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Effects of an inpatient preventive dentistry program on patients and staff



**Author**
Summerhays, Gerald S.

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# EFFECTS OF AN INPATIENT PREVENTIVE DENTISTRY PROGRAM ON PATIENTS AND STAFF

by

Gerald S. Summerhays

THESIS

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in

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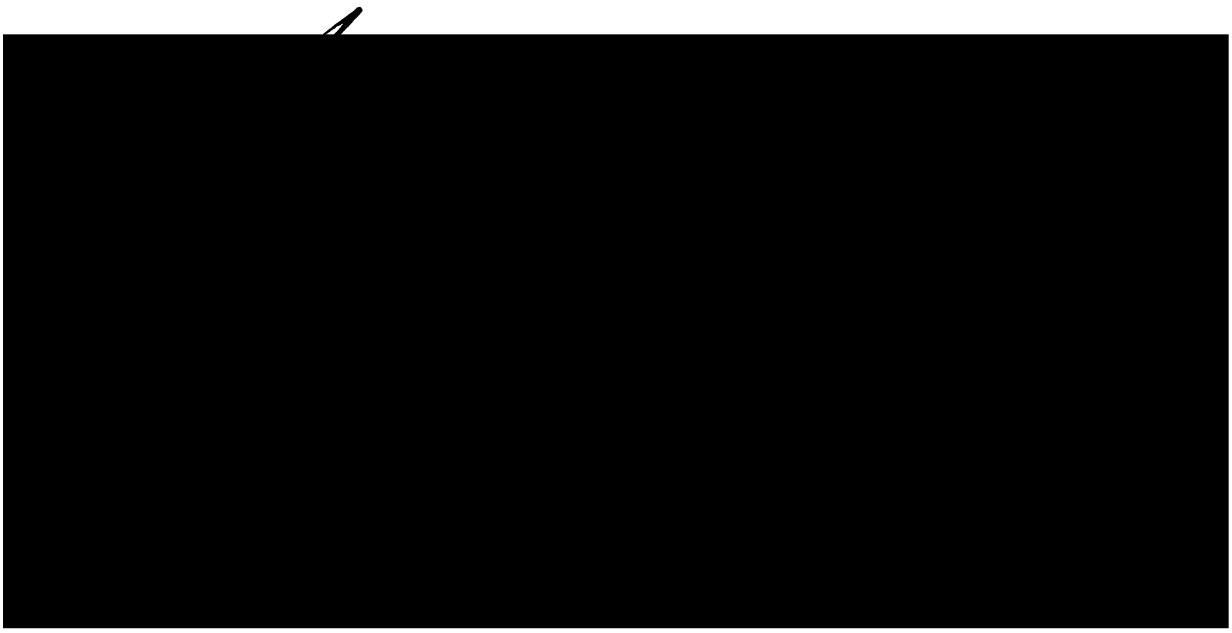

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# I. INTRODUCTION

A. OBJECTIVE: To test the hypothesis that a hospital preventive dentistry program can effect an improvement in the oral health of inpatients.

1. To evaluate the overall effectiveness of the preventive dentistry program at the USPHS Hospital, San Francisco.
    a. To determine the decrease, if any, in the amount of plaque on the teeth of inpatients.
    b. To determine the improvement, if any, in the knowledge, attitudes, and practices of inpatients.
    c. To determine the improvement, if any, in the knowledge, attitudes, and practices of nurses.
2. To evaluate the effectiveness of each component of the hospital preventive dentistry program.

B. BACKGROUND:

Hospitals have historically been crisis care centers. The pathology leading to admission was the only consideration. In recent years health care administrators and health professionals have become increasingly committed to holistic patient care and preventive medicine (Hinman 1978, Erickson 1979).

At the San Francisco USPHS Hospital concern was expressed by the nursing staff that oral disease developed in patients who could not perform their own oral hygiene. The lemon juice

and glycerin swabs utilized to cleanse the mouths of dependent patients obviously did not prevent disease. The Nursing Educator requested dental inservice training for nurses. Hospital administrators asked that an inpatient preventive dentistry program be initiated.

The implementation of a preventive dentistry program at the USPHS Hospital, San Francisco, was designed as a research project to investigate the value of the program. Improvements caused by the program would encourage the expenditure of time and money in establishing similar programs at other hospitals. Documentation of an inability to cause improvements would have the opposite effect.

While most hospitals in the United States have no preventive dentistry program, some Veterans' Administration Hospitals have well developed programs (Thornton, unpublished; Taylor, Munns, and Justin, unpublished). There are a few articles describing hospital preventive dentistry programs (Dinkley and Wilson 1968, Thornton 1979). Even when the programs are described, little or no evidence of effectiveness is presented. A single abstract was found reporting research designed to evaluate a hospital preventive dentistry program: two investigators at the VA Hospital, Miami, measured the knowledge and practices of nurses before and after a class on preventive dentistry (Davis et al. 1977). They found that the presentation caused an improvement in the knowledge of the nurses, but nursing practices did not change. The

researchers concluded, "This study illustrates the need for evaluation of dental health education programs." They implied that if programs are to be valuable they must result in improved practices, not merely improved knowledge.

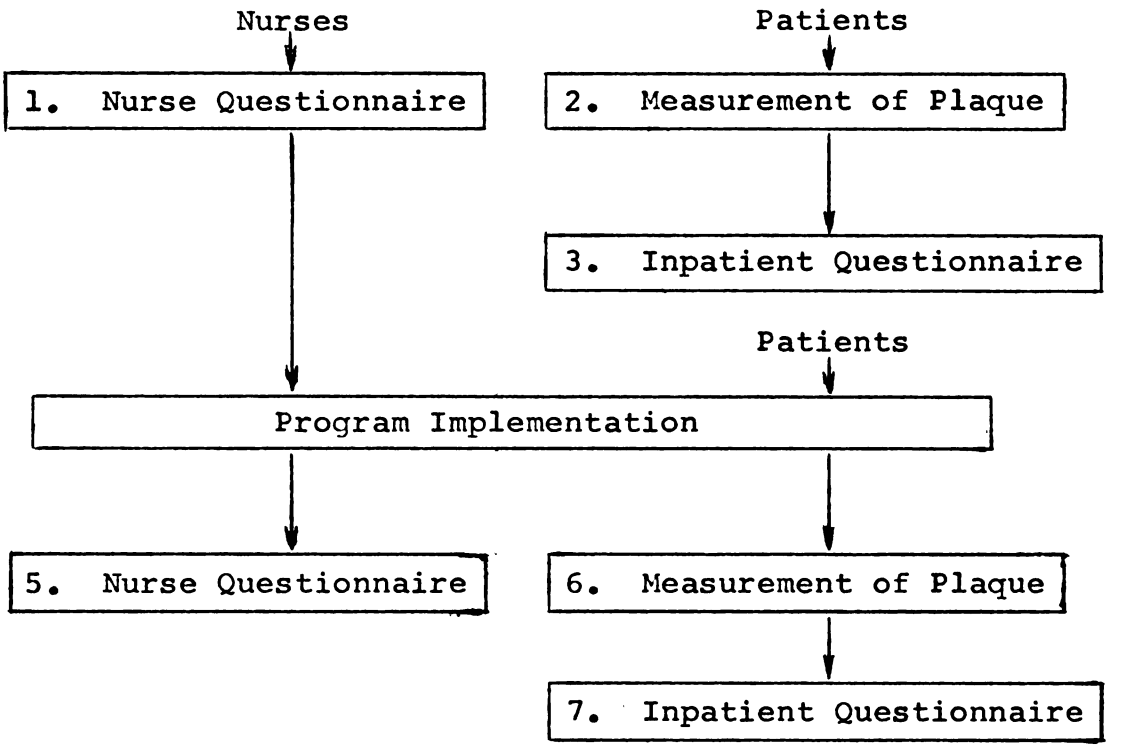
The controversy is not "Will proper oral hygiene practices control dental plaque and improve oral health?" Abundant evidence indicates that the microorganisms of dental plaque are the primary etiologic agents of dental caries (Newbrun 1977, Theilade and Theilade 1976) and periodontal disease (Socransky 1977, Theilade and Theilade 1976). Two to 4 days after the cessation of oral hygiene, inflammation due to microorganisms causes the loss of perivascular collagen in the gingiva adjacent to the teeth (Page, Schluger and Yuodelis 1977, p.173). Clinical gingivitis develops 10 to 21 days after withdrawal of all measures of oral hygiene; after recommencement of oral hygiene, gingival inflammation resolves in about 1 week (Loe, Theilade and Jensen 1965). Removal of dental plaque on a regular basis prevents disease (Loe 1970, p.259; Rosling, Nyman and Lindhe 1976; Axelsson and Lindhe 1977; Socransky 1977). The American Dental Association (1972) prescribes methods for the patient who can perform his own plaque control. Several good articles describe effective oral hygiene procedures for the dependent patient (Niebel and Keough 1972, Block 1976).

The controversy is "Will a hospital program cause inpatients to adopt effective oral hygiene practices?" Dental

personnel find that merely telling dental patients to brush and floss causes only a small proportion to assume the behavior. By trial and error clinicians develop approaches which seem to more effectively teach and motivate patients. Recent controlled studies evaluate the relative effectiveness of several different approaches (Albino 1978, Melcer and Feldman 1979, Craft 1978). No matter which approach is used, it is a challenge to cause dental patients to adopt the recommended oral hygiene habits; it is even more of a challenge to attempt to improve the oral hygiene behavior of large numbers of nondental patients in the complex environment of a hospital.

## II. MATERIALS AND METHODS

The research design for a "before and after" study was utilized. Baseline data were collected; the program was implemented; post-program data were collected. The differences between before and after data were imputed to the program.




The numbers in the diagram indicate the chronological order of administration. Tests 1, 2, and 3 were performed during the first 2 weeks of July, 1978. All components of the preventive program were functioning by December, 1978. Tests 5, 6, and 7 were performed the last 2 weeks of January, 1979. Questionnaires 1 and 5 were identical. Questionnaires 3 and 7 were identical. The same oral hygiene index was used to measure the plaque on patients' teeth before and after

establishment of the program. A preventive dentistry program did not exist when tests 1, 2, and 3 were administered; the program did exist when tests 4, 5, and 6 were administered.

The majority of nurses tested before the program were the same nurses as those tested after. However, because the preventive program required months to implement and the inpatient population turned over rapidly, the patients tested after the program were not the same patients as those tested before the program. Statistics were collected to support the hypothesis that the before and after patient groups were not significantly different as described by age, sex, beneficiary, and admitting service (see "Results" and "Discussion").

## NURSE QUESTIONNAIRE

The nurse questionnaire (see Appendix B) was administered to all available and consenting registered nurses, licensed vocational nurses, and nurse's aids during their respective shifts. Each question was intended to evaluate either a job practice, an attitude, or specific knowledge. Five half days were required to reach all available nursing personnel. A memorandum (see Appendix A) from the Dental Department and the Director of Nursing was read by each respondent immediately before completing the questionnaire. Questionnaires were coded to permit analysis of the responses of those nurses who completed both the questionnaire before and the questionnaire after the program. The responses of nurses who answered only before or only after were analyzed separately.

## MEASUREMENT OF PLAQUE

The amount of plaque on the teeth of inpatients was measured utilizing the "patient hygiene performance" index, the PHP (see Appendix C). A PHP score was obtained for each available consenting inpatient, between 8:30 A.M. and 12:00 noon and between 1:30 P.M. and 4:30 P.M. Only patients who had been in the hospital at least 72 hours were evaluated. Some patients had full dentures and could not be included in the study. A few patients refused to participate. Patients who had fewer then 3 teeth which could be scored were excluded.

Three days were required to evaluate all available inpatients. A memorandum from the Dental Department (see Appendix A) was presented to each patient first. The consent form (see Appendix A) was signed by the patient. A dental hygienist from the faculty at the University of California, San Francisco, was the consultant who scored the PHP. The consultant was not acquainted with the USPHS Hospital, San Francisco, or the preventive dentistry program. She knew nothing about the nature of the research.

## INPATIENT QUESTIONNAIRE

The inpatient questionnaire (see Appendix B) was administered to all available, consenting inpatients immediately after the PHP score was determined. Each question was intended to evaluate either a patient practice, patient awareness of a staff practice, a patient attitude, or information possessed

by the patient. Only dentulous patients who had been in the hospital a minimum of 72 hours answered the questionnaire.

## PROGRAM IMPLEMENTATION

See Appendix D for a detailed description of the hospital preventive dentistry program. The components of the program were:

1. Dental examination upon admission
2. Availability of oral hygiene aids
3. Patient education session
4. Audiovisual system
5. Posters
6. Nursing policy manual
7. Dependent patient care
8. Nurse education session
9. Ward dental information file

One-fourth of a dentist's time and one-half of a dental hygienist's time for one year were allocated to administer and evaluate the preventive dentistry program at the USPHS Hospital, San Francisco. See Appendix E for the program budget.

## DATA ANALYSIS

The effectiveness of the hospital preventive dentistry program was measured by the changes in the dependent variables--the PHP and responses to the nurse and patient questionnaires. At the time the research was being designed it was determined

that to analyze the change in average PHP for the hospital the "normal t-test" would be appropriate and a sample size of 100 would be ideal (Daniel 1974, p.104).

The responses to the questionnaires were analyzed comparing the percentage of patients or nurses who chose a particular response before the program existed with the percentage of patients or nurses who chose the response after experiencing the program. The "normal t-test" was again appropriate for analysis of the change. A sample size of 100 was calculated to be adequate.

# III. RESULTS

## PERSONAL HYGIENE PERFORMANCE (PHP)

The mean PHP (see Appendix C) decreased from 2.97 before the program to 2.27 after the program (see Appendix F, Table 6). This improvement in the average patient oral hygiene was highly significant, $p<.001$.

The number of patients who were approached but then excluded from the study, and the reasons they were excluded, are listed in Table 1. The patients who were never approached because they had not been in the hospital 72 hours as required by the protocol are not included in the table.

Table 1. Reasons Patients Excluded from the Study

| | Dentures* | Too Few Teeth* | "No" Without Reason** | "No, not feel well."** | Other *** | Total |
|---|---|---|---|---|---|---|
| Number Patients Before | 77 | 8 | 7 | 4 | 25 | 105 |
| Number Patients After | 78 | 3 | 5 | 6 | 44 | 126 |

* Patients with fewer than 3 scoreable teeth were excluded.

** When asked to participate in the study some patients responded, "No, I don't feel well." Usually those who responded "no," and gave no reason," were very sick. The great majority of patients were happy to cooperate.

*** Other reasons why patients were excluded from the study are: not in bed, on pass, being discharged, being transferred, in isolation, and unable to give permission.

## INPATIENT QUESTIONNAIRE

The inpatient questionnaire in Appendix B, and Tables 7 and 8 in Appendix F can be consulted as this section is read. Table 7 lists the percentage of patients choosing each possible response and the probability that the change in response was by chance rather than caused by the program. Table 8 lists the percentage of patients answering each question correctly and the probability that the change for each question and for each category of questions was due to chance. The computer symbol in parenthesis after the number of the question indicates to the reader the subject of that question.

### PATIENT AWARENESS OF STAFF PRACTICES

Questions 1, 2, 8, 9, and 15 were designed to measure patient awaremess of staff practices. The percentage of patients answering these four questions correctly improved very significantly, $p<.001$.

Question 1 (EXAM). Examination room records at the time of the posttest corroborate that about 69% of inpatients had been examined.

Question 2 (ASK TB). The program caused very significant increases in the percentages of patients who had been asked by nurses or by dental personnel if they had a toothbrush in the hospital.

Question 8 (MOVIE). As part of the preventive program an audiovisual system was placed in the waiting room of the

Dental Clinic. At the time of the posttest 15% of inpatients responded that they had seen a movie in the Dental Clinic. The patient response to the audiovisual system in the magazine area of each ward was poor. The work-study employee who operated the projector in the wards kept records; an average of only 1.5 patients watched a movie per hour. Of the 31% who answered that they had seen a movie on the wards, many must have merely seen the projector from a distance.

Question 9 (POSTERS). The percentage of patients answering that they had not or did not remember seeing a poster decreased from 70% to 16%. In the pretest 20% responded that they had seen a poster where none existed. in the posttest 77% of inpatients reported seeing the bathroom posters. Posters in the Dental Clinic or hospital lobbies were reported to have been seen by 73% of patients answering the posttest.

Question 15 (INST). Even with the preventive dentistry program only 35% received any instruction. The change from 5 to 15% of patients reporting they had received instruction from nurses was not as great as the change from 8 to 31% of patients reporting they had received instruction from dentists.

While 69% of inpatients at the posttest had received a dental examination, only 31% reported instruction from dental personnel. This supports the observation that due to time pressures in the examination room many patients are told the findings but are given no preventive instructions.

PATIENT PERSONAL PRACTICES

Questions 3, 4, 5, 6, and 7 asked the inpatients about their oral health practices. When considered together, the responses to these questions improved, but only at the $p=<.05$ level.

Question 3 (HAVE TB). A statistically significant improvement was not possible because the pretest responses were skewed to the right. Ninety-six percent of patients reported they had a toothbrush before the program was implemented. Because we personally encountered more than 2% of the inpatients without a toothbrush, it is probable that some people without toothbrushes said they had a brush.

Question 4 (KIND TB). The increase from 28 to 46% of patients responding that they used a soft brush was statistically very significant.

Question 5 (BR HBT). The patients' report of their brushing habits did not improve, while the PHP, a much more reliable parameter, did improve. The number of inpatients who said they brushed very well at least once per day fell 3%, yet the number of patients who said they brushed at least once per day, but haphazardly, rose 9%. There was a 6% rise in patients who responded that they brushed at least once per day. Perhaps the preventive program caused a number of patients to realize that their oral cleaning was not as thorough as it should be.

Question 6 (FL HBT). The 7% increase in patients reporting thorough, daily flossing (response d) was not

statistically significant. But there was a 14% increase in the number of patients who said that they flossed, but that the quality (response c) or frequency (response b) was deficient. Combining responses d, c, and b (21%) the improvement in flossing habits was significant at the $p<.001$ level.

Question 7 (SG HBT). The 12% increase in patients reporting that they had one or no snacks per day was not statistically significant, though its $p=.071$ approached significance at the $p=.05$ level.

PATIENT ATTITUDES

Questions 10 and 11 were intended to measure the attitudes of inpatients. Attitudes were shown not to improve statistically.

Question 10 (ABSES). The 17% increase in patients answering that they would have a root canal instead of extraction was statistically significant. Perhaps more people understood what root canal therapy is, and the improvement was more an indication of increased knowledge.

Question 11 (SAVE). The preventive dentistry program caused no change in the percentage of patients who felt they would do something more to save their teeth.

PATIENT INFORMATION

Questions 12, 13, and 14 were designed to evaluate patients' knowledge of oral health information. The group probability of change was only marginally significant, $p<.05$.

Our records show that 5% or less of the patients attended a patient education session.

Question 12 (CAUS C). The 13% increase in patients responding correctly was marginally significant.

Question 13 (CAUS P). The 11% increase in patients responding correctly was not statistically significant.

Question 14 (FLUOR). The 10% increase in patients responding correctly did not reach the level of statistical significance.

## NURSE QUESTIONNAIRE

The nurse questionnaire in Appendix B and Tables 9 and 10 in Appendix F can be consulted as this section is read. Table 9 lists the percentage of nurses choosing each response and the probability that the change in response was by chance rather than caused by the program. Table 10 lists the percentage of nurses answering each question correctly and the probability that the change for each question and for each category of question was due to chance. The computer symbol listed after the number of the question indicates to the reader the subject of that question.

Question 1 asked if the respondent was an RN, LVN, or nursing assistant. Unless indicated, no statistical difference was found between the response of the different groups. No statistical difference was found between those nurses who answered both pretest and posttest, and those nurses who only answered one test or the other.

STAFF JOB PRACTICES

Questions 2, 3, 4, 5, and 6 were designed to evaluate the job practices of the nurses. Considered as a group, the responses to these five questions improved very significantly, $p<.001$.

Question 2 (INS DPC). The dental hygienist's records indicate that 129 of 148 nurses (87%) attended the nurse education sessions. This corroborates well that about 84% of the nurses had received instruction in the oral care of dependent patients.

Question 3 (ADMIT). In the posttest 79% of nurses responsible for admitting patients reported that they were asking patients if they had a toothbrush. This 57% increase was achieved by adding the question "Do you have a toothbrush here in the hospital?" to the admissions checklist.

Question 4 (ADVIC). In spite of the nurse education sessions there was no increase in the percentage of nurses who gave advice about mouth care to patients.

Question 5 (BF DP). There was only an 8% increase in the nurses who reported that they brushed and flossed the teeth of dependent patients. Because there were only 5 to 10 dependent patients in the hospital at any one time, the small increase was not suprising.

Question 6 (REV INF). About half of the nurses reviewed and signed the dental information file. It is interesting that 20% of the nurses said they were aware of a file before any existed.

STAFF ATTITUDES

Questions 8, 14, and 15 were intended to evaluate the attitudes of nurses. The group probability of change was $p<.05$.

Question 8 (OWN ABS). The increase in the number of nurses who said they would save an abscessed tooth by having root canal therapy was highly significant, $p<.001$. Yet there was no difference in the percentage of nurses who would extract the tooth. There was a 22% change from "I don't know" to "Root canal." These results may well indicate improved knowledge about root canal therapy rather than an improved attitude about saving teeth.

Question 14 (OWN INS). If so instructed, would nurses do something more to save their own teeth? The preventive dentistry program caused no change in the response.

Question 15 (FEEL). Nurses expressed the same feelings before and after implementation of the preventive dentistry program. Half of the nurses were willing to be responsible for the oral care of a dependent patient. One-third of the nurses said they did not have time.

STAFF INFORMATION

Questions 7, 9, 10, 11, 12, and 13 were designed to measure the nurses' knowledge of preventive dentistry. The responses to all 6 questions improved significantly. The group probability of change was $p<.001$.

Question 7 (NP INST). There was a highly significant increase in the percentage of nurses who knew what was not

proper instruction for a patient with a denture.

Question 9 (DP KIT). There was a 46% increase in the percentage of nurses who knew that lemon juice and glycerine were not in a dependent patient kit.

Question 10 (CONSLT). Reasons for requesting a dental consult were discussed in the nurse education sessions. Only 7% chose the correct response in the pretest. Forty-two percent selected the correct response in the posttest. The percentage of registered nurses answering the posttest correctly was far higher than the percentage of licensed vocational nurses or nursing assistants.

Question 11 (CAUS C). The 26% increase in nurses who selected the correct cause of caries was highly significant.

Question 12 (CAUS P). The 24% increase in nurses who selected the cause of gum disease was highly significant.

Question 13 (FLUOR). The 17% increase in nurses who selected the correct action of fluoride was marginally significant, $p<.05$.

The last 3 questions were answered by both nurses and inpatients. Table 2 shows that nurses were consistently more knowledgeable than patients in the pretest. In the posttest nurses improved an average of 22% while inpatients improved only an average of 12%. It was expected that nurses would improve more because 87% of nurses attended a nurse education session, while less than 5% of patients attended a patient education session.

Table 2. Comparison of Knowledge of Nurses Versus Patients

| Question | Nurses Correct Pretest | Patients Correct Pretest | Nurses Correct Posttest | Patients Correct Posttest |
|---|---|---|---|---|
| CAUS C | 46% | 20% | 72% | 33% |
| CAUS P | 61 | 42 | 85 | 53 |
| FLUOR | 33 | 16 | 50 | 26 |

## COMPARISON OF THE PRETEST AND POSTTEST PATIENT GROUPS

The patients tested in July 1978 before a preventive program existed were not the same patients who experienced the program and were tested in January 1979. Tables 3, 4, and 5 support the hypothesis that the patient groups before and after program implementation were not different as described by age, sex, Public Health Service beneficiary status, and admitting service.

Table 3. Age and Sex of Pretest and Posttest Patient Groups

| Patient Group | Average Age | Median Age | Number Males | Percent Males | Number Females | Percent Females |
|---|---|---|---|---|---|---|
| July 1978 (Pretest) | 48 | 52 | 91 | 85% | 16 | 15% |
| Jan. 1979 (Posttest) | 51 | 54 | 94 | 88% | 13 | 12% |

Table 4. Beneficiary Status of Pretest and Posttest Patient Groups

| Patient Group | American Seaman | Coast Guard | Special Non-Reimbursable | Retired Uniformed Servicemen | Dependents of Uniformed Servicemen | Others |
|---|---|---|---|---|---|---|
| July 1978 (Pretest) | 66% | 4% | 10% | 6% | 2% | 12% |
| Jan. 1979 (Posttest) | 66% | 7% | 8% | 8% | 2% | 9% |

Table 5. Admitting Service of Pretest and Posttest Patient Groups

| Patient Group | Medical Service | Surgical Service | Urology Service | Orthopedic Service | Cardiology Service | Other |
|---|---|---|---|---|---|---|
| July 1978 (Pretest) | 43% | 19% | 10% | 13% | 6% | 9% |
| Jan. 1979 (Posttest) | 36% | 15% | 9% | 21% | 6% | 13% |

## IV. DISCUSSION

The experimental design of this study is called the "separate sample, pretest-posttest design" by Campbell and Stanley (1966, p.53). They judged the design to be "not inherently a strong one" but added that "it may frequently be all that is feasible, and is often well worth doing. It has been used in social science experiments which remain the best studies extant on their topics." Many studies of the effects of fluoridated water on dental caries used this design: the caries experience of certain age groups before fluoridation was compared to the caries experience of the same age groups (different children) after fluoridation.

During the planning stages of this research alternative study designs were considered. For example, could all patients be tested immediately at admission, and then tested again after a week in the hospital? This design was rejected because evaluators could not be available so many hours a day for 30 days and because the pretest itself would affect the patients' behavior. In their evaluation of the "separate sample, pretest-posttest design" Campbell and Stanley wrote, "It is well to note its superiority over the ordinary before-and-after design through its control of both the main effect of testing and the interaction of testing with X" (the agent or treatment).

Designs which included a control group were considered. One-half the hospital could not be isolated as the control.

Patients and nurses are too mobile. Because of limited resources it was not possible to use the Seattle USPHS Hospital as a control. There was also a question if the Seattle and San Francisco USPHS Hospitals had comparable patient populations.

Having concluded that the "separate sample pretest-posttest design" was all that was feasible, what then are the threats to the validity of the results? According to Campbell and Stanley, "The main weakness of the design is its failure to control for history." The difference between pretest and posttest results could be a product of coincidental historical events. Yet, this research has been repeatedly presented and discussed and no rival explanation based on any coincidental influence or event has been proposed.

Critical attention has instead been directed at the possibility that the pretest and posttest groups might not be comparable as assumed in the study design. Campbell and Stanley wrote, "Perhaps for studies over long periods the pretest and posttest samples should be selected independently and at appropriately different times, although this, too, has a source of systematic bias resulting from possible changes in the residential pattern of the universe as a whole." The demographic characteristics of the inpatient population of the USPHS Hospital, San Francisco, are computerized. These characteristics were observed to vary little from week to week or from month to month. Therefore it was

expected that the pretest and posttest groups would be comparable. Tables 3, 4, and 5 show that as expected the pretest and posttest groups were not different as described by age, sex, Public Health Service beneficiary status and admitting service. The decreased PHP and the improved responses to the questionnaires are therefore presented as valid evidence of the effectiveness of the inpatient preventive dentistry program at the USPHS Hospital, San Francisco.

The decrease in PHP is more reliable evidence than the questionnaires that the inpatient preventive dentistry program was effective. The PHP is a direct measurement of the amount of plaque on teeth. A patient's PHP score did not depend upon understanding or honesty. The validity of the responses to the questionnaires, however, can be disputed. For example, the inpatients were asked how well they had brushed while in the hospital. Was their response truthful? Did the patients think they had brushed well, yet they had actually brushed poorly? Responses to the questionnaires must be interpreted cautiously.

The questionnaires, nevertheless, provided much information. The details are reported under "Results." One of the purposes of the questionnaires was to help evaluate the effectiveness of individual components of the preventive program. The lower PHP score only indicated that the overall program was effective. But which components were more effective?

Some general statements about the effectiveness of the components of the preventive dentistry program follow:

The dental examination upon admission probably contributed more to the improved oral hygiene than any other component. The responses to the questionnaires indicated that the screening dental examination was the only opportunity for most patients to receive personalized oral health information. Awareness of their personal dental needs could have been strong motivation to brush and floss.

The floss fonts and the brushing and flossing posters in the inpatient bathrooms were very visible to the patients.

Less than 5% of patients attended the patient education sessions. It was usually a struggle to get even 2 or 3 patients to a class. The only sessions routinely well attended were those taught in the alcoholic rehabilitation ward and those organized for diabetics.

The audiovisual system was poorly utilized by patients on the wards, but well utilized by patients in the dental clinic waiting room.

Nurses did best those tasks which required the least personal initiative and effort:

The nurses were required to attend the dental education session, so 87% attended.

A nurse would have to skip over the question on the

admitting checklist in order to not ask patients being admitted if they had a toothbrush. Seventy-nine percent of nurses reported that they were asking the question of new patients.

Reviewing the ward dental information file required more initiative. Only about half of the nurses responded that they had reviewed the file.

Great initiative was required for nurses to give advice to patients. At the pretest 33% said they had given advice. At the posttest 34% said they had given advice.

Providing oral hygiene care for a dependent patient was difficult and uncomfortable for the nurses. The 4% increase in nurses providing such care was due to the dental hygienist constantly checking the dependednt patients and helping the nurses.

# V. CONCLUSION

The hypothesis that a hospital preventive dentistry program can effect an improvement in the oral health of inpatients has been tested.

Introduction of the preventive dentistry program at the USPHS Hospital, San Francisco, resulted in a significant decrease in the amount of plaque on the teeth of inpatients. The program caused improvements in the knowledge and practices of inpatients, but their attitudes did not change. The program caused a very significant improvement in the knowledge of nurses, some improvement in their job practices, but no improvement in their attitudes.

The decrease in PHP and the improved knowledge and practices of inpatients and nurses indicated that the expenditure of time and money in establishing similar programs at other hospitals is justified.

The effectiveness of each component of the San Francisco program was discussed.

# APPENDIX A

# CONSENT FORMS

United States Public Health Service Hospital
San Francisco, California

PLEASE ANSWER THIS SHORT QUESTIONNAIRE. It is very valuable in establishing and evaluating an inpatient preventive dentistry program. A dental hygienist has been assigned 20 hours per week to work with inpatients. Much can be done to inform and motivate and help patients to maintain or improve their oral health while in the hospital. Thank you for your help!

Vivian R. Mercer R.N. Gerald S. Summerhays D.D.S.

Karl F. Urbach, M.D.
Director

ATTENTION!!!

DO NOT PUT YOUR NAME ON THE QUESTIONNAIRE. It will be identified by code number. Your responses are valuable only as they affect totals and averages. No score or answer will be associated with any individual. Information furnished will be subject to the provisions of the Privacy Act of 1974.

You are free not to participate.

U.S.P.H.S. Hospital
San Francisco

Dear Patient:

PLEASE HELP establish and evaluate a preventive dentistry program in this hospital. A dental hygienist needs to color and measure the plaque (bacteria) on the teeth of as many patients as possible in the hospital. A short questionnaire is also used. Your cooperation is appreciated.

Sincerely,

Gerald S. Summerhays D.D.S.

APPROVED

Karl F. Urbach M.D.
Director

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CONSENT TO BE EXAMINED FOR PLAQUE ON TEETH

I understand the purpose of having my teeth examined.

My name will not be written down.

No discomfort or risk is involved.

No personal benefit is obtained.

I am free not to participate.

I can ask questions at any time.

_____
signature of patient

# APPENDIX B

# QUESTIONNAIRES

# DENTAL QUESTIONNAIRE FOR NURSING PERSONNEL

Circle the ONE most correct answer. Answer frankly and honestly.

1. I am

   a. an R.N. b. an L.V.N. c. a N.A. d. _____

2. Have you received instruction in how to brush and floss a patient's teeth who is totally dependent and can't even hold the mouth open for you?

   a. Yes
   b. No
   c. I don't remember

3. Do you routinely ask a patient upon admission to the ward if he or she has a toothbrush?

   a. Yes
   b. No
   c. I never have anything to do with admission of a patient to the ward.

4. Have you given an inpatient any advice about care of his mouth in the last week?

   a. Yes
   b. No
   c. I don't remember.

5. Have you brushed and flossed a dependent patient's teeth during the last week?

   a. Yes, once or twice.
   b. Yes, 3 or more times.
   c. No, I am not responsible for the mouth care of any dependent patient.
   d. No, brush and floss are not available, or I have not been shown how to floss and brush the teeth of a dependent patient.
   e. No

6. Have you reviewed the mouth care information on file at the nursing station?

   a. No, I know of no such information available.
   b. No, it is available, but I have not reviewed it.
   c. Yes

7. Which of the following is NOT proper instruction for a patient with a denture or partial denture?

   a. To leave the denture or partial out overnight.
   b. To take the denture or parital out after every meal to clean it.
   c. To brush the denture or partial with a stiff denture brush.
   d. To take the partial out each time the remaining teeth are cleaned.
   e. To keep the partial or denture in water if it is out of the mouth for any length of time.
   f. I don't know.

8. If you personally had an abscessed back tooth today, would you have it extracted, or would you have a root canal done?

   a. Extracted
   b. Root canal
   c. I don't know.

9. Which of the following is NOT in a oral hygiene kit for a dependent patient?

   a. Fluoride
   b. Floss
   c. Mouth prop
   d. Brush
   e. Lemon juice and glycerin swabs
   f. Ingestible toothpaste
   g. I don't know.

10. Which of the following is NOT an indication for getting a dental consult?

   a. Bleeding gums
   b. Heart surgery anticipated
   c. Lung surgery anticipated
   d. Organ transplant anticipated
   e. An upper extremity handicapped patient is admitted.
   d. Head and neck radiation anticipated for cancer
   e. I don't know.

11. Tooth decay is caused by

   a. Thin enamel or soft teeth.
   b. Poor diet or mineral deficient diet.
   c. Food particles between the teeth or along the gums.
   d. Sugar attacking the tooth surface.
   e. Bacteria (germs).
   f. I don't know.

12. Periodontal (gum) disease is

    a. a degeneration of gums associated with aging.
    b. a contageous disease.
    c. a result of not adequately cleaning the teeth.
    d. a disease inherited from parents.
    e. I don't know.

13. The chief action of fluoride is to

    a. coat the outside of the teeth to increase resistence to decay.
    b. combine with the tooth structure to increase resistence to decay.
    c. neutralize acids.
    d. kill bacteria.
    e. I don't know.

14. If a dentist or a dental assistant or a dental hygienist showed you something more that you need to do to save your teeth, would you do it?

    a. Yes
    b. I might try, but I doubt I'd really follow through and do it forever.
    c. No
    d. I don't know.

15. Which of the following most closely expresses your feelings? Be honest!

    a. Oral hygiene is an important part of nursing care. I am willing, if given the responsibility, to daily brush and floss a dependent patient's teeth.
    b. Hospitals are acute care facilities. I'm not concerned with preventive dentistry.
    c. If people have not cleaned their teeth well for years, they won't change because of instruction.
    d. It would be good for nursing personnel to help implement preventive dentistry in the inpatient population, but we just don't have the time.
    e. None of the above.

# INPATIENT DENTAL QUESTIONNAIRE

Do not put your name on this questionnaire. Answer frankly and honestly.
CIRCLE THE ONE MOST CORRECT ANSWER.

1. Has a dentist checked your mouth since you were admitted to the hospital?

   a. Yes
   b. No
   c. I don't remember.

2. Since you arrived in the hospital has anyone asked you if you have a toothbrush?

   a. Yes, both nursing and dental personnel have asked me.
   b. Yes, only a nurse or nurse's aid asked me.
   c. Yes, only dental personnel asked me.
   d. No
   e. I don't remember.

3. Do you have a toothbrush here in the hospital?

   a. Yes, it came from outside the hospital.
   b. Yes, I got it from the hospital canteen.
   c. Yes, I got it on the ward.
   d. Yes, I got it from dental personnel.
   e. No, I don't have a toothbrush with me here in the hospital.

4. What kind of toothbrush are you using?

   a. Hard
   b. Medium
   c. Soft

5. In the last week how often and how well have you brushed your teeth?

   a. Very well at least once per day.
   b. At least once per day, but I do it so quickly or so haphazardly that I'm sure I miss places.
   c. Less than once per day.

6. In the last week have you used dental floss?

   a. Yes, I flossed when something got stuck between my teeth.
   b. Yes, a few times during the week I flossed between all my teeth.
   c. Yes, about every day I flossed between all my teeth, but I doubt I did a very good job.

d. Yes, about every day I flossed between all my teeth, and I do a good systematic job, pushing the floss against each tooth and going up and down a number of times.
e. No.

7. Think back over the last 24 hours. How often between meals have you had sugar snacks or drinks containing sugar? Be honest!

a. No sugar snacks or drinks between meals in 24 hours.
b. Only one sugar snack or drink between meals in 24 hours.
c. Only 2 or 3 sugar snacks or drinks between meals in 24 hours.
d. Four or more sugar snacks or drinks between meals in 24 hours.

8. Have you seen a movie about taking care of your teeth or gums since arriving at the hospital?

a. No
b. Yes, in several of the places listed below.
c. Yes, in the dental clinic.
d. Yes, in a hospital lobby.
e. Yes, on the hospital ward.

9. Have you seen any dental posters since arriving at the hospital?

a. Yes, both in the ward bathroom or hall and in the hospital lobbies or dental clinic.
b. Yes, only in the ward bathroom or hall.
c. Yes, only in a hospital lobby or in the dental clinic.
d. No, I have not seen any dental poster.
e. I don't remember if I have seen any dental posters or not.

10. If you had an abscessed back tooth today, would you have it extracted, or would you have a root canal done?

a. Extracted
b. Root canal
c. I don't know.

11. Tooth decay is caused by

a. thin enamel and soft teeth.
b. poor diet or mineral deficient diet.
c. food particles between the teeth or along the gums.
d. sugar attacking the tooth surface.
e. bacteria (germs).
f. I don't know.

12. Periodontal (gum) disease is

    a. a degeneration of gums associated with aging.
    b. a contageous disease.
    c. a result of not adequately cleaning the teeth.
    d. a disease inherited from parents.
    e. I don't know.

13. If a dentist or dental assistant or dental hygienist showed you something more that you need to do to save your teeth, would you do it?

    a. Yes
    b. I might try, but I doubt I'd really follow through and do it forever.
    c. No
    d. I don't know.

14. The chief action of fluorides is to

    a. neutralize acids.
    b. kill bacteria.
    c. I don't know.
    d. coat the outside of teeth to increase resistence to decay.
    e. combine with tooth structure to increase resistence to decay.

15. Have you received instruction as to how you can prevent tooth decay or gum disease since you were admitted to the hospital?

    a. Yes, from both dental and nursing personnel.
    b. Yes, only from dental personnel.
    c. Yes, only from nursing personnel.
    d. No
    e. I don't remember.

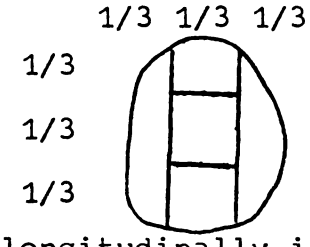
# APPENDIX C

## PHP DESCRIPTION

## PROCEDURE FOR DETERMINING THE PATIENT HYGIENE PERFORMANCE (PHP) SCORE

1. A mouth mirror examination of selected teeth is made following the use of a disclosing solution which stains the oral debris. The patient is instructed to swish for 30 seconds. He may then expectorate but is not allowed to rinse the mouth until after the examination. (Oral debris is defined as the soft foreign material consisting of mucin, bacteria, and food that is loosely attached to the tooth surface and stains dark pink or red.)
2. The examination is performed in the following order.
   Maxillary right second premolar
   Maxillary right central incisor
   Maxillary left second premolar
   Mandibular left second premolar
   Mandibular right central incisor
   Mandibular right second premolar
3. If any of the above teeth are missing, or have full crown restoration or are too severely broken down, an alternate tooth is selected, if available, according to the following:
   a. For second premolar teeth, select the first premolar. If the first premolar is missing or can't be used, no other tooth is substituted.
   b. For right central incisors, select the left central incisor. If the left central incisors are missing or can't be used, no other tooth is substituted.

4. The examination is made on the designated surface for each tooth or substitute tooth. The buccal or lingual surface designated includes one-third of the adjacent mesial and distal surfaces.
   a. Maxillary premolars - buccal surface
   b. Mandibular premolars - lingual surface
   c. Central incisors - labial surface
5. In order to assess the debris on each designated surface, the examiner must mentally divide the tooth into 5 sections.




   a. The clinical crown is subdivided longitudinally into mesial, middle, and distal thirds. The mesial and distal thirds make up the first two divisions and each area extends to the middle third of its adjacent proximal surface.
   b. The remaining middle third of the labial or lingual surface of the clinical crown is now subdivided into the gingival, middle, and occlusal thirds.
   c. Each of these five subdivisions is examined for debris and assigned either of the following.
      0 - No debris is present on that portion of the tooth.
      1 - Debris is present on that portion of the tooth. Debris stains dark pink to red and is relatively easy to detect. Assign the value of 1 only to those areas on which debris is definitely present. 0 should be assigned to questionable areas.

6. Debris scores (D) and calculation of the PHP score.

   a. The debris score (D) for each tooth is determined by adding the scores of each subdivision of the tooth.

   Example 1 - Debris is present in both the proximal areas and the gingival one-thirds. The (D) call is 3.

   Example 2 - Debris is present in one proximal area. The (D) call is 1.

   Example 3 - Debris is present in both proximal areas and the gingival and middle thirds. The (D) call is 4.

   The debris score (D) calls could be any number from 0 to 5. If the tooth and its substitute are both missing or not useable, the call is M. The calls are entered into the following type table.

| Maxillary Right Premolar | Maxillary Central | Maxillary Left Premolar |
|---|---|---|
| Mandibular Right Premolar | Mandibular Central | Mandibular Left Premolar |

   b. The PHP score is the mean ($\Sigma D/N$) of the debris scores. It is calculated by adding the debris scores and dividing by the total number of scores.

   Example 1

| 3 | 4 | 2 |
|---|---|---|
| 0 | 1s | 3 |

   $$PHP = \frac{\Sigma D \text{ (sum of debris score)}}{N \text{ (number of debris scores)}}$$

   $PHP = 13/6 = 2.17$

   (The s indicates a substitute tooth.)

Example 2

| | | |
|---|---|---|
| 2 | 0 | 2 |
| M | 1 | 3 |

$$PHP = \frac{\Sigma D}{N} = 8/5 = 1.6$$

The M indicates no score for that area and is not included in the computation. N = 5 instead of 6.

# APPENDIX D

## PREVENTIVE PROGRAM DESCRIPTION

# DENTAL EXAMINATION UPON ADMISSION

The Hospital Operational/Policy Manual states, "all patients who are admitted to this hospital will receive a dental exam." The dental examination is part of a complete physical examination and is required for all inpatients.

Objectives of Inpatient Examinations:

1. To diagnose dental emergencies (pain, swelling, not just a large cavity) and to arrange indicated dental care.
2. To diagnose oral conditions which could affect a patient's medical status or treatment, to inform the primary physician and to arrange indicated dental care.
3. To identify oral soft tissue lesions and to provide indicated follow-up and treatment.
4. To increase patients' awaremess of their mouths, to appoint indicated patients to a Patient Dental Education Session, to refer a dental hygienist to a limited number of non-ambulatory patients, and to encourage proper care of teeth and gums and dentures.

Logistics:

1. Admitting personnel route ambulatory patients to the Dental Clinic before sending them to their assigned wards. (see the routing sheet included in this section) Inpatients are assured of being seen within ten minutes; they are next in line for an examination no matter how many outpatients are waiting.

2. If a patient arrives at the ward without a Standard Form 521, the ward clerk sends him to the Dental Clinic.
3. Those patients who do not come the first day are called down.
4. A staff dentist is assigned to cover the examination room every day from 3:30 to 4:30 P.M. so the dental resident can go to the wards to examine non-ambulatory patients.

5. All patients should be charted. Negative findings should be recorded. X-rays are not routinely taken for patients who are either not eligible or not available after discharge. The treatment plan for a non-beneficiary could be "To private dentist for complete exam." For a patient not available it could be "Patient not available for treatment at this station." For a patient examined on the wards it could be "Patient to come for a complete exam after discharge." An eligible patient examined in the Dental Clinic who desires

dental care after discharge could receive indicated Xrays and a thorough treatment plan.

6. In order to evaluate the completion and results of the examinations use the form in the Handout section. The "number of admissions to be completed this date" is determined by a schedule:

| | | | | | |
|---|---|---|---|---|---|
| Monday | - | complete | admissions | of | previous Thur. |
| Tuesday | - | " | " | " | " Fri., Sat., Sund. |
| Wednesday | - | " | " | " | " Mon. |
| Thursday | - | " | " | " | " Tue. |
| Friday | - | " | " | " | " Wed. |

7. Materials taken to the wards for the examinations:
   a. Plastic hardware carrier
   b. Disposable examination light with removable plastic cheek retractors (gas sterilized). Source: Hoyt Laboratories, 633 Highland Ave., Needham, Ma. 02194
   c. Standard Forms 521
   d. Handouts for denture patients
   e. "Guide for Dental Health" handouts
   f. Box with appointment slips for patient education classes
   g. Explorers, periodontal probes, mirrors
   h. Sterilizing tray and cover
8. At the admitting desk where patients wait in line a poster explains why a screening dental examination is required upon admission. A similar poster faces the patient in the examination room in the Dental Clinic.

9. Orientation of dental residents must be thorough. It is essential to personally assist them the first days they are responsible for the examinations. Residents tend to be uncomfortable on the wards in the beginning.
10. If the examining dentist does not understand a patient's medical condition and possible correlations or conflicts with the patient's oral status, he should refer to an immediately available text. Either Current Medical Diagnosis and Treatment by Krupp and Chatton published by Lange or The Merck Manual by Berkow published by Merck, Sharp and Dohme Research Laboratories, concisely describes medical conditions and their treatment. Either Oral Pathology by Shafer, Hine and Levy published by Saunders or Burket's Oral Medicine by Lynch published by Lippincott, adds often needed information about the mouth.
11. The most important communication with physicians is one to one as patients' needs dictate. Departmental chiefs can be very influential; therefore, it is desirable to meet with the chiefs of departments involved (Cardiology, Medicine, Orthopedics, Infectious Disease, Medical Records, and Preventive Medicine). In a general hospital staff conference preventive dentistry can be discussed. A presentation can be made in a medical-surgical conference.

USPHS HOSPITAL
SAN FRANCISCO, CA.

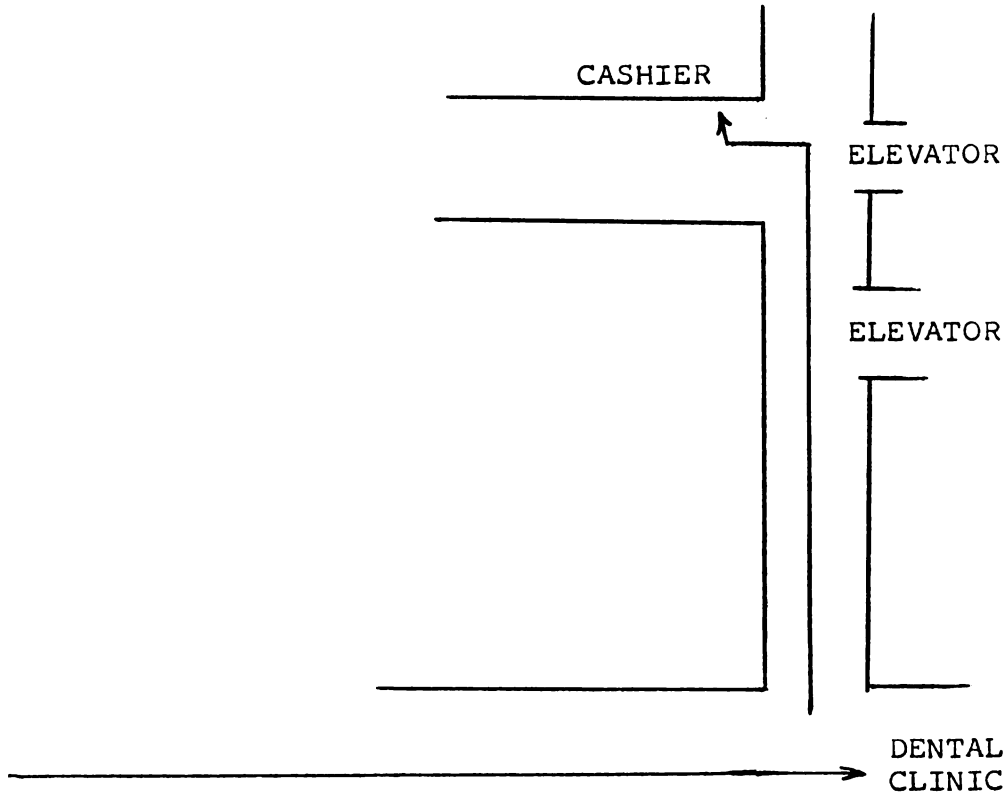
INSTRUCTIONS TO ALL PATIENTS BEING ADMITTED

1. DENTAL CLINIC: Report to the Dental Receptionist, 1st floor. A dentist must see you upon admission, whether you have dentures or natural teeth. The dentist will quickly check your mouth for any condition which could affect your medical care. He will also screen for oral cancer. You will be seen within 10 minutes.

2. AGENT CASHIER: Valuables and money should be deposited with the Cashier, 1st floor, room 1602. The hospital can assume no responsibility for money or property kept at your bedside.

3. CLOTHING ROOM: Clothing and luggage will be stored in the patients' clothing room located in the basement. Pajamas and robes will be issued if you do not have your own. Take the elevator next to the Cashier's Office.

4. WARD ASSIGNMENT: Take the elevator to Ward _____.



ORAL HYGIENE AVAILABILITY

The question "Do you have a toothbrush here in the hospital?" is added to the admission checklist that nurses go over with a new patient upon arriving on the ward. If the response to the question is "No" the nurse can direct the patient to the canteen to purchase a toothbrush, or obtain a free toothbrush from the volunteers or the dental hygienist.

A metal floss font is placed in every bathroom used by many inpatients. The double spool metal floss fonts from Johnson and Johnson were fastened to the wall with toggle bolts. It was necessary to place a 3/8 inch plexiglass block between floss font and wall to permit opening. A set screw added to the cover guards against vandalism.

Consult the occupational therapist if a patient is unable to manipulate brush and floss due to neurological deficits or arthritis.

# PATIENT EDUCATION SESSION

Many ambulatory patients occupy their time with TV and books. They are available to attend a dental health class. During the dental examination at admission the dentist communicates his findings. Many patients then desire to do something about whatever is not healthy. While it is not indicated to undergo non-emergency dental care while an inpatient, the class is available to partially satisfy the desire for improved health. Attendance is increased by giving the patient an appointment slip indicating the time and place. It is still necessary to remind the patient about 30 minutes before the class. Some ward clerks are very helpful in reminding patients.

Rooms that have a table or counter for 6 to 8 people are usually available on the wards.

The best attended sessions are those organized for and supported by specific medical services (Alcoholic Rehabilitation Service, Diabetic Service, Geriatric Service).

# PATIENT EDUCATION SESSION

## OBJECTIVES

After the 1 hour inpatient, dental health education class the participant will be able to:

1. Identify 3 characteristics of a healthy mouth.
2. Identify 3 characteristics of an unhealthy mouth.
3. State if he/she has any characteristics of disease in his/her mouth and what they are.
4. State the cause of tooth decay and gum disease.
5. Identify 2 characteristics of periodontal disease.
6. State 5 consequences of the continued presence of plaque on the teeth.
7. State 4 common measures to create healthy teeth and gums.
8. State the chief action of fluoride.
9. Demonstrate to the instructor effective brushing.
10. Demonstrate effective flossing to the instructor.
11. State the minimum frequency of brushing and flossing.
12. State why an abscessed tooth should be saved by performing root canal therapy.

These objectives are for use by the instructor.

The self-test given to each patient at the beginning of session is filled in by the patient as the class proceeds. The self-test focuses on the objectives.

PATIENT EDUCATION SESSION

INTRODUCTION 5 minutes

1. Introduce yourself.
2. Explain purpose of program. Distribute self-test.

HEALTHY AND UNHEALTHY TEETH AND GUMS 10 minutes

1. Help participants identify characteristics in a healthy and unhealthy mouth using photographs, a natural tooth model, and a periodontal disease model.
2. Help participants identify characteristics of disease in their mouths with the plaque lite.

PLAQUE CONTROL 15 minutes

1. Discuss plaque and its consequences. Use phase microscope/TV monitor.
2. Practice brushing and flossing.
3. Distribute "Guide to Dental Health."

OTHER PREVENTIVE MEASURES 8 minutes

1. Discuss sugar control.
2. Discuss fluoride.
3. Discuss attitude of saving teeth, reasons for annual dental exam, what a root canal is.

SPECIAL DENTAL CARE 2 minutes

1. Discuss care of full and partial dentures.
2. Distribute "Because You Wear Dentures."

CONCLUSION 10 minutes

1. Summarize and answer questions.
2. Distribute written evaluation.

# AUDIOVISUAL SYSTEM

One to one communication tailored to the specific needs of the patient is superior to mass communication. Yet, because of limited manpower, the audiovisual system can provide information and motivation to patients beyond that which we are personally able to provide.

The projector can be secured to the top of a mobile cart. A box with a slot for each film cassette can be made. A poster with "do it yourself" instructions is essential:

1. Choose the movie you want to see.
2. Push the cassette into the hole below the screen.
3. Hold the "on" button down until the film starts.
4. The machine turns itself off at the end of the movie. Remove the film and return it to the rack.

In the dental clinic waiting room patients respond well to the instructions and many movies are watched each day. When one person starts a film, most people watch it. In order to evaluate the use of the audiovisual system in the magazine areas of each ward, a "work study" employee ran the projector 2 hours per week per ward. Use of the projector outside the Dental Clinic does require supervision for security reasons.

Sources of audiovisual projectors and preventive dentistry films are listed in the Equipment section.

POSTERS

Laminated brushing and flossing posters were placed under plexiglass adjacent to the floss font in each of the bathrooms used by many patients. People are attracted to color photographs. They wonder if they are brushing their teeth the recommended way. And with the floss available right next to the instructions, they might as well give it a try! The instructions on the brushing poster are:

Use a SOFT brush.

FEEL the bristles clean the GUM LINE.

SCRUB with SHORT back and forth strokes.

But a brush cannot clean between the teeth. Use floss!

If your gums are not healthy they may bleed each time you clean for a week or two.

The instructions on the flossing poster are:

Control ONE INCH of floss between your fingers.

Saw between tight teeth. Do not snap it through.

Gently go up UNDER THE GUM. Push the floss AGAINST THE

TOOTH to form a "C."

Scrape UP AND DOWN against the tooth a NUMBER OF TIMES.

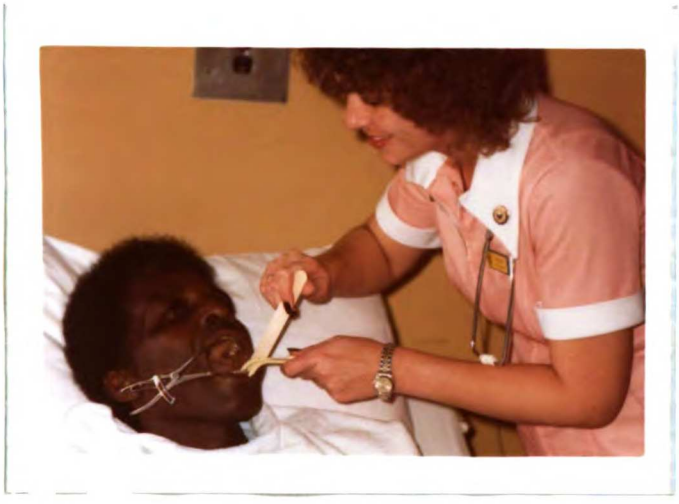
Systematically REPEAT this method on the rest of your teeth.

Preventive dentistry posters were not placed on hospital bulletin boards because they already contained an overwhelming number of notices and other posters.

## ORAL HYGIENE SECTION
## IN THE NURSING POLICY/PROCEDURE MANUAL

This important document was very deficient. The brushing method was at least 15 years out of date. Lemon juice and glycerin swabs were prescribed for cleaning the mouths of patients who could not perform their own oral hygiene. The revision of this document is available from the author.

DEPENDENT PATIENT CARE



The "equipment" and "principal steps" are listed on a small box containing the equipment. Usually several dependent patients are in the same room; only one electric toothbrush is necessary per room.

EQUIPMENT

1. Manual or electric toothbrush
2. Dental floss and floss holder
3. Ratchet mouth prop (if patient cannot hold mouth open)

4. Tongue blade
5. Fluoride gel and 2 cotton tip applicators
6. Towel
7. Irrigation
8. Suction (if patient cannot swallow or expectorate)
9. Ingestible toothpaste (optional)

PRINCIPAL STEPS

1. Elevate head of bed to 45 degrees.
2. Place towel under chin.
3. Open patient's mouth with ratchet mouth prop.
4. Irrigate and suction loose debris.
5. Brush and floss one side of the mouth at a time.
6. Irrigate and suction the mouth thoroughly.
7. Apply topical fluoride gel to all tooth surfaces.
   A film of fluoride is left on the teeth (do not rinse)
   to increase resistence to decay.

EQUIPMENT SOURCES

Electric toothbrush
Teledyne Water Pik
1730 East Prospect St.
Ft. Collins, CO. 80521

Ratchet mouth prop
Arista Surgical Supply
67 Lexington Ave.
New York, NY 10010

Ingestible toothpaste
Oral Disease Research Lab.
Veterans Admin. Med. Center
Houston, Texas 77211

Irrigation and suction
Nursing provides them.

## NURSE EDUCATION SESSION

The Dental Education Sessions for nursing personnel at USPHS Hospital, San Francisco, were requested by the Nursing Educator and were always very well supported by the nursing administration. Involvement of nursing supervisors and head nurses in the planning stages helped to insure their cooperation. Several sessions per week were required for 3 months to teach most of the staff. Then sessions were held only as needed for newly hired nurses. Most nurses rotated shifts so few night and evening sessions were necessary.

In order to assure the attendance of 6 to 10 nurses at each session this sequence was followed:

1. Each head nurse was told which of her nurses had not yet attended. Usually 3 or 4 head nurses each committed to send 2 or 3 nurses.
2. The head nurses were reminded the day of the session.
3. An announcement was made over the intercom 10 minutes before the session.

Effective teaching is based on student involvement. The teacher gets the students to contribute as much as possible. Rather than just pointing out to the participants the characteristics of an unhealthy mouth, the teacher asks, "What differences do you see between these healthy gums and these unhealthy gums?" (pointing at the 2 photographs) The participants fill in the answers on the self-test as the class proceeds.

## NURSE EDUCATION SESSION

### OBJECTIVES

After the 1 hour Dental Health Education Session the participants will be able to:

1. through 12. These objectives are the same as those listed for the Patient Education Session.
13. List 2 instructions for a patient with a full or partial denture.
14. List 6 of the items in an oral hygiene kit for dependent patients.
15. List 4 of the principal steps in performing oral hygiene for dependent patients.
16. List 4 indications for getting a dental consult.

### PROGRAM DESIGN

INTRODUCTION 5 minutes

1. Handout "Dental Resources and Policies" as they come.
2. Introduce yourself.
3. Explain purpose of program. Distribute self-test.

HEALTHY AND UNHEALTHY TEETH AND GUMS 10 minutes

1. Help participants identify characteristics in a healthy and unhealthy mouth using photographs, a natural tooth model, and a periodontal disease model.
2. Help participants identify characteristics of disease in their mouths with a plaque lite.

PLAQUE CONTROL 10 minutes

1. Discuss plaque and its consequences. Use phase microscope/TV monitor.
2. Practice brushing and flossing.
3. Distribute "Guide to Dental Health."

OTHER PREVENTIVE MEASURES 5 minutes

1. Discuss sugar control.
2. Discuss fluoride.
3. Discuss attitude of saving teeth, reasons for annual dental exam, what a root canal is.

SPECIAL DENTAL CARE 15 minutes

1. Discuss full and partial dentures. Denture handout.
2. Demonstrate oral hygiene care of dependent patient. Distribute Nursing Policy Manual Oral Hygiene Section
3. Discuss indications for getting a dental consult.

CONCLUSION 5 minutes

1. Summarize and answer questions.
2. Request oral evaluation of the session.

## WARD DENTAL INFORMATION FILE

Each head nurse was given a Ward Dental Information File to keep at the nursing station. The head nurses were asked to have each nurse initial their name on the list of nurses attached to the file when they reviewed the contents of the file.

The following information was written on the outside of the folder:

DENTAL INFORMATION FOR NURSES

CONTENTS:

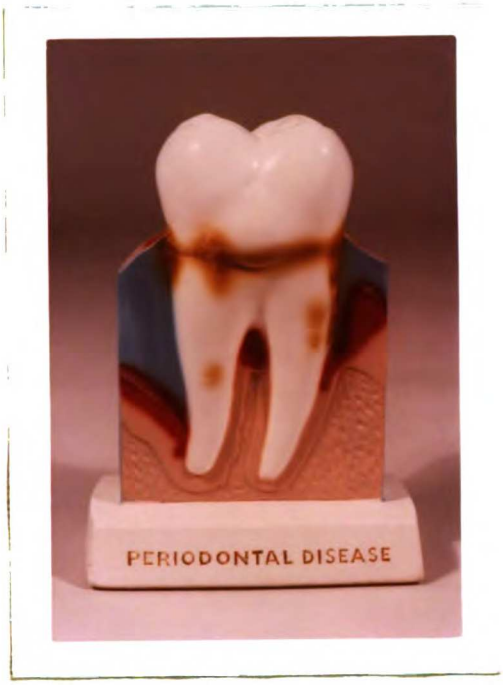
1. Pamphlet "Guide to Dental Health" for patients
2. Handout on dentures for patients with dentures
3. The correct answers to the Dental Inservice Lesson questions (when to get a dental consult, etc.)
4. Dental Resources and Policies (how to get a dental appointment, etc.)
5. Nursing Procedure Manual Revision on Mouth Care (especially of dependent patients)

NOTE: Toothbrushes available for patients from volunteers, Nursing Administration Office (after hours), dental hygienist, or canteen.

Floss available from dispensers in ward bathrooms.

# VISUAL AIDS

1. Photographs of healthy and unhealthy gums
2. Photographs of health and unhealthy edentulous arches
3. Model with decayed and healthy natural teeth.
4. Quadrant model for brushing and flossing from the American Dental Association
5. Periodontal disease model from Proctor and Gamble Co., Professional Services Division, P.O. Box 1996, Cincinnati, Ohio 45201, item code number 70156
6. Endodontic treatment poster from the American Dental Association


PERIODONTAL DISEASE

HANDOUTS

1. Dental Resources and Policies (1 page)
2. Guide to Dental Health (2 page xeroxed pamphlet)
3. Because You Wear Dentures (a single xeroxed sheet)
4. Oral Hygiene Section in the Nursing Policy Manual
5. Patient Education Session Self-test (identical to the first 11 items on the Nurse Education Session Self-test)
6. Nurse Education Session Self-test (a copy follows)
7. Patient Education Session Evaluation (a copy follows)
8. Inpatient Dental Examination Record (explained below)

Copies of 1, 2, 3, and 4 are available upon request from the author.

The column headings of the Inpatient Dental Examination Record are:

Date

Number of admissions to be examined this date

Number of admissions examined

Number of MD's called about patient problem

Number of MD's informed only in inpatient progress notes

Number of patients where only patient told of problem

Number of patients appointed to patient education class

Name of dentist responsible

Signature of staff dentist responsible for checking completion of inpatient exams

DENTAL EDUCATION SESSION FOR NURSES

1. Identify characteristics of an unhealthy mouth.

   a. d.
   b. e.
   c.

2. Identify characteristics of a healthy mouth.

   a. d.
   b. e.
   c.

3. Do you have any characteristics of disease in your mouth?

   If yes, what are they?_____

4. What is the cause of tooth decay and gum disease?

   _____

5. Are you able to identify locations of plaque in your mouth?

   Yes_____ No_____

6. What are the consequences of the continued presence of plaque on the teeth?

   a. e.
   b. f.
   c. g.
   d.

7. State 4 measures to create healthy teeth and gums.

   a.
   b.
   c.
   d.

8. What is the most important characteristic of a toothbrush?

   _____ Why is it important?_____

9. Demonstrate effective brushing.

10. Demonstrate effective flossing.

12. How often should a person brush and floss?_____

12. List proper instructions for a patient with a full or partial denture.

    a.
    b.
    c.
    d.

13. List the items in an oral hygiene kit for dependent patients.

    a.
    b.
    c.
    d.
    e.
    f.
    g.
    h.
    i.

14. List the principal steps in performing oral hygiene for a dependent patient.

    a.
    b.
    c.
    d.
    e.
    f.
    g.

15. List indications for getting a dental consult.

    a.
    b.
    c.
    d.
    e.

PATIENT EDUCATION SESSION EVALUATION

Please comment freely so that we can further improve our class.

1. What did you learn that was new or helpful?

2. Did the class meet your expectations?
   If yes, how? If no, why not?

3. How can the class be improved?

4. Did you floss prior to this session?

5. Now that you have been shown methods to save your teeth, will you apply the brushing, flossing, and sugar control techniques as discussed?

# EQUIPMENT

1. Audiovisual projector and preventive dentistry films

   a. Professional Research Inc.

      660 So Bonnie Brae

      Los Angeles, CA 90057

   b. A-V Scientific Aids, Inc.

      639 North Fairfax Avenue

      Los Angeles, CA 90036

2. Plaque Lite

   Floxite Co., Inc.

   220 First St., Rm. 1515

   Niagra Falls, N.Y. 14303

3. Dependent patient oral hygiene kit

   Refer to the section entitled Dependent Patient Care.

4. Phase microscope/TV monitor

   Dr. Paul Keyes, who has had extensive experience with phase microscope/TV monitor systems, recommended the Olympus BH microscope.

# APPENDIX E
## PROGRAM BUDGET

| | |
|---|---|
| $ 650. | Dental hygiene consultant, statistical analysis, program report |
| 600. | Visual aids, pamphlets, posters, plaque lites |
| 500. | Floss fonts and floss |
| 800. | Dependent patient kits (This was found to be more than was needed). |
| 800. | Toothbrushes and dental floss |
| 1,500. | Audiovisual projector and films |
| 2,000. | Phase microscope-TV monitor |
| 350. | Miscellaneous |
| 7,200 | Total |

This research was made possible by a grant from Health Services Research of the United States Public Health Service.

# APPENDIX F
# TABLES OF RESULTS

TABLE 6

PERSONAL HYGIENE PERFORMANCE (PHP) RESULTS

| | Number of Patients | Mean PHP | Standard Deviation | Standard Error |
|---|---|---|---|---|
| Before Program | 110 | 2.97 | 0.71 | .07 |
| After Program | 110 | 2.27 | 0.98 | .09 |

| | |
|---|---|
| Change in PHP | -.70 |
| t Value | 6.07 |
| Two Tailed Probability | .001 |

TABLE 7

COMPARISON OF RESPONSES TO INPATIENT QUESTIONNAIRE BEFORE AND AFTER PROGRAM IMPLEMENTATION

| Number of Question | Computer Symbol | Letter of Response | Percentage of Patients Before | Percentage of Patients After | Number of Patients Before** | Number of Patients After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 1 | EXAM | a* | 18 | 69 | | | |
| | | b,c | 82 | 31 | 113 | 119 | .0000 |
| 2 | ASK TB | a* | 7 | 24 | | | |
| | | b* | 10 | 20 | | | |
| | | c* | 1 | 16 | | | |
| | | d | 79 | 34 | | | |
| | | e | 4 | 7 | 113 | 119 | .0000 |
| 3 | HAVE TB | a* | 84 | 76 | | | |
| | | b* | 5 | 6 | | | |
| | | c* | 4 | 3 | | | |
| | | d* | 3 | 13 | | | |
| | | e | 4 | 2 | 112 | 119 | .0761 |
| 4 | KIND TB | a | 28 | 10 | | | |
| | | b | 44 | 44 | | | |
| | | c* | 28 | 46 | 111 | 118 | .0007 |
| 5 | BR HBT | a* | 71 | 68 | | | |
| | | b | 13 | 22 | | | |
| | | c | 16 | 10 | 113 | 118 | .1323 |

* Correct response

** For all responses to the question

TABLE 7 - Continued

| Number of Question | Computer Symbol | Letter of Response | Percentage of Patients Before | Percentage of Patients After | Number of Patients Before** | Number of Patients After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 6 | FL HBT | a | 9 | 10 | | | |
| | | b | 4 | 13 | | | |
| | | c | 2 | 7 | | | |
| | | d* | 4 | 11 | | | |
| | | e | 80 | 59 | 113 | 119 | .0035 |
| 7 | SG HBT | a* | 37 | 48 | | | |
| | | b* | 20 | 21 | | | |
| | | c | 32 | 26 | | | |
| | | d | 11 | 4 | 112 | 118 | .1218 |
| 8 | MOVIE | a | 99 | 62 | | | |
| | | b* | 0 | 8 | | | |
| | | c* | 1 | 7 | | | |
| | | d (omitted, movie not shown in lobby) | | | | | |
| | | e | 0 | 23 | 113 | 119 | .0000 |
| 9 | POSTERS | a* | 9 | 66 | | | |
| | | b* | 11 | 11 | | | |
| | | c* | 10 | 7 | | | |
| | | d | 56 | 13 | | | |
| | | e | 14 | 3 | 113 | 119 | .0000 |
| 10 | ABSES | a | 36 | 23 | | | |
| | | b* | 23 | 39 | | | |
| | | c | 41 | 38 | 112 | 119 | .0152 |

* Correct response

** For all responses to the question

TABLE 7 - Continued

| Number of Question | Computer Symbol | Letter of Response | Percentage of Patients Before | Percentage of Patients After | Number of Patients Before** | Number of Patients After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 11 | SAVE | a* | 79 | 79 | | | |
| | | b | 8 | 12 | | | |
| | | c | 5 | 2 | | | |
| | | d | 8 | 8 | 113 | 119 | .3809 |
| 12 | CAUS C | a | 3 | 1 | | | |
| | | b | 5 | 8 | | | |
| | | c | 24 | 23 | | | |
| | | d | 20 | 7 | | | |
| | | e* | 19 | 33 | | | |
| | | f | 28 | 29 | 113 | 119 | .02 |
| 13 | CAUS P | a | 4 | 6 | | | |
| | | b | 4 | 2 | | | |
| | | c* | 42 | 53 | | | |
| | | d | 1 | 1 | | | |
| | | e | 48 | 39 | 113 | 119 | .3882 |
| 14 | FLUOR | a | 3 | 1 | | | |
| | | b | 17 | 12 | | | |
| | | c | 38 | 40 | | | |
| | | d | 26 | 22 | | | |
| | | e* | 16 | 26 | 113 | 119 | .2381 |
| 15 | INST | a* | 2 | 11 | | | |
| | | b* | 6 | 20 | | | |
| | | c* | 3 | 4 | | | |
| | | d | 88 | 60 | | | |
| | | e | 2 | 5 | 113 | 119 | .0001 |

* Correct response

** For all responses to the question

TABLE 8

COMPARISON OF RESPONSES TO THE INPATIENT QUESTIONNAIRE
BEFORE AND AFTER PROGRAM IMPLEMENTATION BY CATEGORY OF QUESTION

| Category of Question | Number of Question | Computer Symbol | Correct Responses | Percentage Correct Before | Percentage Correct After | Probability of Change | Category Probability of Change |
|---|---|---|---|---|---|---|---|
| Patient Awareness of Staff Practices | 1 | EXAM | a | 18 | 69 | .001 | |
| | 2 | ASK TB | a,b,c | 18 | 60 | .001 | |
| | 8 | MOVIE | b,c,e | 1 | 38 | .001 | |
| | 9 | POSTERS | a,b,c | 30 | 83 | .001 | |
| | 15 | INST | a,b,c | 11 | 35 | .001 | |
| | | | | | | | .001 |
| Patient Personal Practices | 3 | HAVE TB | a,b,c,d | 96 | 98 | NS | |
| | 4 | KIND TB | c | 28 | 46 | .01 | |
| | 5 | BR HBT | a | 71 | 68 | NS | |
| | 6 | FL HBT | d | 4 | 11 | NS | |
| | 7 | SG HBT | a,b | 57 | 69 | NS | .05 |
| Patient Attitudes | 10 | ABSES | b | 23 | 40 | .05 | |
| | 11 | SAVE | a | 79 | 79 | NS | |
| | | | | | | | NS |
| Patient Information | 12 | CAUS C | e | 20 | 33 | .05 | |
| | 13 | CAUS P | c | 42 | 53 | NS | |
| | 14 | FLUOR | e | 16 | 26 | NS | |
| | | | | | | | .05 |

TABLE 9

COMPARISON OF RESPONSES TO NURSE QUESTIONNAIRE BEFORE AND AFTER PROGRAM IMPLEMENTATION

| Number of Question | Computer Symbol | Letter of Response | Percentage of Nurses Before | Percentage of Nurses After | Number of Nurses Before** | Number of Nurses After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 1 | STATUS | a | 68 | 76 | | | |
| | | b | 5 | 2 | | | |
| | | c,d | 27 | 21 | 129 | 123 | .3036 |
| 2 | INS DPC | a* | 20 | 84 | | | |
| | | b | 74 | 12 | | | |
| | | c | 6 | 4 | 129 | 123 | .0000 |
| 3 | ADMIT | a* | 22 | 79 | | | |
| | | b | 78 | 21 | 120 | 107 | .0000 |
| 4 | ADVIC | a* | 33 | 34 | | | |
| | | b | 64 | 62 | | | |
| | | c | 4 | 4 | 129 | 123 | .9584 |
| 5 | BF DP | a* | 11 | 14 | | | |
| | | b* | 2 | 3 | | | |
| | | c | 15 | 21 | | | |
| | | d | 26 | 2 | | | |
| | | e | 46 | 60 | 129 | 122 | .0000 |
| 6 | REV INF | a | 80 | 15 | | | |
| | | b | 12 | 29 | | | |
| | | c* | 8 | 56 | 129 | 121 | .0000 |

* Correct response

** For all responses to the question

TABLE 9 - Continued

| Number of Question | Computer Symbol | Letter of Response | Percentage of Nurses Before | Percentage of Nurses After | Number of Nurses Before** | Number of Nurses After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 7 | NP INST | a | 26 | 16 | | | |
| | | b | 5 | 6 | | | |
| | | c* | 12 | 37 | | | |
| | | d | 10 | 11 | | | |
| | | e | 7 | 11 | | | |
| | | f | 40 | 19 | 129 | 123 | .0000 |
| 8 | OWN ABS | a | 17 | 16 | | | |
| | | b* | 40 | 63 | | | |
| | | c | 43 | 21 | 129 | 122 | .0005 |
| 9 | DP KIT | a | 23 | 11 | | | |
| | | b | 4 | 2 | | | |
| | | c | 6 | 5 | | | |
| | | d | 1 | 2 | | | |
| | | e* | 15 | 61 | | | |
| | | f | 10 | 4 | | | |
| | | g | 41 | 15 | 129 | 123 | .0000 |
| 10 | CONSLT | a | 2 | 2 | | | |
| | | b | 8 | 3 | | | |
| | | c* | 7 | 42 | | | |
| | | d | 9 | 6 | | | |
| | | e | 15 | 20 | | | |
| | | f | 9 | 7 | | | |
| | | g | 49 | 20 | 129 | 123 | .0000 |

* Correct response

** For all responses to the questions

TABLE 9 - Continued

| Number of Question | Computer Symbol | Letter of Response | Percentage of Nurses Before | Percentage of Nurses After | Number of Nurses Before** | Number of Nurses After** | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 11 | CAUS C | a | 4 | 0 | | | |
| | | b | 8 | 4 | | | |
| | | c | 22 | 14 | | | |
| | | d | 6 | 8 | | | |
| | | e* | 46 | 72 | | | |
| | | f | 13 | 2 | 129 | 123 | .0001 |
| 12 | CAUS P | a | 15 | 9 | | | |
| | | b | 4 | 0 | | | |
| | | c* | 61 | 85 | | | |
| | | d | 2 | 2 | | | |
| | | e | 19 | 4 | 129 | 123 | .0001 |
| 13 | FLUOR | a | 36 | 39 | | | |
| | | b* | 33 | 50 | | | |
| | | c | 6 | 2 | | | |
| | | d | 8 | 6 | | | |
| | | e | 17 | 3 | 129 | 123 | .0011 |
| 14 | OWN INS | a* | 80 | 78 | | | |
| | | b | 16 | 18 | | | |
| | | c | 1 | 0 | | | |
| | | d | 3 | 4 | 129 | 123 | .7438 |

* Correct response

** For all responses to the question

TABLE 9 - Continued

| Number of Question | Computer Symbol | Letter of Response | Percentage of Nurses Before | Percentage of Nurses After | Number of Nurses Before** | Number of Nurses After | Probability of Change** |
|---|---|---|---|---|---|---|---|
| 15 | FEEL | a* | 54 | 54 | | | |
| | | b | 1 | 1 | | | |
| | | c | 6 | 8 | | | |
| | | d | 34 | 32 | | | |
| | | e | 5 | 5 | 129 | 123 | .9747 |

TABLE 10

COMPARISON OF RESPONSES TO THE NURSE QUESTIONNAIRE
BEFORE AND AFTER PROGRAM IMPLEMENTATION BY CATEGORY OF QUESTION

| Category of Question | Number of Question | Computer Symbol | Correct Responses | Percentage Correct Before | Percentage Correct After | Probability of Change | Category Probability of Change |
|---|---|---|---|---|---|---|---|
| Staff Job Practices | 2 | INS DPC | a | 20 | 84 | .001 | |
| | 3 | ADMIT | a | 22 | 79 | .001 | |
| | 4 | ADVIC | a | 33 | 34 | NS | |
| | 5 | BF DP | a,b | 13 | 17 | NS | |
| | 6 | REV INF | c | 8 | 56 | .001 | |
| | | | | | | | .001 |
| Staff Attitudes | 8 | OWN ABS | b | 40 | 63 | .05 | |
| | 14 | OWN INS | a | 80 | 78 | NS | |
| | 15 | FEEL | a | 54 | 54 | NS | |
| | | | | | | | .001 |
| Staff Information | 7 | NP INST | e | 12 | 37 | .001 | |
| | 9 | DP KIT | e | 15 | 61 | .001 | |
| | 10 | CONSLT | c | 7 | 42 | .001 | |
| | 11 | CAUS C | e | 46 | 72 | .001 | |
| | 12 | CAUS P | c | 61 | 85 | .001 | |
| | 13 | FLUOR | b | 33 | 50 | .05 | |
| | | | | | | | .001 |

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