A STUDY OF ORAL HYGIENE AND THE FOOD AND FLUID INTAKE IN GERIATRIC PATIENTS

by

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CHAPTER I

INTRODUCTION

Statement of the Problem

Good nutrition, adequate protein, vitamins and minerals, for the geriatric patient are important if he is to maintain maximum health. Knowledge of the need for good nutrition is not enough. An essential is getting the geriatric patient to eat foods that contribute to good nutrition.

The mouth is the first organ of the digestive system and the condition of the mouth and teeth has an effect on how desirable food is to the patient. The mouth is where saliva and mastication prepare the food for the next step in the digestive process. Will food taste better to a patient who has a clean mouth and will he have more desire for food? If his teeth are in good condition will he be better able to chew the food that is essential to good nutrition?

Good oral hygiene is essential for keeping the mouth clean and the teeth in good condition. Often patients in nursing homes are not able to give their own oral hygiene and are dependent on others to meet this need. It is the responsibility of the nurse or ancillary worker to give oral hygiene to those patients who cannot do it for

themselves. However, oral hygiene is a part of nursing care which may be neglected if there is a shortage of nursing personnel or time, and if enough emphasis has not been placed on its importance. If a patient receives good oral hygiene, will he have an increased appetite and will his food and fluid intake increase, thus, more adequately meeting his nutritional needs ?

A study (11) was done in 1970 by dental hygienists on six nursing home patients with gingivitis. The researchers used dental prophylaxis followed by thorough oral hygiene. The study included stabilizing or eliminating the gingivitis and then determining how long each patient could go between oral hygiene treatments before gingivitis reappeared. Dental prophylaxis included scaling and cleaning of teeth to remove calculus. The teeth were scaled and polished using brushes and pumice and then given one application of acidulated fluoride phosphate topical jel which has 1.23 percent fluoride. Thorough oral hygiene was defined as brushing the teeth with a Lactona 19 toothbrush using the individual patient's own toothpaste. The teeth were brushed using the sulcular method, which is the vibrating of the brush bristles horizontally at the gingival sulcus and then brushing vertically toward the crown of the tooth anteriorly and posteriorly. The occlusal areas were brushed and the mouth rinsed well with water. The interproximal spaces were cleaned with yarn.

The researchers found that when gingivitis had been eliminated

or stabilized and an oral hygiene program maintained, the interval between oral hygiene treatments could be increased to three or four days without a recurrence of inflammation.

During the study it came to the attention of the researchers that the food and fluid intake seemed to have increased. Since that study had not been designed to collect those data, the principal investigator suggested a study be done to follow through on that impression.

Purpose of the Study

This study was done to test the relationship between oral hygiene and intake of geriatric patients--specifically to test two hypotheses:

1. Thorough oral hygiene twice a week would increase the food intake of the geriatric patient.
2. Thorough oral hygiene twice a week would increase the fluid intake of the geriatric patient.

Research Design

Selection of Participants

All of the patients in the study were presently residing in a 189 bed private religious extended care facility which had Medicare approval. Patients in this agency received dental services from the University of Oregon Dental School which included examining all of the teeth, giving prophylaxis and doing dental repair on those patients who

required it. This was for an eight-week period, summer 1970.

This study was done in conjunction with another one (29) to determine if oral hygiene twice a week produced a change in gingivitis. Therefore, the participants in both studies met the same criteria for selection as study patients. The criteria included patients who were 65 or older, were at least partially dentulous, had gingivitis, of either sex, and were not seriously ill. Data could only be collected on patients who remained throughout the study. Two patients who met the criteria were eliminated from the study when they became ill and were hospitalized. The patients could be on any kind of diet which included food and fluids. Those patients receiving only fluid diets were excluded.

Permission to do the Study

The administrator and the nursing service director of the nursing home were contacted for permission to conduct the study. Written permission was obtained from the 16 patients who were included in the study on the form found in Appendix A. The cooperative attitude of both staff and patients facilitated the completion of the study.

Methodology

The descriptive data of the participants were obtained from the official nursing home records. These data included age, sex, diet,

medications and diagnosis.

Each person selected for the study served as his own control. Each patient was visited by the gerondontologist who diagnosed them as having gingivitis. For the next seven days the total food and fluid intake for each 24 hour period was recorded. The recording was done by the nursing personnel who were licensed practical nurses and aides. The method of recording was explained by the director of nursing and the researcher with continual observation of the method of recording throughout the study. The nursing personnel were cooperative in recording the intake. This agency has standard measures to estimate amounts of food and fluid as found in Appendix B. Since the personnel were familiar with the use of these estimates they were adopted for this study.

The researcher is aware of the limitations of the use of estimates of food and fluid intake compared with more accurate measures. However, this was an exploratory study and it was not realistic to expect the nursing home staff to take the time to measure and weigh all food and fluids. The dietitian offered to weigh the food before and after each meal but she was unable to keep her commitment.

A data collection form found in Appendix C was developed for recording the food and fluid intake of the patients each 24 hour period. This form consisted of a record of breakfast, lunch, dinner and

between meal snacks. Some of these records were kept at the patients' bedsides and others were kept at the nursing stations.

Dental prophylaxis was carried out on each patient, followed by one week of daily thorough oral hygiene using 1/2 sodium chloride and 1/2 sodium bicarbonate. The oral hygiene was then continued twice a week on Mondays and Thursdays for a six-week period.

When, according to the other researcher (29) in conjunction with the dental hygienist, the gingivitis was stabilized, the food and fluid intake was again recorded. This was the experimental phase of the study which lasted 14 days. Details of this phase will be discussed in Chapter III.

Overview of the Study

The report of this study is divided into four chapters.

Chapter I contains an introduction to the statement of the problem, purposes of the study, and design of the study.

Chapter II is devoted to a review of pertinent literature and related studies.

Chapter III describes the study, the analysis and interpretation of the findings of the study.

Chapter IV consists of the summary and conclusions of the study and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE AND RELATED STUDIES

Introduction

The review of the literature consists of a review of information on nutrition of the aged, and the relationship of dental and mouth health to nutrition.

Nutrition of the Aged

The percentage of people 65 years or older is increasing in the United States. In 1900, 4.1 percent of the population was 65 years or older. In 1970 the population over 65 years was 9.5 percent. The projection into 1980 is that 9.9 percent of the population will be over 65 years of age (31).

Medical science has increased the length of life. This does not, however, insure the individual of a healthy, useful, contented old age. The opposite is true due to older people being chronically ill and many of them partially or totally disabled (20). One of the problems which confronts older people is the maintenance of nutrition. Good nutrition can retard senescence, prevent degenerative and chronic diseases, and allow a longer and more comfortable life (1, 18, 39). However,

there is little research specifically in the area of geriatric nutrition, such as normal daily requirements or metabolism in old age.

Paulsen (24) measured the food of 20 patients, males and females, over 60 years of age who were not acutely ill. He estimated that 1600 calories were adequate for women who were over 60 years of age. No estimate was given for men. He found the mean caloric intake for women was 1037 and for men 1331. Both Ohlson et al., and Winters and Leslie have reported low caloric intake in elderly geriatric women (23, 42).

Physicians and dietitians have noted that one of the most common nutrients deficient in the geriatric diet is protein (13, 26, 32, 37). Some of the clinical manifestations of the lack of protein are retarded bone and wound repair, mild types of anemia, decreased resistance to infection, edema, habitual fatigue, and tissue wastage (18, 25, 26, 28, 41). Horwitts (16), who has studied nutritional disorders of older individuals at a state hospital, concluded that the normal protein requirement for individuals over 60 is the same as for any adult. Both Horwitts and Paulsen (16, 24) found in their study of people over 60 that positive nitrogen balance can be maintained on one gram of protein per kilogram of body weight.

A study (24) in which protein was measured indicates that the average intake of protein for the 16 women in the study was 29 grams per day, ranging from 20-43 grams. The mean value for men was 38

grams. The researchers stated that these protein intakes were well below the estimated daily requirements for these individuals.

A statewide survey carried out by Swanson (38) was based on an area probability sample of self-chosen food intakes to determine the caloric, protein and calcium intake. This study was carried out using the 24 hour recall method and involved 1072 Iowa women ranging between 30 and 90 years of age. The daily menus were representative of 650,000 women of this age living in Iowa. The amount of calories accepted as adequate for this study was 1600 and almost all of the patients age 70 years or above fell below this amount. The amount of protein accepted as adequate for needs of this study group was 60 grams. Those women up to age 65 received sufficient protein but after age 65 all of the women fell well below this amount. Only those in the 30 to 39 year range received the 0.8 grams calcium as designated adequate for the study group.

The normal carbohydrate and fat intake for older people was not found. Diets of older people have not been analyzed in terms of actual fat and carbohydrate intake.

Older people need adequate vitamins and minerals to prevent symptoms of capillary and bone fragility, osteoporosis and anemia (7, 8, 18, 24). Paulsen (24) was the only researcher found to have studied the mineral intake of people over 60 years of age. He estimated the daily requirement of calcium for the study population was

0.6 grams, phosphorus 1.3 grams, and for iron 12 mg. He found the intake of his study patients was below recommended requirements in all three of these minerals. The absolute calcium intake varied between 0.19 and 0.65 grams with a mean of 0.35 grams. The range of phosphorus was between 0.44 and 0.86 grams with a mean of 0.57 grams. The iron intake ranged from 3.2 to 9.2 mg with a mean of 4.5 mg. According to Paulsen, the recommended daily allowance of vitamins for people over 60 years is vitamin A 2500 units, thiamine 1.2 mg, riboflavin between 1-2 mg, niacin 10-20 mg, vitamin C 22-32 mg, and vitamin D 250 units. All of the patients studied were deficient in all these vitamins except C.

Chinn (7) found that 15 of 500 older people admitted to a private hospital with a variety of diagnostic conditions had a severe malnutrition and avitaminosis as their primary disability. These patients had sufficient income, which would point to the fact that nutritional problems occur in all socio-economic groups.

In a study (28) done in a geriatric institute in the Bronx, the diets of patients were measured for seven consecutive 24 hour periods. The results of this study showed that the vitamin intake was within the normal range with no apparent defect in their absorption. This study gave no data as to the number of people involved or their income and made no reference to other variables which may have affected the outcome.

Davidson (9) studied 104 individuals in the Age Center of New England in Boston. These people were mostly middle class or above and were living on less income than previously. The income range was from below $1,000 a year to above $20,000 a year. The age range was between 51 and 97 years, with two-thirds being 70 years or older. The membership was divided equally between males and females. This questionnaire study carried out by interviews was done to determine present food and nutrient intake and social and economic aspects as related to nutrition. Vitamin intake calculated from food alone showed a relatively low daily intake in a large proportion of the members. In 40 percent of the group less than 1 mg of thiamine was obtained from food. There were less than 2 mgs of riboflavin in the food of 67 percent of the people. The intake of niacin in 95 percent of the members was less than 20 mgs. The amount of ascorbic acid obtained from food was less than 50 mgs in 27 percent of the members in the study.

Spies and Collins (35) report on findings from the nutrition clinic, Hillman Hospital, Birmingham, Alabama on two white patients brought into the clinic. One was 70 years old, semicomatose on admission; the other was 50 years old, confused and disoriented. Both patients were given high protein, high caloric, high vitamin and mineral diets. The 70-year-old was given thiamine 5 mgs, riboflavin 2.5 mgs, and nicotinic acid 75 mgs three times a day for three weeks.

The 50-year-old patent was given thiamine 50 gms intravenous, then thiamine 20 mgs and niacin 500 mgs orally daily divided into several doses. These patients improved with treatment and were able to return to normal living situations. The authors said these two cases of malnutrition illustrate that similar symptoms due to poor nutrition may accompany old age and be considered by the physician as just the process of aging and thus be disregarded. They stated that results from these and other cases indicate greater effort should be made to detect nutritive deficiencies and specific treatment carried out. It must be remembered, however, that this is a very small sample, since it involves a report of only two patients.

According to Swanson (38), when food over a period of time does not provide adequate nutrients, this causes an alteration in the body fluids and eventually the cells can no longer adjust to the changes. This alteration manifests itself in unusual behavior, activity and mental state. It is significant that changes induced by poor nutrition are changes which are associated with aging.

A thiamine depletion study (16) was carried out on six men between 62 and 81 years of age and five men between 28 and 44 years of age. All of these men were given 4 mgs of thiamine and 3.1 mgs of riboflavin in their diet and vitamin supplement for two years. Their diets were then restricted to 0.2 mgs thiamine and .75 mgs of riboflavin. The urinary excretion of thiamine and riboflavin was

measured for a period longer than three months. The results showed that though the average excretion values for the older men were a little lower than for the younger men, there was sufficient overlapping of the individual results to show that small differences in the averages were not significant. The information from the riboflavin study showed that the older men retained riboflavin as long as the younger men did. The researchers said their studies prove that the nutrient requirements for the older person are the same as for the younger person, but this does not eliminate the fact that nutrition for the aged is still a problem.

It is the opinion of another author (36) that the bowel of an older person has decreased vascularity and is more susceptible to trauma which can impede absorption. Because of this inefficient absorption larger quantities of food substances containing the specific nutrients need to be ingested to allow for the wastage.

Concomitant to the problem of adequate nutritive intake for the geriatric person is maintenance of fluid intake (6, 34, 39). Water is an essential component of the body and functions in many capacities to maintain homeostasis. The fluid intake requirements of an individual varies from between 1500-3000 cc a day (2, 19).

Relationship of Dental and Oral Health to Nutrition

One of the physical factors that prevents older people from

eating the proper foods is poor condition of the mouth and teeth. Horwitt (16) asserts that the loss of teeth and the absence of dentures is one of the most important factors affecting the nutrition of the aged. Many of their food choices are due more to the lack of masticating machinery than the aging process. Decayed or missing teeth, or ill fitting dentures are often the reasons why the older person changes the consistency of his diet, eating more soft cereal food than protein foods that are essential for his diet (4, 8, 14, 17, 20, 23). It has been noted by Watkins and Stieglitz (41) that the lack of bulk foods in the diet can cause constipation or if bulk food is eaten but not masticated well it can cause an irritable bowel which alternates between diarrhea and constipation. These conditions add to the general ill health of the individual.

According to Fones (12), what food is eaten is of prime importance and second to this is that the hygienic or unhygienic condition of the mouth may cause the food to be fit or unfit for consumption. He adds that the detrimental effects to the whole body caused by decomposing food in habitually unclean mouths are well recognized.

Bunting (5) emphasizes that the mouth needs more cleaning than any other part of the body; that it is more habitually dirty and more often diseased than other tissues or organs. Montag and Swenson (21) say that the care of the mouth and teeth affects the well being of the

body as well as the care of the body affecting the health of the mouth and teeth. It is the opinion of Price (27) that predisposing factors of tooth decay, unhealthy mouth and gums are poor physical condition, faulty nutrition and failure to clean and care for the mouth daily.

Mouth health has a marked effect upon nutrition and there is a surprising improvement in the appetite following correction of unhealthy conditions (22, 34). Unfortunately, these are only opinions which have not been subject to the rigors of research.

In a study done by Davidson et al. (9) of 104 members of the Age Center of New England, Boston, a dental team rated the participants' chewing ability from poor to fair, and good to excellent, with an equal number in each category. Twice as many of the members with poor function as those with good function had a low protein intake of less than one gram per kilogram of weight or above. The researchers concluded that protein intake was related to chewing ability.

Summary

A search of the literature did not reveal as much pertinent information regarding nutrition of the aged and its relationship to oral hygiene as would be expected of a problem with this scope. Specifically, there were little data on research which showed the necessary requirements of nutrients for the person over 65 years of age. However, those studies which were carried out show that the same

amounts of protein, vitamins and minerals are necessary as for any adult. Most of the literature indicated that the geriatric person was not receiving the recommended daily dietary allowances which are thought to be essential for the maintenance of health. Support was found for the relationship between good nutritional intake and oral hygiene.

CHAPTER III

REPORT OF THE STUDY

Introduction

This study was done to test the relationship between oral hygiene and intake of geriatric patients--specifically to test two hypotheses:

1. Thorough oral hygiene twice a week would increase the food intake of the geriatric patient.
2. Thorough oral hygiene twice a wekk would increase the fluid intake of the geriatric patient.

This study was done in conjunction with another study in which the same population was used to determine if oral hygiene twice a week was sufficient to produce a change in gingivitis (29).

Description of Participants

The sample population consisted of 14 nursing home patients, nine females and five males. This differs slightly from the distribution that occurred one year in the agency where the study was carried out which showed a ratio of three female patients to one male patient. According to the official records of the nursing home where the study was carried out, the average age of the patients was 82 years. This

is very close to the average age of the patients in this study ($\bar{X}$ = 80). The range of the patients ages was 60 to 92 as shown in Table 1.

Table 1. Frequency Distribution of Study Patients by Age.

Ages	Patients	
	N	%
60-69	1	7
70-79	6	42
80-89	5	37
90+	2	14

The diagnoses of the patients in the study are those which would be expected in people over 65 years of age. Diagnoses of the patients are shown in Table 2.

Table 2. Frequency Distribution of Study Patients by Diagnosis.

Diagnosis	Patients	
	N	%
Fractured hip	1	7
Trigeminal neuralgia	1	7
Cerebral atrophy	2	14
Arthritis	2	14
Diabetes mellitus	3	21
Arteriosclerosis	5	37

All but two of the patients were on one or more medications daily. If a patient received a medication, the average number of

medications he did receive was 3.2. Table 3 shows the distribution of the medications.

Table 3. Frequency Distribution of Study Patients by Number of Medications.

Number of Medications	Patients	
	N	%
0	2	14
1	1	7
2	4	30
3	2	14
4	2	14
5	2	14
6	1	7

Proper mastication is dependent upon two surfaces of teeth which come together. All but one of the patients had at least one chewable surface. Even though the number of chewable surfaces as shown on Table 4 is small, at least these people had some of their own teeth remaining.

Table 4. Frequency Distribution of Study Patients by Number of Chewable Surfaces.

Number of Chewable Surfaces	Patients	
	N	%
0	1	7
1- 4	3	21
5- 9	4	29
10-15	6	43

Seven of the patients were on a general diet. Three were on a diabetic diet, and the other four patients were receiving some type of special diet as seen in Table 5.

Table 5. Frequency Distribution of Study Patients by Diet.

Diets	Patients	
	N	%
Low sodium	1	7
Mechanical soft	1	7
High caloric	1	7
900 Calorie	1	7
Diabetic	3	21
General	7	51

Test of the Hypotheses

Prior to the beginning of thorough oral hygiene, the food and fluid intake of all of the patients was recorded for seven days. This was the control period. After the gingivitis had been stabilized, as reported in the other study (29), the food and fluid intake was recorded for 14 days. This was the experimental phase of the study. Each patient served as his own control. The nursing personnel recorded the actual food intake of each day on a separate page using the standard measures of the agency as a basis for their estimates. The researcher is aware that estimates of food intake are not as accurate as other measures. However, for the purposes of this study the less

precise method was adopted. It is not known whether the nursing personnel overestimated or underestimated the amounts of food eaten. The same measures were used in the control and experimental phase of the study, the nursing personnel remained the same, so it was assumed that the same kind of reporting was being done throughout the study. The nursing personnel were aware that there was a study going on but were not aware of the purposes of the study. They maintained a complete record of the patients' daily intake. There is no reason to believe with their busy daily schedule that the patients in the study were fed more or less than any other patient. The researcher was in the agency each day during the control and experimental phases of the study to observe the daily routines. Because of this constant presence she was accepted by the staff. No attempt was made to record foods that were brought to the patients by the family. It is assumed that patients receiving food during the control phase also received food during the experimental phase.

The researcher and another registered nurse converted the actual amounts of food into calories, protein, carbohydrate and fat. The second nurse is an expert in the field of diabetes mellitus, she has taught patients, physicians and dieticians how to convert amounts of food into their basic values. The source used for this conversion was Food Values of Portions Commonly Used (3). A mean intake of each of the nutrients and fluid was then obtained for the control and

experimental periods of the study. The difference between the mean intake of the two phases of the study were then determined.

The difference in the caloric intake before and after oral hygiene of the individual patients is shown in Table 6. All but one of the 14 patients showed an increase in total caloric intake after instituting thorough oral hygiene twice weekly. The amount of increase in calories ranged from 10-410. All but two of the patients showed an increase of over 100 calories. According to the dietitian in the agency where the study was carried out, the general diet has 1800-2100 calories. The literature indicates that healthy women over 65 should have 1600 calories and healthy men 2200 (15). There were seven patients on general diets and only one was eating at or above 1600 calories. After the patients received the thorough oral hygiene regimen, three of the seven received 1600 calories or above. One of the patients was on a restricted 900 calorie diet, however, after the oral hygiene regimen her caloric intake increased. These data indicate that hypothesis one is supported.

The literature indicates the average protein intake is one gram per kilogram of body weight or an average of 65 grams for men and 55 grams for women (30). The amount of protein in the general diet of patients in the agency where the study was carried out was 70 grams. Table 7 indicates that three of the patients decreased their protein intake during the experimental phase of the study. The loss for two of

Table 6. Mean Difference in Caloric Intake for Individual Study Patients Before and After Thorough Oral Hygiene Regimen.

Patient Number	Diet	Before	After	Difference
1	General	1507	1517	+ 10
2	Mech. soft	1572	1906	+334
3	Diabetic	1386	1594	+208
4	Diabetic	1481	1776	+295
5	Diabetic	1797	1812	+ 15
6	General	1277	1421	+144
7	Low na	635	816	+181
8	General	1588	1247	-341
9	High caloric	2635	2743	+108
10	General	1252	1478	+226
11	General	1561	1766	+205
12	General	1481	1891	+410
13	900 calorie	840	1039	+199
14	General	1830	2143	+313

Table 7. Mean Difference in Grams of Protein Intake for Individual Study Patients Before and After Thorough Oral Hygiene.

Patient Number	Before	After	Difference
1	71	86	+15
2	78	90	+12
3	84	95	+11
4	77	92	+15
5	103	101	- 2
6	44	57	+13
7	26	34*	+ 7
8	74	61	-13
9	129	127	- 2
10	61	72	+11
11	77	90	+13
12	78	103	+25
13	52	78	+26
14	77	93	+16

* Patient weighed 80 pounds.

of the patients was two grams. One patient lost 13 grams, which will be discussed later. Of the 11 patients who had an increase during the time of thorough oral hygiene, the range of the increase was from 7-26 grams. Fifty percent of the patients increased over 15 grams. These data indicate that hypothesis one was supported.

There are no known daily requirements of fat for people 65 years and over. The fat intake in the general diet of the agency where the study was carried out was approximately 75 grams. Three of the study patients received this amount or above before the oral hygiene compared with seven who received this amount or more afterward. All but two of the patients increased their fat intake in the experimental phase of the study. This would be expected with an increase in caloric intake. Hypothesis one was again supported. The data to show this information are found in Table 8.

There are no known daily requirements of carbohydrate for people 65 years and older. The carbohydrate intake in the nursing home where the study was completed was 160-180 grams. Six of the study patients were eating this amount or above before the oral hygiene. After the oral hygiene regimen, nine patients were receiving 160 or more grams carbohydrate. Twelve of the study patients increased their carbohydrate intake during the experimental phase of the study, as shown in Table 9. Again hypothesis one was supported.

One of the patients had a decrease in her calories, fat,

Table 8. Mean Difference in Grams of Fat Intake for Individual Study Patients Before and After Thorough Oral Hygiene.

Patient Number	Before	After	Difference
1	63	66	+ 3
2	64	79	+15
3	52	59	+ 7
4	67	78	+ 9
5	79	80	+ 1
6	55	67	+22
7	22	33	+11
8	67	53	-14
9	132	127	- 5
10	51	60	+ 9
11	73	81	+ 8
12	65	86	+21
13	27	36	+ 9
14	104	114	+10

Table 9. Mean Difference in Grams of Carbohydrate Intake for Individual Study Patients Before and After Thorough Oral Hygiene.

Patient Number	Before	After	Difference
1	165	145	-20
2	171	209	+38
3	154	171	+17
4	143	177	+34
5	169	172	+ 3
6	149	150	+ 1
7	83	99	+16
8	178	133	-45
9	241	272	+31
10	119	164	+45
11	155	171	+16
12	142	177	+35
13	100	109	+ 9
14	159	187	+28

carbohydrate and protein. At the beginning of the experimental phase of the study her roommate developed a bowel obstruction necessitating immediate hospitalization. One explanation for the decrease in her appetite could have been the loss of her roommate. During the experimental phase she was alone at meal time whereas during the control phase she had companionship at meal time.

The nursing home dietitian is cognizant of the amount of fat, carbohydrate, protein and the caloric value of each meal served to the patients every day. The patient is offered specified amounts of nutrients. Many of the patients do not eat all they are served and if their diets are not in balance the agency has at least made it possible for them to be so. The same situation does not exist for fluids. The patients are dependent on the nursing staff for receiving much of their fluid intake. There was no patient in the study who was on fluid restriction yet there were eight patients during both the control and experimental phase of the study whose intake was below the minimum of 1500 cc daily. Five of the patients had a decrease in their fluid intake during the time they were receiving thorough oral hygiene. Nine of the patients had an increase in their fluids as shown in Table 10. Whether this difference in increased fluids was due to the thorough oral hygiene or to uncontrolled and possibly unrecognized variables is not known, therefore the data support hypothesis two.

The increase in fluid intake could have been due to the weather.

Table 10. Mean Difference in Cubic Centimeter of Fluid Intake for Individual Study Patients Before and After Thorough Oral Hygiene.

Patient Number	Before	After	Difference
1	1194	1144	- 50
2	1378	1680	+302
3	1474	1663	+189
4	1242	2159	+917
5	1791	1883	+ 92
6	1169	1083	- 83
7	972	1096	+124
8	1696	1110	-586
9	2459	2667	+208
10	1541	1445	-106
11	1231	1489	+258
12	1210	1420	+210
13	1590	1452	-138
14	1927	2028	+101

The study was done in July, with the average temperature being 85°, and there was no rainfall. This dry warm temperature is not typical for this area. Those patients who increased their fluid intake may have asked for and received more fluids, conversely those patients who did not have an increased fluid intake may not have asked, or may have asked and not received, more fluids. The temperatures of the patients were not kept and recorded for the study which might explain the increase or decrease in fluids. The researcher observed that many of the patients did not have bedside pitchers. Some of the patients were ambulatory and others were in wheelchairs, so both of those groups could have supplemented their fluid intake on their own from the drinking fountain.

CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The literature supports the belief that maintenance of adequate nutrition is a geriatric problem. Good nutrition can retard senescence, decrease degenerative and chronic diseases and allow a longer, more comfortable life. One of the reasons older people may not maintain an adequate diet is poor oral hygiene. It was the purpose of this study to test two hypotheses:

1. Thorough oral hygiene twice a week would increase the food intake of the geriatric patient.
2. Thorough oral hygiene twice a week would increase the fluid intake of the geriatric patient.

The sample population of this study was 14 partially dentulous men and women mainly on a general diet in a nursing home. All of these patients were diagnosed as having gingivitis. The 24 hour food and fluid intake of the study patients was observed for seven days prior to the beginning of a program of thorough oral hygiene. The gingivitis was stabilized and was then controlled through twice weekly oral hygiene. At the time the gingivitis was stabilized the intake was again

recorded. The experimental phase of the study lasted 14 days. Each patient served as his own control. The nursing personnel estimated the food and fluid intake. These amounts were then converted into calories, protein, carbohydrate and fat by using a book of standard measures. A mean value was determined for each respondent on calories, protein, carbohydrate, fat and total fluids both before and after the institution of oral hygiene. Except for one patient who had a decrease in all of the five areas, there was an increase in intake of food. The hypothesis, thorough oral hygiene twice a week would increase the food intake of the geriatric patient, was supported. Nine of the 14 patients reported an increase in fluid intake with the change in dental care. The hypothesis, thorough oral hygiene twice a week would increase the fluid intake of the geriatric patient, was also supported.

Conclusions

The fact that the hypotheses were supported leads to the conclusion that the patient whose gingivitis is controlled and is then maintained on oral hygiene twice a week will eat better. It is suggested that older people, not in nursing homes, who have gingivitis controlled will maintain adequate nutrition and not become ill as readily. More of the patients had increased than decreased fluid intake when their gingivitis was stabilized and controlled with thorough oral

hygiene. However, there are many variables which may have had as great an influence on the outcome as the oral hygiene.

Recommendations for Further Study

It is recommended that this study be repeated with a larger sample over a longer period of time. Both the control and the experimental phases should be extended to allow for collection of sufficient data. It is further recommended that the study be designed and financed so that foods could be accurately weighed rather than estimated. A study of this nature would include all foods provided the patient from any source. Any replication of this study should try to provide control of intervening variables such as state of ambulation, severity of illness, whether patients had to be fed or could feed themselves, and similarity of diet.

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APPENDICES

APPENDIX A

Permission Form

DENTAL HEALTH MAINTENANCE PROGRAM

PREVENTIVE CARE

One of the outstanding health problems faced by older people is that of maintaining the mouth in a reasonable degree of cleanliness and function. The problem exists in the person who has all, some, or a few teeth, as well as in the person who has dentures. Many of our elderly people now desire to maintain their teeth or dentures in a reasonable state of health and function, but this goal is extremely difficult when there are other health problems involved.

The purpose of our Preventive Dental Care Program is to assist the person to maintain a reasonable degree of oral hygiene, to teach better care of their mouths, and to slow down or halt the existing disease conditions such as dental caries (decay) and diseases of the gums (pyorrhea).

- -

We request permission to provide a Preventive Dental Care Program to: _____.

The attention to be given to the oral cavity will consist of the following items: _____

_____

The estimated relative value of preventive care services is presently given as $_____.

Other conditions or limitations associated with this Preventive Dental Care Program are given as follows:

A record of food and fluid intake to be kept and an oral hygiene program instituted to determine the minimal optimal oral hygiene necessary to maintain gingival health.

Permission is hereby granted by the undersigned to initiate and carry out the procedures designated above. It is further understood that such procedures do not constitute nor necessarily finalize a dental care program for the designated individual.

SIGNED _____

APPENDIX B

Standard Measures Form

Intake-Output Record for Bedside Use

Patient's Name: _____ Room No. _____

Standard Measures:

Soup cup	160cc	Ice cream - dixie cup	90cc
Coffee pot	310cc	Jello-dish (except whipped)	50cc
Coffee cup	150cc	Large glass	200cc
Cream pitcher	30cc	Juice glass	120cc
Bread = 1/2 slice		Vegetable and Potato served by scoop = 1/3 cup	

Date	Time	Intake	Output	Date	Time	Intake	Output

APPENDIX C

Data Collection Form

24 HR INTAKE

Patient's Name: Date:

FOOD	FLUID (cc)
Breakfast	Breakfast
Lunch	Lunch
Dinner	Dinner
Between Meals	Between Meals

APPENDIX D

Raw Data

Means of Food and Fluid Intake for Individual Study Patients Before and After Thorough Oral Hygiene Regimen.

Patient Number	Calories		Protein		Carbohydrate		Fat		Fluids	
	before	after	before	after	before	after	before	after	before	after
1	1507	1517	71	86	165	145	63	66	1194	1144
2	1572	1906	78	90	171	209	64	79	1378	1680
3	1386	1594	84	95	154	171	52	59	1474	1663
4	1481	1776	77	92	143	177	67	78	1242	2159
5	1797	1812	103	101	169	172	79	80	1791	1883
6	1277	1421	44	57	149	150	55	67	1169	1083
7	635	816	26	34	83	99	22	33	972	1096
8	1588	1247	74	61	178	133	67	53	1696	1110
9	2635	2743	129	127	241	272	132	127	2459	2667
10	1252	1478	61	72	119	164	51	60	1541	1445
11	1561	1766	77	90	155	171	73	81	1231	1489
12	1481	1891	78	103	142	177	65	86	1210	1420
13	840	1039	52	78	100	109	27	36	1590	1452
14	1830	2143	77	93	159	187	104	114	1927	2028

AN ABSTRACT OF THE THESIS OF

WILMA G. POPE

for the Master of Science in Nursing Education

Date of receiving this degree: June 11, 1971

Title: A STUDY OF ORAL HYGIENE AND THE FOOD AND FLUID INTAKE IN GERIATRIC PATIENTS

Approved: [redacted]
(Associate Professor in Charge of Thesis)

This study was undertaken for the purpose of determining whether there was a relationship between thorough oral hygiene twice a week and improved food and fluid intake in geriatric patients in a nursing home.

Following a review of literature which included information on nutrition of the geriatric person and the relationship of dental and oral health to nutrition the study was carried out on 14 patients who were residing in a 189-bed private religious extended care facility. This study was done in conjunction with another study which was carried out to determine if oral hygiene twice a week produced a change in gingivitis. Therefore, the participants in both studies met the same criteria. The criteria included patients who were 65 years

or older, partially dentulous, had gingivitis, of either sex, and were not seriously ill. Data could be collected only on patients who remained throughout the study and whose diet consisted of both foods and fluids. Each person selected for the study served as his own control. Each patient was visited by the gerondontologist who diagnosed them as having gingivitis. For the next seven days the food and fluid intake for each 24 hour period was recorded using a data collection form which consisted of a record of each meal and between-meal snacks. The recording was done by the nursing home personnel who estimated the amounts of food and fluid according to the standard measures of the nursing home where the study was carried out. Dental prophylaxis was carried out on each patient followed by one week of daily thorough oral hygiene. When, according to the other researcher in conjunction with the dental hygienist, the gingivitis was stabilized, the food and fluid intake was recorded for 14 days.

The actual amounts of food were converted into calories, protein, fat and carbohydrate. A mean intake of each of the nutrients and fluid was then obtained for the control period and the experimental period of the study. The differences between the mean intake of the two phases of the study was then determined.

Findings

On the basis of this study the two hypotheses were accepted.

Thorough oral hygiene twice a week would increase the food intake of the geriatric patient.

Thorough oral hygiene twice a week would increase the fluid intake of the geriatric patient.

All but one of the 14 patients showed an increase in total caloric intake with thorough oral hygiene twice weekly. The amount of increase in calories ranged from 10-410 with all but two patients increasing over 100 calories.

The protein intake of 11 of the patients increased during the experimental phase of the study with a range of 7-26 grams. Fifty percent of the patients increased over 15 grams.

Twelve of the patients increased their fat and carbohydrate intake with thorough oral hygiene twice weekly.

One of the patients had a decrease of all of her nutrients during the experimental phase of the study. An explanation of this decrease may have been the fact that her roommate became ill and was hospitalized at the beginning of the experimental phase and was gone during the entire period, thus leaving her to eat her meals alone.

Nine of the patients increased their fluid intake during the experimental phase of the study. Whether this increase was due to the warm weather or patients' temperatures which were not recorded or other variables is not known.

Conclusions

The support of the hypotheses leads to the conclusion that the patient whose gingivitis is controlled and is then maintained on oral hygiene twice a week will eat better.

Recommendations for Further Study

It is recommended that this study be repeated with a larger sample over a longer period of time. Both the control and the experimental phases should be extended to allow for collection of sufficient data. It is further recommended that the study be designed and financed so that foods could be accurately weighed rather than estimated. A study of this nature would include all foods provided the patient from any source. Any replication of this study should try to provide control of intervening variables such as state of ambulation, severity of illness, whether patients had to be fed or could feed themselves and similarity of diet.