individual skills programme.

*Identify the cause of the inadequacy. Is it laziness, forgetfulness or lack of skill. Poor dental hygiene and care is usually related to time restraints and behavioural difficulties on the clients part. Perhaps more emphasis is needed on these basic problems. (S.H)*

With age the capacity for meticulous oral care often decreases. (M.Y)

Discuss problems that caregivers face when they are required to carry out oral hygiene techniques on their patients and possible solutions:

a. Bleeding. Use gloves.
b. Clenching. Use a mouth prop.
c. Vision and access. Describe the head cradling technique.
d. Technique. Discuss a systematic simple approach to tooth brushing.
e. Other problems? Ask the caregivers to express their views.

Available aids include plastizote and electric tooth brushes. Plastizote is a foam tube that can be slipped onto a toothbrush handle to make the toothbrush easier to grip. Electric toothbrushes may be useful for clients or caregivers with dexterity problems when attempting tooth brushing.

Discuss bathroom design to make tooth brushing an easily accessible activity. Ensure that the toothpaste and brush are accessible. The client should be able to see their face in the mirror.

Describe the nature of tooth pastes available. i.e. Fluoride tooth paste, Sensodyne, Floran H.P., Floran NaF. Recommend Floran NaF as the toothpaste with the most available form of fluoride. Emphasise the importance of the client’s acceptance of the toothpaste and that the pastes taste will be a significant factor. If clients are concerned about the presence of blood when they rinse out after brushing, the use of a red paste such as Close-Up may be of use until the gingivitis is resolved. Suggest putting a safety pin through the cap of the toothpaste if clients find
it difficult to open the tube.

Where no teeth are present, soft tissues of the mouth should be cleaned daily with a soft toothbrush or an oral gauze swab.

*Are mouthwashes of any benefit? Which ones are recommended.* (L.B)

5. Caring for dentures

Every night and if possible after every meal dentures should be removed for cleaning. Brush the inside and outside surface with a nail brush or a soft toothbrush using soap and water. Do not use abrasive cleaners. Clean dentures over a basin of water so that if they are dropped they will not break. Dentures should not be worn overnight.

When cleaning partial dentures care should be taken not to bend the metal clasps. Always keep dentures in water when they are out of the mouth. Add one cap full of Miltons solution to the water.

Denture problems and solutions:

a. Sore spots. Remove the denture, rinse with warm salty water, see a dentist for denture adjustment. New dentures should only be worn for short periods at a time until the wearer is used to them.

b. Ill-fitting dentures. Adhesive substances available from pharmacies should not be used. See a dentist to see if there is a solution to the problem.

c. Thrush. Thrush, also known as candidiasis, can occur under dentures. Thrush can appear in different forms. One type leaves the denture bearing area red and inflamed and causes pain and discomfort. Other thrush infections are painless and present as a white film on the denture bearing area. The denture should be cleaned and soaked in a dilute solution of Miltons solution overnight. The client should be encouraged to leave the denture out of their mouth every night on a regular basis. A prescription from a dental surgeon may be required if it persists.

Detail the dilution of the Miltons solution to be used for soaking dentures. Check that this will not bleach the dentures. (R.B)

In relation to thrush, encourage caregivers to take the client to a dentist for anti-fungal treatment and not to rely on cleaning and soaking the denture. (M.Y)
6. Dental problems that have not been discussed.

a. Pericoronitis.
This refers to infection of the soft tissues around the wisdom teeth. Symptoms include pain, ear ache, swelling, fever. Dental treatment needs to be sought immediately.

b. Temporomandibular joint pain.
Clicking T.M.J. in association with pain from the ear or near vicinity may require treatment of the joint condition.

_explain psychogenic pain. (M.Y)_

c. Discoloured anterior teeth
People suffering from diseases that cause fitting can sometimes damage the nerves of teeth if they fall or suffer a blow. The tooth can lose its vitality and will require dental treatment to ensure its longevity.

d. Worn teeth
People can develop a grinding habit that is difficult to modify. A dentist’s advice should be sought.

e. Oral cancer
Oral cancer often presents as an ulcerated lesion that does not respond to efforts to resolve the ulcer over time. Correct diagnosis requires dental examination and biopsy. There is a correlation between smoking and oral cancer.

_Some of these concepts may be too complicated. (S.L)_

7. The importance of regular dental check-ups and the significance of a thorough medical history when attending a dental appointment.

All new clients should have a professional dental examination within one month of their arrival. Annual dental check-ups should be mandatory for all clients.

Dental procedures can be invasive and stressful. Medical emergencies can result from a dental procedure if a patient’s medical history has been overlooked. eg. Bacterial endocarditis after dental procedures carried out on patients with heart defects where an antibiotic was not prescribed pre-operatively.

8. Encouraging attitudes of caregivers that will motivate them to take preventive action

1. All people are susceptible to dental disease and those who are disabled or elderly may be subject to factors that increase their susceptibility to dental disease.

These factors include:
Appendix 2

a. inability to maintain meticulous oral hygiene.
b. Lack of discernment in the choice of dietary habits.
c. Dry mouth from medications, stress, or diabetes
d. Difficulty in communicating their need for treatment at the early stages of dental disease.
e. Specific dental problems. e.g. People with Down syndrome are immuno-suppressed. People with cerebral palsy have a higher incidence of hypocalcification of their teeth.
f. Crowded teeth are difficult to treat orthodontically if the patient is uncooperative and makes thorough tooth brushing difficult.
g. Financial restraints.
h. Difficulties in being able to organise dental treatment.

2. Dental disease in their clients is severe enough to interfere with some aspect of their clients' lives.

a. Dental disease can be painful causing behavioural changes and eating difficulties.
b. Dental disease can cause halitosis.
c. Dental disease can cause tooth loss making eating difficult. Tooth loss also alters the appearance of a person and can effect their speech.
d. Dental disease left untreated can lead to systemic disease. e.g. pericoronitis can cause a severe infection.
3. The benefits of taking preventive action outweigh the difficulties involved in implementing preventive action.

The difficulties involved in implementing preventive action are:
  a. maintaining oral hygiene and denture hygiene.
  b. controlling the frequency of the consumption of sugary food.
  c. organising regular dental visits.

The benefits of taking preventive action are:
  a. the prevention of pain, halitosis and tooth loss.
  b. minimising the amount of restorative treatment required in the dental surgery.
  c. the maintenance of good oral health which effects speech, eating and appearance.

Add to benefits that for the elderly, their smile is as important as when they were young. (L.B)
PROJECT FOR CAREGIVERS OF ELDERLY PEOPLE

I am the registrar of the Community Dental Health Unit of Westmead Dental Clinical School. The unit aims to meet the needs of disabled and elderly people in the Western Sydney Area.

At present I am designing an education program for caregivers of elderly people in nursing homes. The program will develop the knowledge, attitudes and behaviour required to prevent dental disease in clients. It also aims to encourage caregivers to seek regular dental care for their clients.

Prior to finalising the program, it would be of great benefit to find out from caregivers of elderly people, their current opinions, practices and understanding of dental issues that relate to their clients. I have prepared this project to find out this information. Your completion of this questionnaire will be very useful.

The information I require is important so please answer all questions carefully. The project should take approximately thirty minutes to complete. All answers will be treated as confidential. Please do not seek any help for the answers. The project is not designed to assess you, but to give me assistance in designing an education program for you. There is no need to put your name on the project. Recording your age, gender and educational background will assist me in finding out some characteristics of the caregivers I intend to reach with this program.

Thank you for your participation.

Yours sincerely,

Dr Peter King (B.D.S.)

Circle your age category

15-19  20-24  25-34  35-44  45-54  55+

Male □ or Female □

Educational background
Tick those boxes that apply to you

School Certificate □
Higher school certificate □
Other qualifications □ Please specify
Section A
Tooth Decay

Answer True, False, or Unsure to the following statements
Tick one box

Tooth decay is caused by plaque and sugar on a tooth over a period of time.

True ☐ False ☐ Unsure ☐

With old age, gums recede, exposing the roots of teeth.

True ☐ False ☐ Unsure ☐

The roots of teeth, if exposed, are as resistant to tooth decay as the crowns of teeth.

True ☐ False ☐ Unsure ☐

Give short answers to the following questions

What is dental plaque?

Specify several foods that your clients eat that are likely to cause tooth decay in their natural teeth. Please list.

Specify several foods that your clients eat that are not likely to cause tooth decay. Please list.

If a client had tooth decay, what dietary advice could you offer to reduce the risk of further decay? Please describe.
Appendix 3

Do you ever make suggestions to clients about how they should modify their diets?
Yes □ No □

If yes, please describe.

What advice can you offer a client who is experiencing dry mouth? Please describe.

What might you notice that would indicate that a client is experiencing tooth decay?

What forms of fluoride other than toothpaste should be used for clients with some of their own natural teeth?

Answer True, False, or Unsure to the following statements
Tick one box

Fluoride is most important for children but has little effect on the natural teeth of elderly people.

True □ False □ Unsure □

Of those clients who have some of their natural teeth left, fluoride toothpaste is used whenever their teeth are brushed.

True □ False □ Unsure □

Of those clients who have all or some of their natural teeth left, fluoride toothpaste should be used whenever their teeth are brushed.

True □ False □ Unsure □

Elderly people can suffer from dry mouths that can increase the risk of dental disease.

True □ False □ Unsure □
Section B
Oral Hygiene

Give short answers to the following questions

How do you decide if a client can brush their own natural teeth or if they require assistance? Please explain.

How do you decide if a client can brush their own dentures or if they require assistance? Please explain.

Are you willing to clean the natural teeth of your clients?
Yes □ No □

Are you willing to clean the dentures of your clients?
Yes □ No □

Are you aware that clients' tongues should be brushed?
Yes □ No □

Are you aware that where no natural teeth are present the soft tissues should be cleaned?
Yes □ No □

Do you ensure that clients' tongues are brushed?
Yes □ No □

Do you ensure that where no natural teeth are present, soft tissues are cleaned?
Yes □ No □

What difficulties do you experience when brushing your clients' natural teeth? Please explain.

What difficulties do you experience when brushing your clients' dentures? Please explain.
If a client has some natural teeth present, how often do you think they should have their teeth brushed with a fluoride toothpaste to prevent dental disease? Tick one box.

- Less than once a day
- Once a day
- Twice a day
- More than twice a day

If a client has some natural teeth present, how often do they get brushed with a fluoride toothpaste in your nursing home? Tick one box.

- Less than once a day
- Once a day
- Twice a day
- More than twice a day

How often do you think that clients' dentures should be brushed?

- Less than once a day
- Once a day
- Twice a day
- More than twice a day

How often are your clients' dentures brushed?

- Less than once a day
- Once a day
- Twice a day
- More than twice a day
Section C
Gum Problems

Answer True, False, or Unsure to the following statements
Tick one box

Calculus, sometimes referred to as tartar, is plaque that has gone hard.
   True ☐ False ☐ Unsure ☐

Calculus can be removed by tooth brushing.
   True ☐ False ☐ Unsure ☐

If elderly people keep some of their natural teeth, they inevitably have problems with their gums.
   True ☐ False ☐ Unsure ☐

If the gums bleed during tooth brushing, the gums should be avoided when brushing.
   True ☐ False ☐ Unsure ☐

Gum problems are a major cause of tooth loss in the elderly.
   True ☐ False ☐ Unsure ☐

Failure to remove plaque from the teeth and gums is a major factor in the occurrence of gum problems.
   True ☐ False ☐ Unsure ☐

Give short answers to the following questions

Do you know the names of any gum problems that people who have some of their own teeth can experience? If so, name them.

What might you notice that would indicate that your client was experiencing a gum problem?

What could you do to prevent gum problems in a client who has some remaining natural teeth?
Answer Yes or No to the following questions
Tick one box

Do you think you could recognise plaque in a client’s mouth?

Yes □ No □ Unsure □

Do you think you could recognise calculus in a client’s mouth?

Yes □ No □ Unsure □

Do you think you could recognise tooth decay in a client’s mouth?

Yes □ No □ Unsure □

Do you think you could recognise an ulcer in a client’s mouth?

Yes □ No □ Unsure □

Do you think you could identify thrush in a client’s mouth?

Yes □ No □ Unsure □

Do you think you could identify gingivitis in a client’s mouth?

Yes □ No □ Unsure □
Section D
Dentures

Answer True, False, or Unsure to the following statements
Tick one box

.Ideally, clients should take their dentures out of their mouths overnight and soak them in water.
   True □ False □ Unsure □

.Dentures should be removed after every meal and cleaned.
   True □ False □ Unsure □

.Dentures are fragile and can break if they are dropped into a porcelain basin or sink.
   True □ False □ Unsure □

Give short answers to the following questions

.What products do you use to clean dentures?

.What products do you use to soak dentures in?

.When cleaning a denture for a client, do you take any precautions to prevent breakage if you happen to drop it? If so, what are these precautions.

.Are all clients' dentures marked with their name or initials?
   Yes □ No □

.Do you think it would be useful to mark all clients' dentures with their name or initials?
   Yes □ No □

If so, why?

.Do you think it would be valuable for all clients to have regular dental check-ups?
   Yes □ No □

.Does your nursing home have a system to ensure all clients receive regular dental check-ups?
   Yes □ No □

.Do you attempt to remove hard deposits of calculus or tartar from dentures?
   Yes □ No □

If so, how?
Section E
Opinions

How much do you agree with the following statements.
Tick one response for each statement.

strongly agree  agree  undecided  disagree  strongly disagree

Elderly people are more susceptible to
dental disease than younger people.

Dental problems create social problems
for the client.

Dental problems effect the general health
of a client.

There is benefit in caregivers of elderly
people implementing preventive dental
action in nursing homes.

The difficulties involved in carrying out
preventive dental action should be overcome
in view of the benefits to be gained.

A dental education program for caregivers
of elderly people should be a compulsory
component of their education.

Please make any comments about the type of dental health education program that you think would be useful for caregivers of elderly people in nursing homes.
RESPONSES OF CAREGIVERS TO THE PROJECT

Qualitative comments about the answers given to the short answer questions are recorded in italics after each of those questions. The correct answers to the true/false questions are in bold print. The number of people who ticked each of the boxes is recorded above each box.

Circle your age category

2  3  11  9  7
15-19  20-24  25-34  35-44  45-54  55+
2  31

Male ☐ or Female ☐

Educational background
Tick those boxes that apply to you

School certificate ☐ 14
Higher school certificate ☐ 9
Other certificates ☐ Please specify

5: Registered nurses,
Dip Ed, College graduate

Assistants in nursing are usually female with no educational background beyond the School Certificate. There is a wide range of ages in the group.
Section A
Tooth Decay

Answer True, False, or Unsure to the following statements
Tick one box

Tooth decay is caused by plaque and sugar on a tooth over a period of time.

True □ False □ Unsure □

With old age, gums recede, exposing the roots of teeth.

True □ False □ Unsure □

The roots of teeth, if exposed, are as resistant to tooth decay than the crowns of teeth.

True □ False □ Unsure □

Give short answers to the following questions

What is dental plaque?
This question was answered well. Only 4 answers mentioned the presence of bacteria, however almost every answer understood it to be a film on teeth containing food particles.

Specify several foods that your clients eat that are likely to cause tooth decay in their natural teeth. Please list.
Well answered by all.

Specify several foods that your clients eat that are not likely to cause tooth decay. Please list.
Well answered by all.

If a client had tooth decay, what dietary advice could you offer to reduce the risk of further decay? Please describe.
The concept of reducing the amount of sugar is understood but not the need to reduce the number of between meal snacks.
Appendix 4

. Do you ever make suggestions to clients about how they should modify their diets?

   10  23
   Yes □ No □

   If yes, please describe.
   One caregiver suggested reducing between meal snacks and allowing clients to chew sugarless gum. Other caregivers who gave advice were concerned with weight control, not dental needs.

. What advice can you offer a client who is experiencing dry mouth? Please describe.
   Drink regularly was often suggested. One caregiver suggested reducing salty food and to swab the mouth.

. What might you notice that would indicate that a client is experiencing tooth decay?
   A common misconception was that bleeding gums is a sign of tooth decay. Many answers included bad breath as a symptom.

. What forms of fluoride other than toothpaste should be used for clients with some of their own natural teeth?
   The concept of fluoride mouth rinses was known to many of the caregivers. Other answers included fluoride tablets, water, and fluoride treatments by dentists.

Answer True, False, or Unsure to the following statements
Tick one box

. Fluoride is most important for children but has little effect on the natural teeth of elderly people.

   15  10  7
   True □ False □ Unsure □

. Of those clients who have some of their natural teeth left, fluoride toothpaste is used whenever their teeth are brushed.

   26  3  4
   True □ False □ Unsure □

. Of those clients who have all or some of their natural teeth left, fluoride toothpaste should be used whenever their teeth are brushed.

   29  0  1
   True □ False □ Unsure □
Elderly people can suffer from dry mouths that can increase the risk of dental disease.

True □ False □ Unsure □

Those areas that require most attention in relation to tooth decay are:
- Roots of teeth are more susceptible to tooth decay than the crowns of teeth.
- Dietary advice that will decrease the risk of tooth decay in susceptible clients.
- The value of regular fluoride for elderly people needs to be understood.
- Encourage them to use the fluoride rinses that they are aware of and explain the potential use of these in atomisers for clients who cannot rinse.

Section B
Oral Hygiene

Give short answers to the following questions

- How do you decide if a client can brush their own natural teeth or if they require assistance? Please explain.
  Only one caregiver suggested examining the mouth after the client attempts brushing as a way of deciding if the client requires assistance. All other comments related to watching the client carry out the task or making an assessment based on their general dexterity and alertness. One other caregiver suggested that they all need help.

- How do you decide if a client can brush their own dentures or if they require assistance? Please explain.
  Similar answers to the previous question were given. No one suggested examining the dentures after the client has attempted to brush them.

- Are you willing to clean the natural teeth of your clients?
  Yes □ No □

- Are you willing to clean the dentures of your clients?
  Yes □ No □

- Are you aware that clients’ tongues should be brushed?
  Yes □ No □
Appendix 4

Are you aware that where no natural teeth are present the soft tissues should be cleaned?

Yes ☐ No ☐

22  11

Do you ensure that clients' tongues are brushed?

Yes ☐ No ☐

13  20

Do you ensure that where no natural teeth are present, soft tissues are cleaned?

Yes ☐ No ☐

17  16

What difficulties do you experience when brushing your clients' natural teeth? Please explain.

Sucking the brush, chewing the brush, closing the mouth, refusing to open, moving the head, becoming aggressive, and swallowing the toothpaste with difficulty spitting and rinsing were common complaints. Only one caregiver complained of the clients' gums bleeding and a few caregivers said that brushing was painful for the client.

What difficulties do you experience when brushing your client's dentures? Please explain.

Difficulties were that the dentures were slimy, slippery, break when dropped, and have stains that are difficult to remove. One caregiver complained of feeling sick when they cleaned dentures.

If a client has some natural teeth present, how often do you think they should have their teeth brushed with a fluoride toothpaste to prevent dental disease? Tick one box.

Less than once a day ☐
Once a day ☐ 2
Twice a day ☐ 16
More than twice a day ☐ 13

If a client has some natural teeth present, how often do they get brushed with a fluoride toothpaste in your nursing home? Tick one box.

Less than once a day ☐
Once a day ☐ 15
Twice a day ☐ 15
More than twice a day ☐ 3

How often do you think that clients' dentures should be brushed?

Less than once a day ☐
Once a day ☐ 3
Twice a day ☐ 20
More than twice a day ☐ 10
How often are your clients' dentures brushed?

- Less than once a day □
- Once a day □14
- Twice a day □14
- More than twice a day □5

Those areas that require most attention in relation to oral hygiene are;

Discussion about the difficulty in effectively cleaning natural teeth and dentures should be emphasised to encourage a greater acceptance of responsibility by caregivers to clean their clients' teeth and dentures for them.

The significance of cleaning clients' soft tissues and tongue should be explained.

All the difficulties experienced by caregivers when brushing their clients' teeth and dentures should be discussed in the program.

There is a large discrepancy between the number of times caregivers believe that clients should have their teeth and dentures brushed compared to the number of times these cleaning events actually occur. This will require discussion.

Section C
Gum Problems

Answer True, False, or Unsure to the following statements
Tick one box

Calculus, sometimes referred to as tartar, is plaque that has gone hard.  

22 2 9
True □ False □ Unsure □

Calculus can be removed by tooth brushing.

5 20 8
True □ False □ Unsure □

If elderly people keep some of their natural teeth, they inevitably have problems with their gums.

15 12 5
True □ False □ Unsure □

If the gums bleed during tooth brushing, the gums should be avoided when brushing.

10 17 6
True □ False □ Unsure □
Gum problems are a major cause of tooth loss in the elderly.

25 1 6
True □ False □ Unsure □

Failure to remove plaque from the teeth and gums is a major factor in the occurrence of gum problems.

26 2 4
True □ False □ Unsure □

Give short answers to the following questions
Do you know the names of any gum problems that people who have some of their own teeth can experience? If so, name them. Gingivitis was the most commonly reported gum problem. Thrush, halitosis and stomatitis were also reported. Three caregivers from Yagoona Nursing Home reported "palitis".

What might you notice that would indicate that your client was experiencing a gum problem?
This question was answered well with most caregivers understanding the correlation between bleeding gums and gum disease. Other symptoms mentioned were halitosis, not eating, red gums, and sore mouth. No one mentioned loose teeth.

What could you do to prevent gum problems in a client who has some remaining natural teeth? The need to brush the teeth to improve the health of the gums was well understood. Very few mentioned the place of mouthwashes.

Answer Yes or No to the following questions
Tick one box

Do you think you could recognise plaque in a client’s mouth?

25 5 2
Yes □ No □ Unsure □

Do you think you could recognise calculus in a client’s mouth?

18 6 9
Yes □ No □ Unsure □

Do you think you could recognise tooth decay in a client’s mouth?

28 1 4
Yes □ No □ Unsure □

Do you think you could recognise an ulcer in a client’s mouth?

29 2 2
Yes □ No □ Unsure □

Do you think you could identify thrush in a client’s mouth?

25 2 6
Yes □ No □ Unsure □

Do you think you could identify gingivitis in a client’s mouth?

12 8 13
Yes □ No □ Unsure □
Those areas that require most attention in relation to gum problems are:

- not to avoid the gum margins if they are bleeding on brushing.
- the nature of calculus.
- that gum problems in the elderly dentate population can be prevented and are not inevitable.
- the use of chlorhexidine in the control and prevention of gum diseases.
- the need for regular dental examinations of all dentate clients and professional periodontal care of clients with gum disease.
- use slides to teach caregivers how to identify gingivitis.

Section D
Dentures

Answer True, False, or Unsure to the following statements
Tick one box

.Ideally, clients should take their dentures out of their mouths overnight and soak them in water.

True □ False □ Unsure □

26  4  2

.Dentures should be removed after every meal and cleaned.

True □ False □ Unsure □

32  1

.Dentures are fragile and can break if they are dropped into a porcelain basin or sink.

True □ False □ Unsure □

29  3  1

Give short answers to the following questions

.What products do you use to clean dentures?
Only 4 caregivers use denture powder to clean dentures. All other caregivers used toothpaste which is too abrasive for denture cleaning.

.What products do you use to soak dentures in?
All caregivers use Sterodent to soak dentures in except for one caregiver who uses sodium bicarbonate.

.When cleaning a denture for a client, do you take any precautions to prevent breakage if you happen to drop it?
If so, what are these precautions.
4 caregivers commented that they hold the denture properly and 3 mentioned that they put a facewasher in the sink while they clean the dentures. 4 caregivers noted that they hold the dentures low in the sink. Most simply stated that they were careful but were not aware of precautions to take.
.Are all clients' dentures marked with their name or initials?

Yes □ No □

31 2

Do you think it would be useful to mark all clients' dentures with their name or initials?

Yes □ No □

33

If so, why? Well answered by all who responded to this question. The need for identification to prevent mixing up the dentures is well understood.

Do you think it would be valuable for all clients to have regular dental check-ups?

Yes □ No □

32 1

Does your nursing home have a system to ensure all clients receive regular dental check-ups?

Yes □ No □

27 5

Do you attempt to remove hard deposits of calculus or tartar from dentures?

Yes □ No □

12 19

If so, how? Most of those who ticked yes did not comment how they removed these deposits. Those that did referred to brushing them, however no one suggested soaking the dentures overnight in diluted vinegar and scrubbing the dentures in the morning.

In relation to denture care:

The need to remove dentures overnight, clean them after meals, and that dentures are fragile is understood by a large proportion of the caregivers. However, it is not well understood that toothpaste is too abrasive to use for the cleaning of dentures, that special precautions are required to clean them safely to prevent breakages, and that hard build up on teeth requires special soaking techniques to remove this calculus.

The value of regular dental check-ups and marking of dentures was almost universally accepted by these caregivers and systems are in place in these nursing homes to ensure these practices are carried out.
### Section E Opinions

How much do you agree with the following statements. Tick one response for each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>strongly agree</th>
<th>agree</th>
<th>undecided</th>
<th>disagree</th>
<th>strongly disagree</th>
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<td>Elderly people are more susceptible to dental disease than younger people.</td>
<td>11</td>
<td>13</td>
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<tr>
<td>Dental problems create social problems for the client.</td>
<td>11</td>
<td>18</td>
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<tr>
<td>Dental problems effect the general health of a client.</td>
<td>15</td>
<td>15</td>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>There is benefit in caregivers of elderly people implementing preventive dental action in nursing homes.</td>
<td>10</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>The difficulties involved in carrying out preventive dental action should be overcome in view of the benefits to be gained.</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td></td>
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<tr>
<td>A dental education program for caregivers of elderly people should be a compulsory component of their education.</td>
<td>15</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Please make any comments about the type of dental health education program that you think would be useful for caregivers of elderly people in nursing homes. No additional information was gained from this question.
DENTAL CARE

Diet

Use artificial sweeteners in tea and coffee.

Discourage clients from constantly having sugary snacks and drinks and from sucking on lollies.

If a client suffers from dry mouth, use an artificial saliva such as "Salube" prior to eating.

Fluoride

Fluoride toothpaste should be used to brush natural teeth both in the morning and in the night.

Fluoride mouthrinse should be used at lunchtime to protect teeth from tooth decay.

Oral hygiene

All clients should be offered assistance to clean their natural teeth.

All surfaces of all teeth should be brushed using a soft tooth brush.

Where no teeth are present, the gums should be brushed or wiped with a swab daily.

Denture care

All clients should be offered assistance to clean their dentures.

Always place a facewasher in the sink when cleaning a denture so that if it is dropped, the denture will not be cracked. Alternatively, fill the sink with 5 cm of water.

Toothpaste is too abrasive to use to clean dentures, soap on a toothbrush is recommended.

Dentures should be removed overnight and soaked in water.

All dentures should be marked with the owner’s initials.

Dental visits

All clients require regular check-ups from a dentist. This includes clients who have no natural teeth left.

When escorting a client to the dentist, ensure a full medical history of the client is available for the dentist.
DENTAL NEEDS OF THE ELDERLY

by Dr Peter King
Registrar
Community Dental
Health Unit,
Westmead Hospital

Eating is a very significant event in the lives of elderly people. A healthy mouth allows people to enjoy their food, speak clearly, and engage in social interaction with confidence. However, the mouths of the elderly are often a complicated composite of teeth, dentures, and soft tissues that each require individual attention and present their own unique problems.

If someone has no teeth, we call them edentulous and most of them wear full dentures. However, only 44 percent of people over 65 in Australia are edentulous. Most of the elderly have at least some of their natural teeth to be cared for, and many wear partial dentures to fill in the gaps where teeth have been lost. So keeping elderly people’s mouths healthy involves attending to teeth gums, dentures, the tongue, and other soft tissues. It is believed that the tongue can often trap a lot of plaque and food that can cause bad breath, reduced taste acuity, gum disease, and decay in the roots of teeth.

The keys to maintaining optimal oral health in the elderly are controlled dietary habits, regular application of fluoride, oral hygiene, denture care, and regular dental examination.

Susceptibility to tooth decay

The expression “5/6 he is a bit long in the tooth” points to a dental phenomenon that is a great problem for the elderly. As the gums recede, teeth appear to be longer. But it is the roots of teeth that are being exposed to the oral cavity that create this illusion. Unfortunately, roots do not have the hard enamel covering that crowns have to protect them, so the roots are far more susceptible to decay.

Other factors that increase the risk of decay in the elderly are:

- xerostomia: this describes the condition of dry mouth. Many elderly people take medications that decrease the flow of saliva. Certain diseases of the salivary glands are more common in the elderly. Saliva is very important in the fight against tooth decay, since it washes away the acids produced during eating.

- eating habits change. Many small snacks often replace the usual three meals. New habits such as sucking on boiled lollies or drinking sugared tea regularly develop.

- the capacity for meticulous oral care decreases.

- teeth drift and become crowded and difficult to clean.

The question is: what can caregivers do to decrease the risk of dental decay in their clients? The answer is: ensure that all clients with some of their natural teeth have regular fluoride applied on a daily basis, look at their diets in light of their dental needs, and ensure clients have their teeth brushed daily with particular attention placed on cleaning the gum margin.

Diet

To understand the significance of fluoride and
diet on clients’ susceptibility to tooth decay, a clear understanding of what happens when we eat is required. Normally the saliva in our mouths has a neutral pH but when we eat this quickly changes to an acidic pH. The acid is formed by the bacteria in plaque breaking down the food into acidic substance. Each eating event results in an acid attack that lasts 20 minutes before the mouth’s pH level returns to neutral. People’s teeth can cope with a few acid attacks a day but they cannot cope with constant snacking.

If a client enjoys sugary foods they should be encouraged to eat these foods at mealtimes since their mouths are already experiencing an acid attack at these times. Between-meal snacks should be foods that are low in sugar and beverages should be sweetened with artificial sweeteners. The instruction is not to stop clients eating sweets that bring interest and variety into their diet, but to choose the appropriate time to consume sugary foods to prevent them causing tooth decay. It is not the quantity of sugar but the frequency of eating sugary foods that should concern the dental aware carer.

The dry mouth client is more susceptible to tooth decay since saliva is required to bring the pH back to neutral after an acid attack. There is special dietary advice that dry mouth clients should take in addition to the recommendation of reducing sugary between-meal snacks and using artificial sweeteners. They should avoid spicy, salty and highly acidic foods, as well as tobacco and alcohol. Salivary flow can be stimulated after eating by sucking on a cherry stone or by chewing sugarless gum. The use of a saliva substitute available through pharmacies can be used prior to eating and throughout the day.

Fluoride

Fluoride plays a very important role in the prevention of tooth decay in elderly people. The surface of teeth is made up of crystals containing calcium, phosphate, and hydroxide ions. During an acid attack the tooth surface loses these substances. If fluoride is present in the saliva it encourages the crystals to reform. The reformed crystal incorporates some of the fluoride which leaves the tooth surface more resistant to tooth decay than before the acid attack.

This is why it is important for elderly people with natural teeth to have fluoride applied to their mouths regularly. Brushing after every meal with a fluoride toothpaste is a very important preventative dental practice. If a client cannot rinse the fluoride solution can be put into an atomiser and introduced into the mouth with two short bursts of spray. However, rinsing or spitting should not be used as a substitute for daily tooth brushing since the day to day removal of plaque is essential for maintaining a healthy mouth.

Oral Hygiene

The periodontium refers to the supportive structures of teeth. This includes the gingiva, the periodontal ligament, and bone. Periodontal diseases are those that affect these structures. If plaque is not removed from the gum margins regularly, the bacteria in plaque causes the gum margins to become inflamed. The gums look red, swollen, and bleed when they are brushed. Dentists call this condition gingivitis. The bacteria in plaque can also affect the bone and periodontal ligaments that give the tooth support. When these structures are affected the condition is called periodontitis. The number of teeth lost due to periodontal disease is not known, but the number of teeth that need to be extracted due to the disease increases with age. Periodontal disease is also associated with bad breath and although it is a chronic disease it can cause acute episodes of periodontal abscess that can be painful and debilitating.

The control and prevention of periodontal disease with these people requires daily removal of plaque and regular professional dental examination and treatment. Some clients will benefit from daily use of an antimicrobial mouth rinse called chlorhexidine. All new clients should have a dental examination and a system should be implemented to ensure that they receive regular dental examinations.

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“We offer Stock and Service not just Samples”
The daily removal of plaque is often a difficult task to accomplish in a nursing home since most clients are not able to do a thorough cleaning themselves. If a client has bleeding gums, carers may prefer to avoid the gums, but this symptom is often an indication that the gums need more thorough cleaning. Problems with cleaning people's teeth need to be discussed and solutions found. Some advice that may be helpful:

- stand behind the client and cradle their head in the crook of your arm when brushing their teeth.
- if the client chews or sucks on the brush, use a mouth prop on one side of the mouth while brushing the other. A face washer rolled up and folded once overforms an accessible, simple mouth prop.
- use a small amount of toothpaste (the size of a pea) and if there is still too much foam, use Colgate junior toothpaste which is a low-foaming gel.

The soft tissues that dentures rest on also require daily brushing to maintain optimal health. A soft toothbrush or a mouth swab should be used.

Denture care

The care of full dentures and partial dentures are similar except for the fact that partial dentures have wires that are used to hold the teeth in place. They have been carefully bent to a precise shape so care should be taken when cleaning these areas.

Dentures are brittle and can chip or break if they are dropped onto a hard surface. Try putting a damp face washer in the sink or fill the sink with water so that if you drop the denture while brushing it, the fall will be broken. If a denture is broken it needs to be sent for repair and the temporary loss can be very distressing for an elderly person.

Toothpaste is an abrasive made to clean our hard enamel covered teeth, and is too abrasive for dentures. If the inside surface of a denture is worn away to a smooth surface it can become loose and ill-fitting. Use denture paste or soap on a brush - preferably a denture brush. Alternatively, a nail brush will work as well. Ideally dentures should be cleaned after every meal since elderly people often fail to remove all food debris from the mouth.

If you come across dentures that have been neglected for some time and now have calculus (tartar) adhering strongly, they should be soaked overnight in a cup of water with a tablespoon of vinegar added. This dissolves the calculus, leaving the dentures easy to clean next day.

Of course all dentures should be removed every night and soaked in water to allow the soft tissues in the mouth to come into contact with air. Otherwise candida albicans may proliferate under the denture resulting in thrush infection.

Another practical point which can save a lot of time is to have clients' dentures engraved with their owner's initials. This avoids confusion over whose dentures are whose.

Conclusion

The dental health of elderly people falls into a special needs category due to their often complicated health status and the variety of structures requiring attention in their mouths. Carers should be educated in the dental needs of their clients and encouraged to develop the skills, knowledge and attitudes to maintain good oral health in the people they care for.

References

**PROCESS EVALUATION OF DENTAL HEALTH PROGRAM**

Please complete this evaluation. There is no need to record your name on the evaluation. Its' intention is to provide me with information to discern the effectiveness of the program.

Listed below are several pairs of words or phrases with numbers 1 to 5 between them. I'd like you to circle which number best describes how you feel about the program. The higher the number, the more you think the phrase on the right describes it. The lower the number, the more you think the phrase on the left describes it. You could also pick any number in between.

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<td>Good use of visual aids</td>
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</table>
Appendix 8

IMPACT EVALUATION

Please complete this questionnaire. There is no need to record your name on the questionnaire. One month after completing the dental health program, I will ask you to complete this questionnaire again. This will assist me in evaluating the effectiveness of the program.

Answer True or False to the following statements
Tick one box

1. Fluoride is most important for children but has little effect on the natural teeth of elderly people.
   
   True □ False □

2. The roots of teeth decay more easily than the crowns of teeth.
   
   True □ False □

3. Toothpaste is the recommended cleaning agent for dentures.
   
   True □ False □

4. Where no natural teeth are present, the mouth does not require any cleaning.
   
   True □ False □

5. If the gums bleed during tooth brushing, they should not be brushed.
   
   True □ False □
Answer Yes or No to the following statements
Tick one box

6. I actively discourage clients from eating lollies throughout the day.
   Yes□ No□

7. I actively encourage clients to use artificial sweeteners in their tea or coffee.
   Yes□ No□

8. I ensure that a fluoride toothpaste is used every time a client’s teeth are brushed.
   Yes□ No□

9. I clean the natural teeth of all my clients for them.
   Yes□ No□

10. When I accompany a client to a dental visit, I ensure that a thorough medical history of the client is available for the dentist.
    Yes□ No□

11. Every time I clean a client’s dentures over a sink, I place a facewasher in the sink or fill the sink with water.
    Yes□ No□

12. I sometimes clean clients’ dentures in the shower receptacle during their shower time.
    Yes□ No□

13. I clean all of my clients’ dentures for them.
    Yes□ No□

14. I use fluoride mouthrinse to apply fluoride to my clients’ teeth.
    Yes□ No□

15. I clean the gums of those clients who have full dentures.
    Yes□ No□
How much do you agree with the following statements. Tick one response for each statement.

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<td>1. Dental disease can be severe enough to interfere with aspects of your clients' lives.</td>
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<td>2. It is important for elderly people in nursing homes to get preventive dental care.</td>
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<td>3. Caregivers require special skills to maintain oral health for their clients.</td>
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<td>4. Since most elderly people in nursing homes who have some teeth will eventually lose those teeth, regular dental check-ups are not important.</td>
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<td>5. For those elderly people in nursing homes who have none of their own natural teeth, regular dental check-ups are not important.</td>
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FINALISED PROGRAM

The objectives that each section is aimed to fulfil are recorded in parenthesis.

Section A: The Care of Teeth and Gums.

Slide series and accompanying lecture

Slide 1 Tooth and gum care
Only 44% of people in Australia who are over 65 have no teeth. Most of the elderly population have at least some of their natural teeth to be cared for, and many wear partial dentures to fill in the gaps where teeth have been lost. So keeping the mouths of elderly people healthy, involves attending to teeth, gums, dentures, and soft tissues.

Slide 2 Recession (cognitive objective 1a)
The expression, "he is a bit long in the tooth " points to a dental phenomenon in the aged that is also a great problem for elderly persons. As the gums recede teeth appear to be longer since the roots of teeth are being exposed to the oral cavity. Unfortunately, the roots of teeth do not have the hard enamel covering that the crowns of teeth have had to protect them. Hence, the roots of teeth are far more susceptible to tooth decay than the crowns of teeth.

Slide 3 Factors that increase the risk of tooth decay (behavioural objective 8a and 2b)
Factors that can increase the risk of tooth decay in the elderly are:

. Eating habits change. Many small snacks instead of three meals a day often occurs. New habits such as sucking on boiled lollies or drinking sugared tea regularly develop.
. Inadequate use of fluoride toothpaste and mouth rinses.
Dry mouth—Many elderly people take medications that decrease the flow of saliva. Certain diseases of the salivary glands are more common in elderly people. Saliva is very important in the fight against tooth decay since it washes away the acids produced during eating.

The capacity for meticulous oral care decreases.

Teeth drift and become crowded and difficult to clean.

The question is: what can caregivers do to decrease the risk of dental decay in the mouths of their clients.

**Slide 4 The prevention of tooth decay**

The answer is: ensure that all clients with some of their natural teeth have regular fluoride applied on a daily basis; look at their diets in light of their dental needs; and ensure clients have their teeth brushed daily with particular attention placed on cleaning the gum margin.

**Diet**

**Slide 5 Diet**

To understand the significance of fluoride and diet on clients' susceptibility to tooth decay, a clear understanding of what happens when we eat is required.

**Slide 6 Stephan curve (cognitive objective 2a and 2b)**

Normally the saliva in our mouths has a neutral pH but when we eat this quickly develops into an acidic pH. The acid is formed by the bacteria in plaque breaking down the food into acidic substances. These eating events or acid attacks usually last 20 minutes before the mouth’s pH level returns to neutral. Peoples' teeth can cope with a few acid attacks each day but they cannot cope with constant snacks. If a client has a dry mouth there is not as much saliva to wash away the acids and the
acid attacks last for a longer period of time. Encourage clients with dry mouths to drink water regularly, and to use a saliva substitute prior to eating. Salube is the name of a saliva substitute available from chemists.

**Slide 7 Diet advice (behavioural objective 4)**

If a client enjoys sugary foods they should be encouraged to eat these foods at mealtimes since their mouths are already experiencing an acid attack at these times. Between meal snacks should be food or drink that are sugarless and beverages should be sweetened with artificial sweeteners. Encouraging your clients to use artificial sweeteners in their tea and coffee would benefit their dental health. The instruction is not to stop clients eating sweets that bring interest and variety into their diet but to choose the appropriate time to consume sugary foods to prevent them causing tooth decay. It is not the quantity of sugar but the frequency of eating sugary foods that should concern the dentally aware caregiver. Really bad habits like sucking on boiled lollies have to be stopped. Perhaps you could suggest to those families who bring sweets when they visit to limit the number of sweets to an amount that can be consumed during the visit. Also, food debris must not be left in clients’ mouths for a long period after eating since it will cause the mouth to remain in an acidic state.

**Fluoride**

**Slide 8 Fluoride (cognitive objective 1b)**

Fluoride plays a very important role in the prevention of tooth decay in elderly people. The surface of teeth are made up of crystals that dissolve during acid attacks after eating. If fluoride is present it encourages the crystal to reform. This is why it is important for elderly people with natural teeth to have fluoride applied to their mouths regularly.
Slide 9 Fluoride fights tooth decay in the elderly (behavioural objective 3)

Brushing after every meal with a fluoride toothpaste is a very important preventive dental practice. If it is impossible to brush clients' teeth with a fluoride toothpaste after every meal, the use of fluoride mouthrinses are recommended. If a client cannot rinse, the fluoride solution can be put into an atomiser and introduced into the mouth with two simple short bursts of spray. However, rinsing or sprayng should not be used as a substitute for daily tooth brushing since the day to day removal of plaque is essential for maintaining a healthy mouth.

Oral Hygiene

Slide 10 Oral hygiene and the prevention of gum disease (behavioural objective 8b)

The number of teeth lost due to gum disease is not known, however the number of teeth that need to be extracted due to gum disease increases with age. Furthermore, gum disease is associated with bad breath and although it is a chronic disease it can cause acute episodes of abscess that can be painful and debilitating.

Slide 11 Case of periodontitis (cognitive objective 3a and behavioural objective 1 and 7)

If plaque is not removed from the gum margins regularly, the bacteria in plaque causes the gum margins to become inflamed. The gums look red, swollen, and bleed when they are brushed. Dentists call this condition gingivitis. Many caregivers avoid brushing the gums if they bleed. However, the only way that the gums will stop bleeding on brushing is if the gum margins are brushed thoroughly every day and a dentist should be called to treat any damage that has been done by the gum problem. This slide shows how plaque and tartar, if left on the gum margins can cause gum problems.
The control and prevention of gum disease with these people requires daily removal of plaque and regular professional dental examination and treatment. All new clients should have a dental examination and a system should be implemented to ensure that all clients receive regular dental examinations to prevent dental problems occurring. Whenever you take a client for a dental appointment, ensure that you have a record of their medical history and current medications otherwise the dentist may not be able to treat the client.

**Slide 12 Caregiver brushing a client’s teeth**

**(cognitive objective 3b)**

The daily removal of plaque is often a difficult task to accomplish in a nursing home since most clients are not able to do a thorough cleaning themselves. If a client has bleeding gums, carers may prefer to avoid the gums, but this symptom is often an indication that the gums need more thorough cleaning. Problems with cleaning people’s teeth need to be discussed and solutions found. Some advice that may be helpful is:

- stand behind the client and cradle their head into the crook of your arm when brushing their teeth.
- if the client chews or sucks on the brush, use a mouth prop on one side of a mouth while brushing the other. A face washer rolled up and folded once over forms an accessible, simple mouth prop.
- use a small amount of toothpaste (the size of a pea) and if there is still too much foaming use Colgate junior toothpaste which is a low foaming gel.

The soft tissues that dentures rest on also require daily brushing to maintain optimal health. A soft toothbrush or a mouth swab should be used. As mentioned earlier, the tongue should also be brushed.
Slide 13 Client and caregiver
This man is a client of mine who presented with gingivitis and decay in the roots of his teeth. His caregiver, also photographed here played a large part in resolving these problems.

Slide 14 Root decay and gum disease (behavioural objective 8b)
These are some of his teeth and you can see how red the gums are and how decayed the teeth are. (At this point of the program motivation techniques should be used. Encourage the caregivers to remember an episode in their own dental histories where they experienced pain from their mouths. Relate that to how many clients feel if dental problems are left not treated and prevented.)

Slide 15 After treatment (behavioural objective 8a and 8c)
After restoring two of the teeth and three weeks of regular brushing carried out by the caregiver the gingival health began to show signs of improvement.

Answer any questions that relate to the slide series.
Encourage a brief discussion on the following points:
(cognitive objective 3c and behavioural objective 2)
Discuss with the caregivers appropriate times for toothbrushing in an attempt to establish a regular routine that is not hurried. The most appropriate time for brushing may be different for different groups. Stress that fluoride toothpaste should be used whenever a clients natural teeth are brushed.
With age the capacity for meticulous oral care decreases. Few people in nursing home can adequately clean their teeth and dentures. Hence, all clients should receive assistance to clean their teeth and dentures. This issue should be opened for discussion to identify any objections to accepting this duty of care. Dispel the myth that eating an apple will clean their teeth.
Appendix 9

Discuss problems that caregivers face when they are required to carry out oral hygiene techniques on their patients and possible solutions:

a. Bleeding. Use gloves.
b. Clenching. Use a mouth prop.
c. Vision and access. Describe the head cradling technique.
d. Technique. Discuss a systematic simple approach to tooth brushing.
e. Other problems? Ask the caregivers to express their views.

Discuss the use of mouthwashes. Chlorhexidine mouthwash is the one of choice for clients who have gum problems. Like the fluoride mouthwash, it can be used in an atomiser and sprayed onto the gums if the client cannot rinse.
Section B : The Care of dentures

Video clip from "It's a mouthful" 10 minutes
(cognitive objective 4a, 4b and 4d behavioural objective 6)

Points made by the video are:
- Since the mouth is changing shape all throughout life and dentures do not, dentures should be checked every 2 to 3 years to ensure that their fit is still adequate.
- Dentures should be marked with the initials of the owner to avoid problems of losing or mixing up dentures in a nursing home.
- This can be done by dentists when dentures are remade or relined.
- Expensive commercial cleaning products are not necessary. Clean dentures using soap, a nailbrush and a toothbrush.
- If the denture cleaning is considered an unpleasant task, soak the dentures in mouthwash prior to cleaning or use gloves.
- How to hold the dentures safely when brushing is explained.
- How to place a facewasher in the basin to prevent the denture breaking if dropped by the caregiver during cleaning is explained.
- How to use the nailbrush and toothbrush to clean all parts of the denture is explained.
- Brushing of the gums under dentures is important to stimulate blood flow, and to remove bacteria and dead skin cells.
- Care is required when cleaning dentures that have clasps on them. The clasps should be brushed gently to prevent bending the clasps.
- Denture soaking powders or solutions that contain chlorine should not be used on dentures that are metal based.
- Dentures should be removed overnight and soaked in a glass of water. The reasons given were firstly that dead
skin cells trapped under the denture encourage infection and secondly that by taking the dentures out it gives the gums covered by the dentures some relief.

Dentures should be removed if damage to the gum has occurred. Food particles can sometimes get trapped under a denture and cause an ulcer.

If a denture has a pressure point that is causing pain, the denture will require adjusting by a dental surgeon.

Encourage discussion about the points made by the video and answer any questions about the information.

Clarification of some points made in the video (cognitive objectives 4a, 4b and behavioural objective 5)

Explain that toothpaste is too abrasive for the cleaning of dentures. Point out that if toothpaste is used, the denture surface can be worn away, causing it to become ill fitting. Special denture cleaning pastes are available or the simple use of soap as indicated in the video is adequate.

The video mentions that dentures are sometimes cleaned during showering time in nursing homes. Clarify that the dentures should not be cleaned in the shower recess since if they are dropped they may fracture on the hard shower floor. The denture should be taken to the basin and as shown a facewasher placed in the basin. If a facewasher is not available, half fill the basin with water to protect the denture should it be dropped.

Discuss with the caregivers the frequency of denture cleaning. Encourage them to identify appropriate times to clean their clients' dentures in the light of their other duties and time restraints. Suggest that denture cleaning is difficult to do thoroughly and that all elderly people in nursing homes would find it difficult to clean their dentures properly. All clients should have their dentures cleaned for them at least once each day and preferably after each meal. Those clients wearing partial dentures require cleaning after each
meal since the denture can hold food around the teeth for long periods of time which can cause tooth decay. The marking of dentures can also be done by caregivers using the "Identurc denture marking system" available from 3M.

**Activity** (cognitive objective 4a)

**Aim:**
- To make caregiver aware of the different types of dentures.
- To teach how each type of denture should be held when cleaning them.
- To teach how to use a nail brush in addition to a tooth brush for cleaning dentures.

**Method:**
- Show the group full upper dentures, full lower dentures and partial dentures.
- Demonstrate how to hold these dentures as pointed out in the video. Demonstrate the brushing technique as pointed out in the video.
- Pass around a collections of dentures, nailbrushes, toothbrushes and denture brushes so the group can practice holding dentures, and correct brushing of the dentures.

**Additional information presented using slide series:**
(cognitive objective 4c, behavioural objective 1 and 8)

**Slide 16 Pressure ulcer**
The denture has eaten into the mucous membrane and given rise to a so called pressure ulcer. The client may not necessarily be in pain. Unless the condition is altered by a denture adjustment, the pressure ulcer may spread.

**Slide 17 Denture stomatitis with granulation tissue**
A condition that frequently affects elderly denture wearers is fungus in the palate. As you can see from this illustration, that part of the mucous membrane covered with the denture is bright red. Even though the condition may cause no pain or discomfort, it should be treated since the inflammation
can spread. The treatment, to be performed by a dentist, often consists of giving the patient tablets containing a fungicide to suck.

**Slide 18 Healthy Mucosa**
After a 4 week course of anti-fungal treatment, the mucous membrane is usually healthy looking again. But remember, these inflammations in the oral mucosa are easily prevented by good oral hygiene.

**Slide 19 Angular cheilitis**
Sometimes the fungus infection can spread to the corners of the mouth. Ulcers and inflammation are often observed at the corners of the mouth, particularly if the old dentures have become too low. Then it is often not sufficient to treat the condition with a fungicidal ointment. The old dentures need to be corrected by a dentist.

**Slide 20 Oral Cancer**
This is a slide of an oral cancer under the tongue. Early detection of oral cancer is important since oral cancer has a high mortality rate. Dental surgeons are trained to look for abnormal tissue in the mouth that may be cancerous. This is one of many good reasons why people without their own natural teeth still require regular dental visits.

**Slide 21 Calculus on denture**
Deposits of tartar can occur on dentures just as on natural teeth. It is best removed by soaking the dentures in a diluted solution of vinegar overnight. Use one tablespoon to a glass of water. Brush the denture the next morning using a nail brush. Do not use sharp instruments to attempt to remove the tartar since they will scratch the denture and encourage more tartar to form.
Slide 22 Plaque on denture
If the denture is coated like the one illustrated here, it will cause bad breath and an unpleasant taste in the mouth. At the same time the coatings very often cause inflammation of the mucous membrane under the denture, on the tongue and at the corners of the mouth. One is not always aware of having an inflammation of the mucous membranes. The inflammatory conditions are often symptomless but they can give rise to smarting pains or bleeding areas on the mucosa.

Answer any questions related to the slides.
DATA TABLES

List of data tables

Analysis of data from pre- and post- questionnaire for attitudes

Questions 1-5 raw data by home ..................... 124
Questions 1-5 amended to best response by home ... 125
Questions 1-5 % response ............................. 126
Questions 1-5 Chi square .............................. 127

Analysis of data from pre- and post- questionnaire for knowledge and behaviour

Question 1-15 raw data by home ..................... 128
Question 1-15 amended to best response by home ... 129
Question 1-15 % response by home ................... 130
Question 1-15 % response with t values .............. 131
### Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes

#### Analysis of data for pre- and post- Questionnaire

**Responses - Questions 1-5 for scale of Attitudes - Strongly Agree to Strongly Disagree**

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### Appendix 10

Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes
Analysis of data for pre- and post- Questionnaire
Responses - Questions 1-5 for 5 point scale of Attitudes - Amended to Best Responses = 5

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### Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes

#### Analysis of data for pre- and post- Questionnaire

**Responses - Questions 1-5 for scale of Attitudes - Strongly Agree to Strongly Disagree**

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**Responses - Questions 1-5 for 5 point scale of Attitudes - Amended to Best Responses = 5**

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**% Responses - Questions 1-5 for 5 point scale of Attitudes - Amended to Best Responses = 5**

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Chi Square Test: 2x5

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df = 4  \( \text{Chi} = 5.7 \)  
Significance \( p > 0.10 \)
Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes
Analysis of data for pre- and post- questionnaire

Responses - Number True (1-5), Number Yes (6-15)

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Responses - Number True (1-5), Number Yes (6-15)

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Appendix 10

Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes
Analysis of data for pre- and post- Questionnaire

Responses - Best responses to Questions 1-15 - Pre-test

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Responses - Best responses to Questions 1-15 - Post-test

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### Appendix 10

Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes

Analysis of data for pre- and post- Questionnaire

% Responses - Best responses to Questions 1-15 - Pre-test

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Total: 1  64  61% 50% 50% 98% 84% 28% 18% 65% 58% 84% 48% 52% 73% 16% 51%

Non Responses: 0 0 0 0 0 0 2 1 0 13 0 1 0 0 1

Note: Adjustment made to % for non-response to individual questions and total.

% Responses - Best responses to Questions 1-15 - Post-test

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Total: 2  60  92% 48% 73% 97% 88% 63% 60% 85% 76% 84% 90% 65% 73% 68% 80%

Non Responses: 0 0 0 0 0 0 2 0 1 2 0 0 1 1 0

Note: Adjustment made to % for non-response to individual questions and total.
Appendix 10

Evaluation of dental health program for Care Givers of Elderly People in Nursing Homes
Analysis of data for pre- and post- Questionnaire

% Responses - Best responses to Questions 1-15 - Pre-test

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% Responses - Best responses to Questions 1-15 - Post-test

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