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ABSTRACT

A study was conducted to evaluate the traditional method (physician, nurse) versus a systems approach method of providing health education. The objectives included the following: identify cost-effective and feasible ways of delivering patient education; guarantee an important resource for the professional in fulfilling his/her patient education responsibilities with economy and efficiency; help minimize the medical workload; assure medical accountability in the patient education area; improve medical management; decrease patient recidivism; enhance patient satisfaction; and assist the patient consumer to be an effective self-care agent. The sample consisted of 502 diagnosed adult essential hypertensive army patients derived from the active duty, retired, and dependent population of two army outpatient clinics. A two-group experimental design was used. Personal characteristics, measures of comprehension and retention, measures of compliance behavior, locus of control, and reading level were the main categories of patient variables. Major conclusions were that all of the data indicated a need for a more effective, efficient, and cost-effective method of patient education than now exists in the army health care delivery system. (Author/JH)

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Report HCSD #79-001-D

A COMPARATIVE EVALUATION OF THE TRADITIONAL VERSUS A SYSTEMS APPROACH FOR HYPERTENSIVE PATIENT EDUCATION

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Final Report

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PRODROMUS

The Patient and Community Health Education Model: A Developmental Evaluation Project (PACOMED) was an epic study conceived and carried out by LTC Deloros Kucha. Fundamentally, the study consisted of developing a System Approach (SA) designed educational program that gave new knowledge to the patient that could directly influence his understanding of and treatment for his problem; the result could be measured for each patient and the medical responsibility for education could be documented. The ultimate goals of such a program were to produce a net saving in professional resources and to cause patients to assume more responsibility for their health care by producing behavioral change.

The study results are included in five reports, four written by LTC Kucha and the Cost Benefit Analysis by Mr. Dale L. Williams. These reports each with a summary and with supporting documents, are collected here as the single comprehensive report of the study. They are:

Assessment for Consumer Health Education Needs of Fort Belvoir, March 1975, Final Report. Report HCSD# 79-001-A.

Strategy for Instructional Systems Design and Formative Evaluation, July 1976, Final Report. Report HCSD# 79-001-B.

A Patient Learning Center for an Army MEDDAC - A Feasibility Study, December 1977. Final Report. Report HCSD# 79-001-C.

A Comparative Evaluation of the Traditional Versus A Systems Approach for Hypertensive Patient Education, August 1977. Final Report. Report HCSD# 79-001-D.

Cost Benefit Analysis.

These five reports include a great deal of information in many forms-survey data, observed data, anecdotal information, evaluations, conclusions and opinions. The reader will have no problem differentiating the study data from the author's stated opinions. These opinions have not been edited because when they come from one with the education and experience of LTC Kucha they too can be of value to the reader.

There is one generalization that can be safely made from the study of the hypertension program-The Systems Approach to patient education was successful in increasing the patient's knowledge. The patients who used the developed program learned more and retained more than the control group. Behavioral change is harder to measure and the results are more tenuous. Both groups reported that their behavior had changed and in some areas the SA group reported more improvement than the control group. However, in the one objective measurement, weight loss, neither group showed any improvement in behavior after six months.

Even though the PACOMED program was suggessful in teaching th[illegible]s, the patient learning center was not a total sucoess because of p[illegible]ation. This is understandable from the study design. It was a study to [illegible] SA developed teaching methodology and that is where the effort w[illegible]rted. Programs to improve utilization would have used resources at the [illegible] the main study. The project officer made the decision to dedicate [illegible] to the central study question; a decision that was appropriate.

The study has a powerful negative as well as a positive message. The positive message is what has already been stated, that the SA methodology is better than traditional ways to educate patients. The negative is as important--a program that educates patients will, not by itself constitute an effective operational Patient and Community Health Eduction and Information System.

Application of the PACOMED findings will be of little value unless it is part of a comprehensive program. The effective patient (consumer) education and information system must consist of three distinct components, all of which are indispensable:

a. Patient education

b. General population health information

c. Medical treatment facility (MTF) staff education and training

The patient education has been addressed in this study and the system proposed can do the job well.

The dissemination of information to the general population of health care consumers is not a new idea. The use of all information media, pamphlets, posters, school programs, etc., is a technique with which we are all familiar. However, it cannot stop with general information about health and preventive medicine. To be an effective part of a comprehensive program, it must convince the people of the advantages and in fact, the necessity, for them to become involved in and responsible for their own health care. They must be persuaded that the MTF is not a vending machine where you put in your coin (or hospital card) and a cure or good health comes out of the slot. When they are convinced they will understand the desirability and will seek the specific education they need to regain or maintain a health state.

It sometimes appears that the solution to the third task is the most elusive. There are a multitude of reasons why practitioners are reluctant to refer their patients to a specialized activity for instruction. They range from misinformation and distrust to valid concern about proper roles in patient care. Some very conscientious practitioners feel that using a specialist to instruct their patient is another step toward total depersonalization of the practice of medicine. Others feel that every patient has specific needs for information that cannot be met by "mass production." Some are very concerned that they may not agree with what is taught and it could subvert the patient's confidence in the practitioner. A few still believe in the paternal

physician and do not agree that the patient should have a major role in determining, participating in or even understanding their treatment. There are other reasons for reluctance to transfer patient education by the practitioner, but the majority fall in the above categories and that is where the staff education must concentrate. The problems of physician input and individualization in the training program are addressed in the PACOMED study. Most practitioners are also realistic enough to recognize advantages when they are shown how much better someone else can serve their patients' needs. Additionally, the educator must also recognize these problems, and the limitations of their program. Education and supportive counselling must not be confused, and the practitioner should never feel he is expected to delegate the latter.

These reports have the conceptual information that permits an understanding of the methodology of the educational program. They also contain specific information for establishment and operation of a Patient Learning Center. Therefore, they can be used both for understanding the process and as a manual for establishing the facility. As discussed before, the Patient Education Program cannot stand alone but its' development is the most complex and time consuming part of a complete program.

It is recommended that copies of this report be furnished to office that has staff responsibility for patient education in the Health Services Command and Office of The Surgeon General. It is also recommended that the existance of these reports be publicized and made available to any Medical Training Facility interested in organizing a comparable program.

NOTICE

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

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The purpose of the investigation was to evaluate the traditional method (physician, nurse) versus a systems approach method of providing health education. The objectives were: to identify cost-effective and feasible ways of delivering patient education; to guarantee an important resource for the professional in fulfilling his/her patient education responsibilities with economy and efficiency; to help minimize the medical workload; to assure medical accountability in the patient education area; to improve medical management; to decrease patient recidivism; to enhance patient satisfaction; to assist the patient consumer to

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19. and External Scale; Nelson-Denny Form A Reading Test; Patients' Opinion Toward the System Approach; Six month assessment; Cost Analysis.

20. be an effective self-care agent. The sample consisted of 502 diagnosed adult essential hypertensive patients derived from the active duty, retired, and dependent population of two outpatient clinics. A two-group experimental design was used. Personal characteristics, measures of comprehension and retention, measures of compliance behavior, locus of control, and reading level were the main categories of patient variables. Major conclusions were that all of the data indicated a need for a more effective, efficient, cost-effective method of providing patient education than now exists in the AMEDD health care delivery system. More specifically, this study demonstrated and effectiveness of the systems approach methodology in the areas of comprehension, retention, behavioral compliance, and cost-effectiveness.

SUMMARY

1. INTRODUCTION.

This is the report of the major phase of the research project: PACOMED--Patient and Community Health Education--which began in September 1974 and was terminated in December 1977. While education for the hypertensive patient was only one of eight conditions for which learning packages were developed, hypertension was the only one chosen for comparative evaluation.

Hypertension was selected because of its prevalence as the major health challenge in America today, with large numbers of the military population suffering from it, and a corresponding amount of medical resources directed toward detection, treatment, education, and follow-up of this chronic condition. Since prevention and control can be strongly affected by behavioral modification, the importance of proper patient education cannot be overemphasized.

2. PURPOSE.

The purpose of this investigation was to evaluate the traditional method (physician or nurse) versus a systems approach method of providing health education, to include engineering the educational environment, the use of a non-professional paramedic as health education, the development of validated health education information..

3. OBJECTIVES.

The overall objectives of the investigation, as stated in the original PACOMED protocol, were:

a. To identify cost-effective and feasible ways of delivering patient education.

b. To guarantee an important resource for the professional in fulfilling his patient education responsibilities with economy and efficiency.

c. To help minimize the medical workload.

d. To assure medical accountability in the patient education area.

e. To improve medical management.

f. To decrease patient recidivism.

g. To enhance patient satisfaction.

h. To assist the patient consumer to be an effective self-care agent.

4. METHODOLOGY.

a. The USAMEDDAC, Fort Belvoir, Virginia, was selected as the test site. In September 1974, the developmental phase of the study was begun and by July 1975 it was completed. This study was conducted from October 1975 until March 1977.

b. A pilot study using thirty diagnosed adult hypertensive patients was conducted for four months to validate the prototype systems approach strategies, materials, evaluation tools, and feasibility of data collection methods.

c. For the definitive study, the clinical setting was the Internal Medicine Outpatient Clinic at Andrew Rader, US Army Health Clinic, Fort Myer, Virginia, for the control, and the Internal Medicine Outpatient Clinic at DeWitt Army Hospital, Fort Belvoir, Virginia, for the experimental group. Each was staffed with physicians and nurse clinicians and each had a caseload of approximately 250 hypertensives a month among their patients, mostly returnees for prescription refill, blood pressure readings, patient education, etc.

(1) The sample consisted of 502 diagnosed adult essential hypertensive patients derived from the active duty, retired, and dependent population of the two outpatient clinics. The T (Traditional), or control group, had 250 and the SA (Systems Approach) group had 252.

(2) A two-group experimental design was used. The T group received the traditional health teaching (doctor or nurse to patient on a one-to-one basis). The SA group received their health teaching by viewing a validated instructional program via a video cassette administered by a non-professional paramedic in the patient learning center. Patients were placed in a control or experimental group, but were not told of the existence of two groups. All agreed to participate.

d. Patient measurements.

(1) Personal characteristics, measures of knowledge, measures of compliance behavior, locus of control, and reading level were the main categories of patient variables. The initial interviews were based on structured and multiple choice questionnaires and included data on demographic and socioeconomic characteristics, historical features of the patient's hypertension, education provided in reference to length of time as a hypertensive, identity of health care provider, and instructions provided by a physician or nurse clinician. Patients completed a multiple choice questionnaire (pre-test) based on specific learning objectives for desired achievement in the areas of knowledge of their disease, low sodium diet objectives, and medications objectives.

(2) After the educational intervention, the patients completed another multiple choice questionnaire (post-test) of parallel design to determine the extent of comprehension of the learning objectives after

completing the learning experience. A post-test only was given to 50 patients from each group in order to check for sensitization of the subjects by use of the pre-test.

(3) Six months later the same test was administered to determine retention. Also, tests for behavioral compliance, locus of control (Rotter I/E), and reading level (Nelson-Denny, Form A, Reading Test), were given at six months.

(4) The experimental (SA) group was given the Lickert scale response form to elicit opinions pertaining to the system approach learning process.

5. FINDINGS AND RELATED DISCUSSION.

a. Clinic patient population for the initial encounter. Of the 502 diagnosed adult hypertensive patients who were the initial subjects, all but the 100 who were in a post-test only group (analyzed separately), completed the instructional series; 250, or 62 percent, completed the six month follow-up.

b. Patient comprehension after instruction. The patients who participated in the systems approach scored higher on a criterion test of their comprehension of hypertension information than those who had the traditional mode of instruction. This held true for all of the three-part test (general hypertension information, sodium restricted diet, and medications). Neither group reached the criterion level (80 percent or above) on the pre-tests. On the post-tests, 81 percent of the patients in the SA group reached the criterion level compared with only 8.5 percent in the T group.

c. Findings for the post-test only group. Fifty patients from each group were given the post-test only in order to ascertain whether the "before" measures were sensitizing the subjects to the measurement instruments, causing changes in scores due solely to the effect of re-testing. The data distribution showed that the pre-tests were not cueing the patients to any measurable extent.

d. Findings for the six-month retention assessment.

(1) For the 250 patients who completed the six month assessment, there was a marked loss of knowledge in both groups. However, there was a measurable and a statistically significant level of increased retention in the SA group.

(2) Both groups showed some similar improvement in blood pressure.

(3) Neither group showed any improvement in behavior as measured by weight loss.

(4) Patients in both groups demonstrated an increased knowledge of drugs and reported better behavior in regard to adhering to low sodium diet, decrease in coffee consumption, decrease in tension and an increase in physical activity. The SA group did better than the T group in knowledge of drugs, adherence to low sodium diet and decreased coffee drinking.

e. Results of the Rotter's Internal and External Scale (Locus of Control). There were more internally controlled individuals in both groups.

f. The results of the Nelson-Denny reading scale indicated an above 9th grade reading level for 86 percent of the T group tested and 76 percent of the SA group tested.

g. One hundred and eighty of the 202 patients in the experimental group filled out the Lickert scale response form. The patients were extremely receptive of the SA teaching methodology.

h. Cost analysis for program evaluation, a comparison of the traditional and systems approach groups in relation to research and development, investment, and operating costs.

(1) Research and development costs for the traditional method are nil.

(2) For investment costs, no cost for the T method; $11,030 for the SA method, $6,933.00 of which are non-expendable equipment and furnishings which can be used for other learning systems as well.

(3) Operating costs soon recoup the expense of establishing the SA system as is seen below:

		Traditional Approach	Systems Approach
1 patient :	Physician	$ 17.85	$ 6.20
	Nurse	9.45	
10 patients:	Physician	178.50	7.01
	Nurse	94.50	
250 patients:	Physician	4,462.50	175.25
	Nurse	2,362.50	
3,000 patients:	Physician	53,550.00	$2,103.00
	Nurse	$ 28,350.00	

6. CONCLUSIONS.

a. There is a need for a more effective, efficient, and cost-effective method of providing patient education than now exists in the AMEDD health care delivery system.

b. The systems approach to a patient education program was demonstrated to have the following advantages or attributes when compared to the traditional approach.

(1) Better comprehension of the information and concepts presented.

(2) Better retention although both groups had a marked loss after six months.

(3) The patients in both groups reported improved behavior after six months. There was a greater gain in the systems approach group. Neither group showed any improvement in the objective measurement of behavioral change, i.e., weight loss.

(4) The SA system is shown to be more economical of critical professional manpower resources than the traditional system.

c. The traditional system of patient education with the practitioner instructing the patient could be improved. The individual physician and nurse practitioner would be more effective if they were trained in educational techniques and strategies. The traditional system will always be profligate of professional manpower when compared to the SA system but it could be improved so the man hours used were more effective.

d. The Systems Approach methodology described here should not be restricted to patient education programs. It could be used effectively for such things as worker safety and occupational health, preventive medicine, school health education, self-help programs, nutrition, etc.

6. RECOMMENDATIONS.

a. In view of the demonstrated efficiency in the areas of comprehension, retention, behavioral outcomes, and cost-effectiveness of the SA approach compared to the T approach it would appear very desirable to institute this type of patient education program.

b. Consideration should be given to providing intensive in-service or continuing education to physicians and nurses in the area of educational methodology to make the time they spend in patient education more productive.

c. Additional research should be encouraged with the following goals.

(1) To determine requirements for reinforcing education as to quantity and time intervals for maximum retention.

(2) Long term follow-up studies of patients who are adequately educated to determine if there are permanent changes in behavior or life style.

(3) Population studies to determine if adequate patient education can be measured in changing disease patterns, lowering of rates of avoidable sequelae, or lessening of dependence upon medical treatment facilities.

PREFACE

The firm direction for the "accountability" movement seems to center around the very reasonable concern that the health care system find ways to relate dollars to output. The traditional method of assessing total health care cost has been primarily based on the establishment of the relationship between dollars and health care input. Of course, most health care systems can't even provide that cost information except in gross terms. In short, the present need is clearly seen to be a measure of the quality of health care output; and it is in this arena that the new trend toward "accountability" for the taxpayer's dollars must be met if the health care system is to continue as it is known.

There is an increasing realization that technical virtuosity is not necessarily synonymous with effective care. A better balance is needed between therapeutic medicine and health education. And above all accountability should be inherent in the health care delivery system, especially in the area of Consumer Health Education.

It is hoped that this study will send the readers away with thoughts of rethinking and restructuring their patterns of presenting consumer health education, to reassess their use of time spent in consumer health education, and to reappraise their own instructional role, performance, and the cost of that performance.

ACKNOWLEDGEMENTS

A great deal of effort has been expended by many friends and colleagues to ensure the success of this study.

The personnel at DeWitt Army Hospital, Fort Belvoir, Virginia and the U.S. Army Andrew Rader Clinic, Fort Myer, Virginia were unfailingly helpful and cooperative.

Dr. Douglas Tang, Ph.D., Department Chief, Department of Biostatistics, Division of Biometrics and Medical Information Processing, Walter Reed Army Institute of Research, Washington D.C. assisted with the statistical analysis.

I am especially grateful to SFC Benjamin F. Dawson and SP5 Rodney P. Pittam of the PACOMED staff for their consistent superior performance in all stages of the project to include: developing the patient learning center, formative evaluation of the hypertension learning system, the pilot study, program planning, collection and tabulation of data, typing, graphics, proof-reading, and reproduction work.

A special word of praise is due to Dr. Everett C. Rompf, Ph.D., Education Specialist Project Officer, 1st Development Division, Directorate of Training Development, Fort Belvoir, Virginia. Major John A. McAuliffe, M.C., Assistant Chief, Family Practice, DeWitt Army Hospital, Fort Belvoir, Virginia, Colonel William G. Peard, M.C., Commander, U.S. Army MEDDAC, Fort Polk, Louisiana, and Colonels Madeline L. Bluemle, ANC, Assistant Chief, Nursing Research Service, Department of Nursing, Walter Reed Army Medical Center, Washington D.C. and Jessie W. Bynum (ret) ANC for their editing assistance.

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A COMPARATIVE EVALUATION OF THE TRADITIONAL VERSUS A SYSTEMS APPROACH FOR HYPERTENSIVE PATIENT EDUCATION

1. INTRODUCTION.

Hypertension (high blood pressure) is the major health challenge in America today; it is the greatest single cause of death. More than 24 million people in this country have it and what is worse, fewer than half of them know they have it. It affects men, women, and children of every national origin and there are usually no symptoms.[1]

Finding the hypertensives, the millions of unsuspecting people whose health and life expectancy are so vulnerable, is only one part of the challenge. Solely to have the patient know they have high blood pressure solves nothing. Treatment for patients who "feel fine" is the message that must be gotten across to the patient consumers. This can be accomplished only if the patient understands his/her total health problem and actively does his/her part to help.[2]

Recently, overworked health care personnel and administrators of health care facilities have recognized the benefits of patient education in terms of shorter hospital stays, reduced patient bills, better patient compliance with treatment regimens, and few patient readmissions.[3]

The importance of health education in the overall system of health care is well recognized by professionals in the field. Moreover, consumers of health services are becoming increasingly vocal in stating their desires for more knowledge about health concerns. The question is not about the desirability of health education; the problems center around means and methods of disseminating health information and education.[4]

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[1]Galton, Lawrence, The Silent Disease: Hypertension (New York, Crown Publishers, 1973), 1-11.

[2]Woods, James W., High Blood Pressure (Chapel Hill, North Carolina Memorial Hospital Patient Education Center, 1974), 1-9.

[3]Health Education of the Public, A Statement of Public Policy (Lansing, MI, Prepared by State Health Planning Advisory Council and the Office of Health and Medical Affairs, September, 1976), 45-53.

[4]Green, H. G. and Buchan, B. J., "The Clinic Waiting Room: Environment for Health Education Via Television," The Journal of Biocommunication, August, 1976, 3:2, 4-7.

Demands on health workers are such that the number of health educators and others who are professionally qualified to do this work cannot meet the need. It is virtually impossible to give comprehensive patient care to every patient that should have it under the existing modes of health care delivery. There are not even enough physicians and nurse clinicians for all primary care areas; how then can they realistically expand their already overburdened roles to give quality patient education to every consumer that has a need and a right to it? They cannot. If by some fluke of the imagination one would say they could, the cost would be prohibitive. In the past decade the cost of health care has risen over 400 percent. Solutions must be found to give as good or a higher quality of patient care at a lower cost.[5]

a. Purpose.

The purpose of this investigation as the third of a planned series of five studies was to: revalidate a model (Kucha's Original OHIMS Model) based on a systems approach for hypertensive patient education; to include engineering the educational environment, use of a non-professional paramedic as health educator, development of validated health education information (that utilized the instructional systems design method), to evaluate the traditional method (physician or nurse) versus a systems approach method of providing health education, and to provide information to the Health Services Command for use in planning future hypertensive patient education programs to military care eligible beneficiaries.

b. Background.

Health care personnel in clinical settings have not incorporated accountability concepts into their patient education practices. A patient may be diagnosed, treated, and sent home with a minimum of information, at best, on how to manage their illness. Nowhere in the health care system are there specified means of responsibility for patient education to insure that the patient or family member receives the proper information.[6] To further compound this problem, more times than not, the patient education that was done lacked individualization

[5]Kucha, Deloros H., Two Year Progress Report (Health Care Studies Division, Academy of Health Sciences, FSHTX, November, 1976), 40.

[6]Kucha, Deloros H., "An Evaluation of Traditional and Programmed Instruction to Teach Medical Management to Patients and Their Families," Educational Technology Research, 1971, 50:1-20.

in the instructional strategy.[7] Also, there was no follow-up to insure that learning was achieved by patients and family members.[8] It was evident that a need existed to develop a method of effective health education that was acceptable to the patient consumers and at the same time would not impinge greatly on, but enhance, the ongoing efforts to deliver health care.[9]

In addition, the resources of an increasingly sophisticated and effective educational technology have not been applied to the task of meeting the needs of patient information and management.[10]

The importance of adequate education for the patient cannot be over estimated, nor can the importance of the educational responsibility of the health team be overlooked.

To date, there has been no full-scale application or empirical validation and evaluation of hypertensive health education in the Army's health setting.[11,12,13]

Studies of a different conceptual framework in the civilian sector have been conducted. However, nothing definitive has been published

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[7]Kucha, Deloros H., The Design, Development, and Evaluation of an Empirical Model of an Outpatient Health Information and Management System (Unpublished Doctoral Dissertation, The Catholic University of America, 1973), 16.

[8]Ibid.

[9]Kucha, Deloros H., Systematic Assessment of Consumer Health Education Needs of DeWitt MEDDAC, Fort Belvoir, Virginia (Phase 1, Project: PACOMED, Health Care Studies Division, Academy of Health Sciences, FSHTX, October 1974-March 1975).

[10]Kucha, Deloros H., Guidelines for Implementing An Ambulatory Consumer Health Information System: A Handbook for Health Education (San Antonio, Published under the auspices of the Army-Baylor University Graduate Research Series, 1974), 6-14.

[11]Ibid.

[12]Kennedy, Eunice J., "Managing the Hypertensive Patient: Report of a Study," Military Medicine, November, 1975, 795-796.

[13]Soper, M. R., Knight, C. C., and Morgan, W., "Evaluation of a New Nurse Practitioner Role in a Medical Clinic," Military Medicine, November, 1975, 772-776.

using the tools and techniques of educational technology or the systems approach in the area of hypertensive health education.[14,15,16,17,18]

2. OBJECTIVES.

The overall objectives of the investigation, as stated in the original PACOMED protocol, were:

a. To identify cost-effective and feasible ways of delivering patient education.

b. To guarantee an important resource for the professional in fulfilling his patient education responsibilities with economy and efficiency.

c. To help minimize the medical workload.

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[14]Inui, T. S., Yourtee, E. L., and Williamson, J. W., "Improved Outcomes in Hypertension After Physician Tutorials: A Controlled Trial," Annals of Internal Medicine, 1976, 84: 646-651.

[15]Caldwell, J., et al, "The Dropout Problem in Anti-hypertensive Treatment," Journal of Chronic Diseases, 1970, 22: 579-592.

[16]Bernheimer, E. and Clever, L., Experiences Implementing Patient Education in an Outpatient Clinic (San Francisco, St. Mary's Hospital and Medical Center, Report submitted to California Regional Medical Program for period covering October 1, 1974 - September 30, 1975).

[17]Green, L. W., "Toward Cost-Benefit Evaluations of Health Education: Some Concepts, Methods, and Examples," Health Education Monographs, 1974, 2: 34-64.

[18]Simonds, S. K., Current Issues in Patient Education (New York, Published by American Association of Medical Clinics and Core Communications in Health, 1974).

3. METHODOLOGY.

a. Overview.

(1) While the literature does not conclusively provide a specific framework for the problem investigated in this study in patient education, the definition of technology goes beyond any particular medium or device. In this sense, technology is more than the sum of its parts; it is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction. It was this definition, the process, that was given emphasis throughout the developmental phase of the study. (The basic process of all technologies is the same; it is the systems approach.)[19,20,21]

(2) The U.S. Medical Department Activity, Fort Belvoir, VA, was selected as the test site. A patient learning laboratory was developed in the ambulatory setting adjacent to the Family Practice Clinic in the DeWitt Army Hospital (DAH).

(3) In October 1974 the developmental phase of the study was begun and by July 1975 it was completed. In October 1975, approval for the comparative evaluati[illegible] A Sub-Protocol: A Systems Approach for Hypertensive Patient Education, was received from the Ambulatory Division, Health Services Command. The data for the evaluative phase of the study was collected from October 1975 until March 1977.

b. Procedures.

(1) Operational Definitions.

(a) Baseline Data: Behavioral measures taken prior to beginning a new learning experience (i.e., blood pressure reading, weight, etc.).

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[19]Galbraith, J. K., The New Industrial State (Boston, Houghton Miffin Co., 1967), 12-13.

[20]Corrigan, R. E. and Kaufman, R. A., A Systems Approach for Solving Educational Problems: Operations PEP (San Mateo County, CA, Superintendent of Schools, 1967), 35.

[21]Culbertson, J., Designing Education for the Future (New York, Citation Press, 1966), 266.

(b) Behavioral Changes: The amount of change in the direction of desired behavioral outcomes (i.e., takes medication, diets (if indicated) low sodium, etc.)) possessed by patients six months after the termination of a method of teaching.

(c) Comprehension: The amount of hypertension information (general information, sodium restricted diet, medications) possessed by patients immediately after the termination of a method of teaching.

(d) Criterion-referenced Measures: Measures used to ascertain an individual's status with respect to some criterion, i.e., performance standard. It is because the individual is compared with some established criterion, rather than other individuals, that these measures are described as criterion-referenced.

(e) Educational Technology: The application of science-based or science-derived concepts and techniques in a systematic way to the practical task of education.

(f) Medical Advice: Giving a limited, unstructured explanation or directions using professional knowledge or intuition on some aspect of health care or behavior.

(g) Non professional Paramedic: A graduate of the 91020, clinical specialist course, a civilian licensed practical nurse, or a 91 B20 who has had prior clinical experience.

(h) Norm-Referenced Measures: Measures used to ascertain an individual's performance in relationship to the performance of other individuals on the same measuring device.

(i) Patient Health Education: Using structured information with scientific assessment and teaching strategies. Those strategies encompass the cognitive, psychomotor, and affective domains to alter an individual's attitudes and behavior in favor of improved health.

(j) Patient Information: Showing a film, distributing pamphlets, giving classes or counseling patients, etc., about a given health area, service or problem without regard to prespecified terminal objectives in the cognitive, psychomotor or affective domains. The emphasis is on unstructured information without utilization of scientific assessment and teaching strategies.

(k) Post-test: A set of criterion questions identical to those given on the pre-test, administered to determine the extent of the patient's comprehension of desired information after completing a new learning experience.

(l) Pre-test: A set of criterion questions directly related to the content of the learning experience administered to

determine the extent of the patient's comprehension of desired information prior to beginning a new learning experience.

(m) Retention: The amount of hypertension information (general information, sodium restricted diet, medications) possessed by patients six months after the termination of a method of teaching.

(n) Systems Approach: A devised and designed regular or special method or plan or methodology or procedure; the organization of hardware, software, and people for cooperative operation to complete a set of tasks for desired purposes. It is denoted as SA in the remainder of this report.

(o) Traditional Health Teaching: Planned sequence of didactic and demonstration instruction with supplemental handouts (with the exact teaching objectives as the systems approach method) given by a physician or nurse clinician. It is denoted as T in the remainder of this report.

(p) Validated Instruction: Instruction that does in fact accomplish that for which it was designed; that causes the learner to demonstrate the performance at the mastery level consistently.

(2) Hypothesis. The following null hypothesis was tested: There will be no difference in the Systems Approach (SA) taught group and the Traditionally (T) taught group in behavioral change, comprehension, retention or cost of instruction.

(3) Pilot Study. A pilot study was conducted for a period of four months to validate the prototype systems approach strategies, materials, evaluation tools, and feasibility of data collection methods. Thirty diagnosed adult hypertensive patients on an outpatient status from DeWitt Army Hospital, Family Practice, were the subjects. The Family Practice Residency Program served as the main resource for coordinating the information needed to develop the patient education learning system and evaluation tools. It was found that due to the small number of family panels and the probability of sensitizing the potential subjects, it would not be possible to use the Family Practice population for the definitive study.

(4) Definitive Study.

(a) Setting.

1 The clinical setting for the study was the Internal Medicine Outpatient Clinic at the Andrew Rader US Army Clinic, Fort Myer, VA, for the control group and the Internal Medicine Outpatient Clinic at DeWitt Army Hospital, Fort Belvoir, VA, for the experimental group. Andrew Rader US Army Clinic internal medicine staff consisted of two physicians and one nurse clinician, with a mean patient case load of 400 patients per month and approximately 220 to 240 hypertensives per month.

2 DeWitt Army Hospital's internal medicine staff consisted of six physicians and two nurse clinicians, with a mean patient caseload of 900 patients per month and approximately 250 to 260 hypertensives per month.

3 Most of the hypertensive patients in both groups were not newly diagnosed but returnees for prescription refills, blood pressure readings, patient education, and follow-up visits.

(b) Sample.

1 Five hundred and two diagnosed adult essential hypertensive patients on an outpatient (Internal Medicine Clinic) basis derived from the active duty, retired military, and dependent population of the DeWitt Army Hospital and the Andrew Rader US Army Health Clinic.

2 The initial breakdown was "walk-in" selection of the two groups; the T group had 250 patients and the SA group had 252 patients. Fifty in each group were in a post-test category.

3 Informed consent was obtained from all patients. Initially there were no refusals to participate in the study.

(c) Design. A two group experimental design was used with assignment of subjects to either a control or an experimental group. The T group received the traditional health teaching. The SA group received their health teaching by viewing a validated instructional program via a video cassette (3/4 inch U-matic format) administered by a non-professional paramedic in a patient learning center.

1 Patient Measurements.

a The main categories of patient variables were: (1) personal characteristics, (2) measures of knowledge, (3) measures of compliance behavior, (4) locus of control, and (5) reading level. After their regular visit to either a physician or nurse clinician, patients were placed in a control or experimental group. They agreed to participate in the research project and were not told of the existence of two groups (traditional and systems approach). The initial interviews of the groups were based on structured and multiple choice questionnaires. Data elicited included demographic characteristics (age, sex, place of residence), socioeconomic characteristics (marital status, type of employment, rank, education), historical features of the patient's hypertension and education provided in reference to length of time as a hypertensive, health care provider, if had prior instruction, time of prior instruction, instructions provided by a physician or nurse clinician.

b In the same interview, additional questions were asked to determine a patient's baseline behavior. Items queried

or measurements obtained included: blood pressure, weight, complies with the laboratory and/or ancillary test, takes medication, knows drugs and action, adheres to low sodium diet, number of cups of coffee per day, number of cigarettes per day, degree of tension experienced, type and frequency of physical activity.

c Additionally, the patients completed a multiple choice questionnaire (pre-test) to determine their knowledge in reference to the following learning objectives (the objectives were identified by a physician consultant as feasible achievements for all patients participating in the study):

GENERAL INFORMATION OBJECTIVES

Upon completion of this program the patient will be able to:

- Define blood pressure
- Define systolic pressure and diastolic pressure
- Define hypertension and give some indication of the range of blood pressure in which it falls
- Define borderline hypertension and indicate the pressure range in which it falls.
- List several diseases hypertension is directly related to
- Explain the implications of high blood pressure
- Tell whether hypertension is controllable with medication
- Tell what the hypertensive patient's attitude toward smoking should be
- Tell what the goal of hypertension treatment is for the patient's health
- Explain why the doctor may require regular visits as part of the patient's treatment
- State what the hypertensive patient can look forward to with his/her disease under control

LOW SODIUM DIET OBJECTIVES

Upon completion of this program the patient will be able to:

- Explain that sodium is a mineral found in salt
- Explain why salt intake should be reduced
- Explain in simple terms the effect of sodium on blood volume
- Explain the function of the kidneys in relationship to blood volume
- List at least two methods that may be used so the patient may eat the same food the family does
- List several foods or spices in which high concentrations of sodium are found.

- Name several foods to avoid because they are heavily salted.
- Select from a sample menu foods that are low in sodium and can be eaten in restaurants and at food counters
- Select sample menus for making lunch to eat at school or work
- Describe the policy to follow on using salt substitutes
- Describe several ways to cover up the lack of sodium in the diet by using spices and herbs
- List several sources of recipes that may be used in preparing a low sodium diet.
- State the average number of sodium grams to eliminate from a simple low sodium diet
- Describe the adjustments that may need to be made if the doctor recommends a specific level of sodium each day

MEDICATIONS OBJECTIVES

Upon completion of this program the patient will be able to:

- Recognize from a complete list of medications, his/her medications and describe their use
- Explain the importance of taking medication as prescribed
- Recognize what rules the patient should follow when on medication
- Explain the importance of and how to fill out a medication record sheet
- Explain the importance of not taking another persons medication
- Explain why medications should not be taken in front of children
- Explain why it is important to tell the physician about the medications the patient is taking that do not need a prescription
- Explain what effect alcoholic beverages can have on some medications
- Tell what to do with medications no longer being used
- Explain allergic reactions that may occur from prescribed medications
- Tell how many days' medication the patient should have on hand prior to having the prescription refilled
- Tell why the patient should take his/her medication at the prescribed time

d After the educational intervention, the patients completed another multiple choice questionnaire (post-test) to determine the extent of the patient's comprehension of the learning objectives after completing the learning experience.

e Six months later the data was collected by individual patient visits and personal interviews. The measurements were: behavioral compliance, retention test (amount of information possessed six months after the termination of a method of teaching), locus of control (Rotter I/E), reading level (Nelson-Denny, Form A, Reading test).

f Following is a chart showing the amount of time spent on each encounter for both groups.

CONTROL GROUP		EXPERIMENTAL GROUP	
Initial Encounter:			
Collect Behavioral Baselines and Pre-Test	20 mins	Collect Behavioral Baselines and Pre-Test	20 mins
Physician or Nurse Clinician Provided Instruction	1 hour	Validated Instructional Mode	1 hour
Post-Test	10 mins	Post-Test	10 mins
Six Month:			
Collect Behavioral Follow-up, Retention Test, Rotter IE Scale, Nelson Denny Reading Test	50 mins	Collect Behavioral Follow-up, Retention Test, Rotter IE Scale, Nelson Denny Reading Test	50 mins
After collection of data, reinforcement by physician or nurse clinician	10 mins	After collection of data, reinforcement by non-professional paramedic	10 mins

g In addition there were 50 patients from each group who only had a post-test. This was done to eliminate any suspicion of sensitizing the subjects ("before" measures may sensitize subjects to the measurement instrument and cause a change in scores due solely to the effect of retesting).

h The experimental subjects were given one additional measurement, a Lickert scale response form reflecting the

patient's opinion pertaining to the Systems Approach learning process. The process evaluation included opinions on the following: viewing time, content interest, questions on topic, pace, content uniqueness, content value, non-professional paramedical health educator's style, learning center, preference for instruction, freedom to learn by audiovisual compared to usual instructions by professional health workers, personal responsibility for learning by audiovisual compared to usual instruction by health workers, patient's attitude toward audiovisual modes for health education, patient's viewing of commercial television in hours.

i The data for both groups were collected by two non-professional paramedics who had the education and preparation to assume the data collection role.

2 The Treatment Variables.

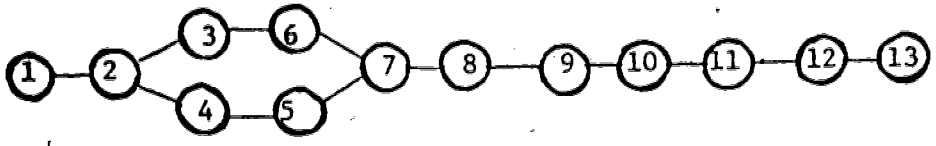
a Traditional Health Teaching. The Traditional Approach consisted of a planned sequence of didactic and demonstration instruction with supplemental handouts (with the exact teaching objectives as the Systems Approach method), given by either a physician or nurse clinician.

b The Systems Approach methodology took the form of a validated instructional program (via a video cassette) administered by a non-professional paramedic in a patient learning center.

(1) The essence of a validated instructional program is validating the learning systems until the patients who use the systems as planned meet the learning objectives.

(2) Instructional design is a logical, step by step, preparation of the instructional strategy, which, when validated, will teach predetermined objectives.

(3) The following is a diagram of the event identification and narration of the systems approach that was used:



1. Topic Selection
2. Meeting with content consultant to ascertain tasks (Task Analysis)
3. Development of behavioral objectives
4. "Real World" search for existing educational software
5. Evaluation of existing educational software
6. Development of criterion measures
7. Design of the instructional system
8. Formative evaluation
9. Data collection
10. Revision
11. Physician evaluation
12. Cost analysis
13. Final staff evaluation

(4) A point was reached when no further improvements were likely. It was then that the instructional package was subjected to the comparative evaluation.

(5) Another facet of the Systems Approach methodology was to utilize a non-professional paramedic to administer the instructional program. This could be accomplished because the validated learning system had accompanying directions and flow charts for their administration (the tasks involved in operating the learning center were minimal and elementary in nature). In addition the non professional paramedic performed the functions of counselor, records manager, and coordinator. See Appendix F, page 143, Non-Professional Paramedic as Health Educator.

(6) The learning center offered a specialized learning area that probably facilitated the activities for patient learning. See Appendix G, page 155, Physical Facilities.

(7) Use of the learning center as the focus of the instructional effort was based upon a family of assumptions such as would be articulated in a systems approach to learning. These assumptions include the application of technology to learning for achieving instructional efficiency and effectiveness. See Appendix E, page 131, Communications Media.

(d) Reliability and Validity of Evaluation Tools.

1 The pre-post test and retention measures were criterion-referenced rather than norm-referenced measurements. Criterion-referenced tests were devised to make decisions both about individuals and treatments, e.g., instructional programs. In the case of decisions regarding patients a criterion-referenced test was administered which ascertained if a set of instructional objectives were achieved by a replicable instructional sequence. Also, whether the patient mastered the criterion which was considered to be prerequisite to commencing the next sequence of instruction. By administering the criterion-referenced

measure to the patients after they had completed the instructional sequence, a decision could be made regarding the efficacy of the sequence (treatment).

2 It is well known from the study of classified test theory that when the variances of test scores is restricted (criterion-referenced), correlational estimates of reliability and validity will be low. It was clear that the classical approaches to reliability and validity estimation needed to be interpreted more cautiously or discarded in the analysis of the criterion-referenced tests.

3 A correct response analysis was conducted during the developmental stage. (See Strategy for Instructional Systems Design Process and Formative Evaluation and Appendix 1, pp. 1-12.)

4 The commercial Nelson-Denny Reading Test comprehension portion used has a reliability of .81. The Rotter I/E scale has been administered to numerous samples. An internal consistency coefficient (Kuder-Richardson) of .70 was obtained from a sample of 400 college students (Rotter, 1966). The literature did indicate that there were individual differences in perception about one's control over one's destiny and that the Rotter scale was sensitive to these differences.

(e) Analysis of Data. All data were checked, scored, and coded separately by two coders according to the categories established. The data were entered on IBM cards and the cards were verified for accuracy. Data were analyzed by automatic data processing equipment and a variety of statistics were computed.

(f) Cost-Effective Analysis. Cost-effective analysis is often viewed as an alternative to evaluation research, but essentially it is a logical extension of it. In order to affix dollar values to the benefits of a program, first there has to be some evaluative evidence of what kinds and how much benefit there has been. Documentation was obtained for research and development, investment, and operating costs to include personnel, instructional materials, space, and administrative costs.[22]

4. FINDINGS AND RELATED DISCUSSION.

The findings for each of the data collection procedures will be presented followed by the discussion related to the specific finding.

[22]Weiss, C. H., Evaluation Research: Methods of Assessing Program Effectiveness (Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1972), 32.

a. Clinic Patient Population for the Initial Encounter.

(1) Findings.

(a) Five hundred and two diagnosed adult hypertensive patients were the initial subjects. All completed the instructional series. One hundred of the 502 subjects were in a post-test only group and were analyzed separately. Of the remaining 402 subjects (200 in one group and 202 in the other group) 250 completed the six month follow-up (124 in the T group and 126 in the SA group) or 62 percent of the test population.

(b) Of the 76 dropouts from the six month follow-up in the SA group, four were deceased, 10 retired and moved to another area, and six had a permanent change of station. The remaining 56 simply didn't want to continue. Reasons ran the gamut from inclement weather conditions, "not interested," "didn't have the time," to "don't call us, we'll call you."

(c) In the T group the dropout reasons were the same. Ten subjects had a permanent change of station and five retired and located in another section of the country. The remaining 51 gave reasons similar to those of the SA group.

(d) Both groups had similar populations (see Table 1, p. 16, Demographic and Socioeconomic Characteristics of Hypertensive Patients in Relation to Method of Instruction: Initial Encounter), with only 3.5 percent of the total population active duty, the smallest proportion. The largest group represented was the dependent wives comprising 61.5 percent of the total population. Next came the retiree population which had the remaining 35 percent. The sex distribution was 61.5 percent female and 38.5 percent male. The majority of the subjects (91 percent) were 40 years old and over. Ninety percent were married. The most common educational levels were high school graduate and 1-3 years of college. Sixty-seven percent were in one or the other of those levels. In the occupation categories 72 percent were unemployed, retired, a housewife, or an administrative worker.

(e) The history (see Table 2, p. 18, Historical Features of Hypertensive Patients Illness and Education Provided: Initial Encounter), of the illness showed that the time since diagnosis, for 12 percent, was less than three months; 18 percent, one to two years; and 56 percent, more than two years. The health care provider for 46 percent was a physician, and for 54 percent, a nurse clinician. Sixty-eight percent of the population had prior instruction and 32 percent did not. The time of prior instruction was 18 percent, less than three months; 13 percent, four to six months; five percent, seven to 12 months; 22 percent, one to two years; and 42 percent, more than two years. Instructions were provided to 53 percent by a physician and 47 percent by a nurse clinician.

TABLE 1

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF HYPERTENSIVE PATIENTS IN RELATION TO METHOD OF INSTRUCTION: INITIAL ENCOUNTER

Demographic and Socioeconomic Variables	All Patients (N=402) %	T Group (N=200) %	SA Group (N=202) %
RANK OF MILITARY			
Active Enlisted			
E-1 thru E-6		1	.5
E-7 thru E-9		1	1.5
Active Officer			
Company Grade		.5	.5
Field Grade		0	2
	3.5		
Retired Enlisted			
E-1 thru E-6		2	3.5
E-7 thru E-9		7.5	9
Retired Officer			
Company Grade		4	2
Field Grade		21	21
	35		
RANK OF SPONSORS OF DEPENDENTS			
Active Enlisted			
E-1 thru E-6		1.5	1
E-7 thru E-9		2.5	2
Active Officer			
Company Grade		0	4
Field Grade		5.5	11
Retired Enlisted			
E-1 thru E-6		4.5	2
E-7 thru E-9		16.5	15
Retired Officer			
Company Grade		4	2
Field Grade		28.5	23
	61.5		

TABLE 1 continued

Demographic and Socioeconomic Variables	All Patients (N=402) %	T Group (N=200) %	SA Group (N=202) %
SEX			
Male	38.5	36.5	41
Female	61.5	63.5	59
AGE			
less than 30	1	.5	1
30-39	8	6.5	9
40-49	25	17.5	33
50-59	42	43	42
60-69	20	29.5	11
70 and older	4	3	4
MARITAL STATUS			
Married	90	91.5	89
Widowed	6.5	5.5	7
Single	1.5	1	2
Engaged	0	0	0
Divorced	1	1.5	0
Separated	1	.5	2
EDUCATION COMPLETED			
Elementary (grades 1-6)	2	1.5	2.5
Junior High (grades 7-8)	4	4	3.5
High School (grades 9-12)	38	38.5	37
1-3 Years College	29	30	28
Baccalaureate	18	15.5	21
Master's Degree	8.5	9	8
Doctor's Degree	.5	1.5	0
OCCUPATION			
Unemployed or Retired	12	16.5	10
Housewife	41	40	43.5
Administrative (office work)	19	18.5	19
Technical Specialist (mechanical)	7	4.5	9
Professional (non-medical)	11	13	8
Combat Related (line groups)	1	0	2
Student (full time)	1	.5	1
Blue Collar Work (custodial)	3	2.5	3
Medical Professional (RN,MD,DDS)	2	1	2
Other	3	3.5	2.5

TABLE 2

HISTORICAL FEATURES OF HYPERTENSIVE PATIENTS ILLNESS AND EDUCATION PROVIDED: INITIAL ENCOUNTER

Historical Features	All Patients (N=402) %	T Group (N=200) %	SA Group (N=202) %
TIME SINCE DIAGNOSIS			
Less Than 3 Months	12	4.5	20
4 to 6 Months	8	4.5	10
7 to 12 Months	6	5.5	6
1 to 2 Years	18	22.5	14
More Than 2 Years	56	63	50
HEALTH CARE PROVIDER			
Physician	46	30.5	62
Nurse Clinician	54	69.5	38
HAS HAD PRIOR INSTRUCTION			
Yes	68	84.5	49.5
NO	32	15.5	50.5
	(N=269) %	(N=169) %	(N=100) %
TIME OF PRIOR INSTRUCTION			
Less Than 3 Months	18	8	34
4 to 6 Months	13	15.5	9
7 to 12 Months	5	5.5	5
1 to 2 Years	22	21	24
More Than 2 Years	42	50	28
INSTRUCTION PROVIDED BY			
Physician	53	62	35
Nurse Clinician	47	38	65

b. Patient Comprehension for the Initial Encounter.

(1) Findings.

(a) Table 3, p. 20, Percentage of Patients That Achieved the Criterion Level by Type of Instruction for the Initial Encounter, compares the percentage of patients achieving the criterion level by type of instruction for the initial encounter. Typically, when using criterior-referenced tests, interest is in the proportion of subjects who meet a criterion level of performance.[23] The data was reported in increments to provide a better picture of where the scores were falling. Neither group reached the criterion level on the composite pre-test. On the composite post-test, 81 percent of the patients in the SA group reached the criterion level compared to only 8.5 percent in the T group.

(b) The difference in test scores between the groups was statistically significant at the $p < .0001$ level. See Appendix A, p. 99, Technical Tabular and Graphic Data Pertaining to Summary Statistics of Test Scores.

(2) Discussion.

(a) The SA & T groups were demographically comparable except that the T group had a greater representation in the under age 50 (43 percent), than the SA group (24.5 percent).

(b) In the area of history of their hypertension there were some differences. The SA group had a larger proportion of relatively new cases (less than six months, 30 percent) than the T group (less than six months, 9 percent). Also, the T group had 84.5 percent who had received prior instruction while the SA group had 49.5 percent.

(c) The null hypothesis that there would be no difference in the SA & T groups on comprehension is not confirmed. The Systems Approach group showed a significant increase in comprehension.

c. Clinic Patient Population for the Initial Encounter: Post-Test Only Group.

(1) The pre-test measures may sensitize subjects to the measurement instrument and cause a change in scores due solely to the effect of retesting. To guard against this, a group of 100 were not pre-tested, but given either the SA or T instruction and then tested for comprehension.

[23] Popham, J., Evaluation in Education: Current Applications (Berkeley, CA, McCutchan Publishing Corporation, 1974), 240.

TABLE 3

PERCENTAGE OF PATIENTS THAT ACHIEVED THE CRITERION LEVEL BY TYPE OF INSTRUCTION FOR THE INITIAL ENCOUNTER

GROUPS		Criterion Level 0-29%	30-49%	50-69%	70-79%	80-100%
COMPOSITE SCORES						
Pre-Test:	T Group (N=200)	1.5	21	63.5	14	0
	SA Group (N=202)	2	26	61	11	0
Post-Test	T Group	0	9.5	49	33	8.5
	SA Group	1	1	5	12	81
GENERAL INFORMATION						
Pre-Test	T Group	5	14.5	38.5	24	18
	SA Group	0	17	43	23	17
Post-Test	T Group	1	10.5	29.5	27	32
	SA Group	1	3	14	22	60
LOW SODIUM DIET						
Pre-Test	T Group	19.5	49	31	.5	0
	SA Group	17	45	37	1	0
Post-Test	T Group	7	30	53	8	2
	SA Group	0	4	9	14	73
MEDICATIONS						
Pre-Test	T Group	0	9.5	20	32	38.5
	SA Group	2	[illegible]	7	33	55
Post-Test	T Group	0	5	[illegible]	26	52
	SA Group	1	[illegible]	[illegible]	4	93

TABLE 4

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF HYPERTENSIVE PATIENTS IN RELATION TO METHOD OF INSTRUCTION: POST-TEST ONLY

Demographic and Socioeconomic Variables	All Patients (N=100) %	T Group (N=50) %	SA Group (N=50) %
RANK OF MILITARY			
Active Enlisted			
E-1 thru E-6		0	2
E-7 thru E-9		4	0
Active Officer			
Company Grade		0	0
Field Grade		0	4
	5		
Retired Enlisted			
E-1 thru E-6		4	0
E-7 thru E-9		22	10
Retired Officer			
Company Grade		2	0
Field Grade		30	16
	42		
RANK OF SPONSORS OF DEPENDENTS			
Active Enlisted			
E-1 thru E-6		0	2
E-7 thru E-9		0	4
Active Officer			
Company Grade		2	2
Field Grade		0	10
Retired Enlisted			
E-1 thru E-6		2	4
E-7 thru E-9		4	20
Retired Officer			
Company Grade		4	2
Field Grade		26	24
	53		

TABLE 4 continued

Demographic and Socioeconomic Variables	All Patients (N=100) %	T Group (N=50) %	SA Group (N=50) %
SEX			
Male	46	62	30
Female	54	38	70
AGE			
less than 30	3	0	6
30-39	2	0	4
40-49	29	30	28
50-59	40	38	42
60-69	20	20	20
70 and older	6	12	0
MARITAL STATUS			
Married	88	88	88
Widowed	9	10	8
Single	1	0	2
Engaged	0	0	0
Divorced	1	2	0
Separated	1	0	2
EDUCATION COMPLETED			
Elementary (grades 1-6)	1	0	2
Junior High (grades 7-8)	3	0	6
High School (grades 9-12)	35	34	36
1-3 Years College	26	28	24
Baccalaureate	20	26	14
Master's Degree	14	10	18
Doctor's Degree	1	2	0
OCCUPATION			
Unemployed or Retired	13	16	10
Housewife	36	28	44
Administrative (office work)	25	30	20
Technical Specialist (mechanical)	5	6	4
Professional (non-medical)	8	6	8
Combat Related (line groups)	0	0	0
Student (full time)	0	0	0
Blue Collar Work (custodial)	3	4	2
Medical Professional (RN,MD,DDS)	0	0	0
Other	11	10	12

TABLE 5

HISTORICAL FEATURES OF HYPERTENSIVE PATIENTS ILLNESS AND EDUCATION PROVIDED: POST-TEST ONLY

Historical Features	All Patients (N=100) %	T Group (N=50) %	SA Group (N=50) %
TIME SINCE DIAGNOSIS			
Less Than 3 Months	8	0	16
4 to 6 Months	4	2	6
7 to 12 Months	2	2	2
1 to 2 Years	15	20	10
More Than 2 Years	71	76	66
HEALTH CARE PROVIDER			
Physician	30	4	56
Nurse Clinician	70	96	44
HAS HAD PRIOR INSTRUCTION			
Yes	71	90	52
no	29	10	48
	(N=71) %	(N=45) %	(N=26) %
TIME OF PRIOR INSTRUCTION			
Less Than 3 Months	49.2	60	38.4
4 to 6 Months	16.4	28.9	3.9
7 to 12 Months	2	0	3.9
1 to 2 Years	7.9	4.4	11.5
More Than 2 Years	24.5	6.7	42.3
INSTRUCTION PROVIDED BY			
Physician	53	62	35
Nurse Clinician	47	38	65

(2) Table 4, p. 21, Demographic and Socioeconomic Characteristics of Hypertensive Patients in Relation to Method of Instruction: Post-Test Only: and Table 5, p. 23, Historical Features of Hypertensive Patients Illness and Education Provided: Post-Test Only, revealed that for the most part the population category percentages paralleled the main group.

(3) Findings. Table 6, below, Percentage of Patients That Achieved the Criterion Level by Type of Instruction for the Initial Encounter: Post-Test Only Group. The post-test only sample had the following success in reaching criterion level: T group, zero percent, SA group, 68 percent. While both are lower than the "pre-and post-test" sample (T - eight percent, SA 81 percent), the overwhelming preponderance of success of the SA instruction in both samples validates that the significant factor is the difference in instruction, not the "pre-test."

TABLE 6

PERCENTAGE OF PATIENTS THAT ACHIEVED CRITERION LEVEL BY TYPE OF INSTRUCTION FOR THE INITIAL ENCOUNTER: POST-TEST ONLY GROUP

GROUPS	0–29%	30–49%	50–69%	70–79%	Criterion Level 80–100%
COMPOSITE SCORES					
POST-TEST					
T Group (N=50)	0	16	76	8	0
SA Group (N=50)	0	0	10	22	68

d. Clinic Patient Population for the Initial Encounter and Six Month Assessment.

(1) Findings. See Table 7, p. 25, and Table 8, p. 27. The characteristics of the 250 patients who completed the six month assessment was essentially the same as the original total sample of 402. Both the SA and the T groups were comparable to the original large group in both demographic and disease history characteristics.

TABLE 7

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF HYPERTENSIVE PATIENTS IN RELATION TO METHOD OF INSTRUCTION FOR THE INITIAL ENCOUNTER AND SIX MONTH ASSESSMENT

Demographic and Socioeconomic Variables	All Patients (N=250) %	T Group (N=124) %	SA Group (N=126) %
RANK OF MILITARY			
Active Enlisted			
E-1 thru E-6		0	0
E-7 thru E-9		1	1
Active Officer			
Company Grade		0	0
Field Grade		0	2
	2		
Retired Enlisted			
E-1 thru E-6		3	2
E-7 thru E-9		4	8
Retired Officer			
Company Grade		4	3
Field Grade		24	24
	37.5		
RANK OF SPONSORS OF DEPENDENTS			
Active Enlisted			
E-1 thru E-6		0	0
E-7 thru E-9		2	1
Active Officer			
Company Grade		3	4
Field Grade		0	9
Retired Enlisted			
E-1 thru E-6		6	2
E-7 thru E-9		14	15
Retired Officer			
Company Grade		6	4
Field Grade		30	25
	60.5		

TABLE 7 continued

Demographic and Socioeconomic Variables	All Patients (N=250) %	T Group (N=124) %	SA Group (N=126) %
SEX			
Male	39.5	39	40
Female	60.5	61	60
AGE			
less than 30	1.5	0	3
30-39	4.5	4	5
40-49	21.5	13	30
50-59	48	50	46
60-69	20.5	29	12
70 and older	4	4	4
MARITAL STATUS			
Married	91	91	91
Widowed	5.5	5	6
Single	1	1	1
Engaged	0	0	0
Divorced	[illegible]	[illegible]	[illegible]
Separated	1.5	1	2
EDUCATION COMPLETED			
Elementary (grades 1-6)	2	2	2
Junior High (grades 7-8)	2.5	3	2
High School (grades 9-12)	34.5	35	34
1-3 Years College	30	30	30
Baccalaureate	20.5	18	23
Master's Degree	9	9	9
Doctor's Degree	1.5	3	0
OCCUPATION			
Unemployed or Retired	12.5	[illegible]	8
Housewife	43	39	47
Administrative (office work)	18.5	16	21
Technical Specialist (mechanical)	5.5	3	8
Professional (non-medical)	10.5	15	6
Combat Related (line groups)	.5	0	1
Student (full time)	1.5	1	2
Blue Collar Work (custodial)	2.5	3	2
Medical Professional (RN,MD,DDS)	2	2	2
Other	3.5	4	3

TABLE 8

HISTORICAL FEATURES OF HYPERTENSIVE PATIENTS ILLNESS AND EDUCATION PROVIDED FOR THE INITIAL ENCOUNTER AND SIX MONTH ASSESSMENT

Historical Features	All Patients (N=250) %	T Group (N=124) %	SA Group (N=126) %
TIME SINCE DIAGNOSIS			
Less Than 3 Months	12.5	3	22
4 to 6 Months	5.5	2	9
7 to 12 Months	5.5	5	6
1 to 2 Years	17.5	21	14
More Than 2 Years	59	69	49
HEALTH CARE PROVIDER			
Physician	43.5	23	64
Nurse Clinician	56.5	77	36
HAS HAD PRIOR INSTRUCTION			
Yes	69	86	52
No	31	14	48
	(N=173) %	(N=107) %	(N=66) %
TIME OF PRIOR INSTRUCTION			
Less Than 3 Months	22.5	5	39
4 to 6 Months	11.5	13	8
7 to 12 Months	4.5	2	6
1 to 2 Years	19.5	16	20
More Than 2 Years	42	50	27
INSTRUCTION PROVIDED BY			
Physician	52	63	41
Nurse Clinician	48	37	59

(2) Discussion. No relationships for noncompliant behavior could be drawn on the basis of sex, age, educational background, or that the patients with the most complex regimens were the least likely to comply. The literature does indicate that at least 25 percent of the patients never comply no matter what tactics are used.[24,25,26,27,28]

e. Patient Comprehension and Retention For The Initial Encounter and Six Month Assessment.

(1) Findings. See Table 9, p. 29 and Appendix A.

(a) The demographic and disease history of the groups that took the six month assessment were essentially the same as the total SA & T groups from which they came. Statistical comparison of the initial composite examination results (pre-test) showed the SA & T groups to be a common population in this regard.

(b) The "post-test" results were of the same magnitude of difference as in the total sample with the SA group having 87 percent reaching the 80 percent criterion level while only 10 percent of the T group did.

(c) Retention as measured by six month retesting was rather poor in both groups if the 80 percent criterion level is compared

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[24]Sackett, D. L., et al, "Randomised Clinical Trial of Strategies for Improving Medication Compliance in Primary Hypertension," The Lancet, 31 May 1975, 1205-1207.

[25]Tagliacozzo, D. M. and Ina, K., "Knowledge of Illness as a Predictor of Patient Behavior," Journal of Chronic Disease, (Pergamon Press, Printed in Great Britain), 1970, 22:765-775.

[26]Gillum, R. F. and Barsky, A., "Diagnosis and Management of Patient Noncompliance," Journal of American Medical Association, June 17, 1974, 228:1563-1567.

[27]"Noncompliant Patients are Seen as 'Forceful, Opinionated' Persons," US Medicine, March 15, 1977, 13:2,9.

[28]Tagliacozzo, D. M., et al, "Nurse Intervention and Patient Behavior: An Experimental Study," American Journal of Public Health, 1974, 64: 596-603.

TABLE 9

PERCENTAGE OF PATIENTS THAT ACHIEVED THE CRITERION LEVEL
BY TYPE OF INSTRUCTION FOR THE
INITIAL ENCOUNTER AND SIX MONTH ASSESSMENT

GROUPS		0-29%		30-49%		50-69%		70-79%		80-100%	
COMPOSITE SCORES											
Pre-Test:	T Group N=124 %	1		19		69		11		0	
	SA Group N=126 %		*1*		*14*		*64*		*18*		*3*
Post-Test:	T Group	0		2		56		32		10	
	SA Group		*0*		*.5*		*3.5*		*9*		*87*
6 Mo Ret:	T Group	1		7		69		18		5	
	SA Group		*1*		*5*		*40*		*42*		*12*
GENERAL INFORMATION											
Pre-Test:	T Group	1		14		44		23		18	
	SA Group		*5*		*15*		*40*		*24*		*16*
Post-Test:	T Group	0		8		35		23		34	
	SA Group		*1*		*1*		*13*		*25*		*60*
6 Mo Ret:	T Group	2		8		44		35		11	
	SA Group		*2*		*6*		*20*		*42*		*22*
LOW SODIUM DIET											
Pre-Test:	T Group	15		52		33		0		0	
	SA Group		*15*		*47*		*36*		*2*		*0*
Post-Test:	T Group	4		10		39		31		16	
	SA Group		*0*		*5*		*5*		*13*		*77*
6 Mo Ret:	T Group	6		35		51		8		0	
	SA Group		*.5*		*19.5*		*60*		*17*		*3*
MEDICATIONS											
Pre-Test:	T Group	0		11		18		33		38	
	SA Group		*.5*		*1.5*		*7*		*32*		*59*
Post-Test:	T Group	0		5		19		24		52	
	SA Group		*1*		*0*		*0*		*5*		*94*
6 Mo Ret:	T Group	0		5		19		32		44	
	SA Group		*0*		*1*		*14*		*18*		*67*

to the post-test results. However, we should be more interested in the difference in retention in the two groups from their level of knowledge prior to instruction. To make this comparison the criterion level cannot be the divider of success and failure because of the small numbers involved and because to do so would cause loss of other valid comparative data. When comparison is made of the spectrum of test results at the six month interval compared to pre-test results, it is seen that both the T & SA group showed significant increase in knowledge as measured by the test. If the same comparison is made between the SA & T groups six month results, the SA group has significantly greater retention than the T group ($p < .001$).

(d) The null hypothesis that there would be no difference in retention between the SA & T groups is rejected. The SA taught group had better retention.

(2) Discussion. This phenomenon raises some interesting questions about educational design, methodology, and patient interaction.

(a) Educational Design.

1 In the area of educational design, it could be an indication that the instructional strategy should be designed in a more rigid operant conditioning theoretical framework, with more reinforcement for the initial learning and a variable ratio schedule of reinforcement for the following instructional strategies. For example, a programmed instruction format initially followed by an ideational or concept scaffolding format for reinforcement.[29]

2 Germane is the traditional reinforcement theory, which predicts that the most rapid learning occurs if every correct response is reinforced. It also predicts that learning is slower under fixed-ratio reinforcement; that is, if every other, third, or every tenth response, for example, is reinforced. The corollary prediction is that learning is slowest under variable-ratio reinforcement; that is, if there is no regularity with which correct responses are reinforced.[30,31]

[29] Gagne, R. M., The Conditions of Learning (New York, Holt, Rinehart, and Winston, Inc., 1970), 273-276.

[30] Bigge, M. L., Learning Theories for Teachers (New York, Harper and Row, 1964), 134.

[31] Hilgard, E. R. and Bower, G. H., Theories of Learning, Third Edition, (New York, Appleton-Century-Crofts, 1966), 156-180.

3 The following propositions are related to the learned material.

a People tend to retain more of what they learn when the material is more organized, meaningful, and related;

b The retention rate goes up rapidly as material is "overlearned." That is, learning the same material several times, even though it may appear wasteful at that time, produced more lasting learning in most circumstances.

4 Traditional reinforcement theory predicts that once learning has taken place and reinforcement ceases, the learning is maintained longest by individuals learning under a variable-ratio schedule of reinforcement. Learning is maintained only briefly by individuals learning under continuous reinforcement, and for an intermediate length of time under a fixed-ratio schedule.[32]

5 On the other hand, recent research on human learning has focused on how people think rather than how they respond to stimuli. This research has generated a body of theory that explains how people take in information and how they organize information in memory. These activities of assimilating and arranging information are known collectively as information processing.

6 By and large, researchers agree that human perception and human memory impose rigorous organization on what is learned and on how it is learned. Concepts are not stored randomly, but rather are related to other similar concepts in clusters, which in turn are related to other similar concepts in clusters. The whole forms a logical and often measurable structure. In addition, it is generally agreed that cognitive structures are changed when new concepts are learned, and also that they in turn act upon those new concepts to make them more congruent with existing structures. What we learn changes what we know and what we know changes what we learn.[33]

7 This research suggests a few general principles that are important for instructional designers. The following propositions give an indication of how:

[32]Ausubel, D. P., "A Subsumption Theory of Meaningful Learning and Retention," Journal of General Psychology, 1962, 66:213-224.

[33]Winn, W., "How People Process Information," Audiovisual Instruction, November, 1976, 57-58.

a Research into the use of "advance organizers" has shown that students learn better if they are told in advance how the content to be learned is organized.

b There is ample evidence that verbal information is processed differently from visual information. Generally, verbal information is structured sequentially and pictural information is structured spatially.

c There is evidence that different instructional strategies produce different types of cognitive structure. Not only do different methods affect the way concepts within a given conceptual domain are structured, but they also affect the way in which these same concepts are related to other new structures beyond the domain in question.[34]

(b) Educational Methodology.

1 The questions involving educational methodology are: in view of the marked loss shown in the six month retention scores, when should patients be reinforced; two, four, six months, in order to sustain retention? If they were reinforced, would that have a direct effect on their behavioral outcomes?

2 To date there has been little, if any, empirical evidence in the literature with which to compare the results of this study.[35,36]

(c) Patient Interaction. Retention of knowledge is related to how much one used it, how often, and how soon after learning. One may not be able to diagram a sentence accurately six months after having learned how, but one should be able to speak or write more correctly. So, too, with patients. One would be better able to follow a low sodium diet but might not remember the exact number of milligrams

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[34]Clark, R. E., "Constructing a Taxonomy of Media Attributes for Research Purposes," AV Communications Review, 1975, 23:197-215.

[35]Adams, S. A., Human Memory (New York, McGraw Hill, 1967).

[36]Ausubel, D. P., "The Use of Advance Organizers in the Learning and Retention of Meaningful Verbal Material," Journal of Educational Psychology, 1960, 51:267-272.

of sodium in a teaspoon of salt. In other words, it is a loss of fine memory, but behavioral modification has already taken place.[37,38]

f. Patient Baseline and Behavioral Outcomes for the Initial Encounter and Six Month Assessment.

(1) Findings.

(a) For behavior to be practiced as it should, a foundation of comprehensive, properly arranged cognitive knowledge is needed. The following presents the patients' baseline behavior prior to the educational intervention and six months after.

(b) Table 10, p. 34, gives a Comparison of Baseline and Behavioral Outcomes Before Instruction and Six Month Assessment. In most of the behavioral outcomes, there was a positive gain in the desired direction for both groups.

(c) Blood Pressure.

1 In order to detect any effect of the educational intervention on blood pressure levels, systolic and diastolic readings were recorded when patients reported for instruction and at six month assessment appointments. The pressures of 140 mm Hg systolic and 90 mm Hg diastolic were used as the limits of acceptability.

2 Both groups showed a larger percentage of the population with an acceptable blood pressure reading after six months (see Table 10). There is no difference between SA & T group results.

(d) Weight.

1 For each patient weight was recorded as measured in pounds on the day of entering one of the two groups, and again six months later.

2 The mean weight of both groups was the same at the beginning and at the end of the study.

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[37] Ausubel, D. P. and Blake, E., "Proactive Inhibition in the Forgetting of Meaningful School Material," Journal of Educational Research, 1958, 52:145-149.

[38] Postman, L., "Short-Term Memory and Incidental Learning in A. W. Melton (Ed)," Categories of Human Learning (New York, Academic Press, 1964), 75-100.

TABLE 10

COMPARISON OF BASELINE AND BEHAVIORAL OUTCOMES BEFORE INSTRUCTION AND SIX MONTH ASSESSMENT

OUTCOMES	BEFORE INSTRUCTION T GROUP N=124 %	BEFORE INSTRUCTION SA GROUP N=126 %	SIX MONTH ASSESSMENT T GROUP N=124 %	SIX MONTH ASSESSMENT SA GROUP N=126 %
BLOOD PRESSURE				
Systolic				
≤ 140	65	50	74	66
≥ 140	35	50	26	34
Diastolic				
≤ 90	73	75	88	83
≥ 90	27	25	12	17
WEIGHT IN POUNDS				
Mean Weight	164	164	165	165

Frequency of Weight Gain/Weight Loss

	LOSS-%				GAIN-%		
LBS.	11+	6-10	1-5	0	1-5	6-10	11+
T Group (N=124)	3	10	23	9	34	15	6
SA Group (N=126)	4	7	29	11	34	12	3

Range of Weight Gain and Weight Loss

LBS.	LOSS	GAIN
T Group (N=124)	-22	+20
SA Group (N=126)	-27	+17

TABLE 10 continued

COMPARISON OF BASELINE AND BEHAVIORAL OUTCOMES
BEFORE INSTRUCTION AND SIX MONTH ASSESSMENT

OUTCOMES	BEFORE INSTRUCTION T GROUP N=124 %	BEFORE INSTRUCTION SA GROUP N=126 %	SIX MONTH ASSESSMENT T GROUP N=124 %	SIX MONTH ASSESSMENT SA GROUP N=126 %
NO. CIGARETTES PER DAY				
0	72	69	71	70
1-10	6	10	6.5	11
11-20	13	12	11	16
21-40	8.5	9	11	2
41+	.5	0	.5	1
DECREASE IN TENSION				
Yes	48	66	50	53
No	52	34	50	47
TYPE OF PHYSICAL ACTIVITY				
0	54	45	23	14
Sedentary	0	0	0	1
Light	13	10	7	4
Moderate	22	12	42	32
Vigorous	11	25	27	40
Strenous	0	8	1	9
FREQUENCY OF PHYSICAL ACTIVITY				
Daily	60	75	79	83
Twice Weekly	33	15	17	13
Weekly	7	10	4	4

TABLE 10 continued

COMPARISON OF BASELINE AND BEHAVIORAL OUTCOMES BEFORE INSTRUCTION AND SIX MONTH ASSESSMENT

OUTCOMES	BEFORE INSTRUCTION T GROUP N=124 %	BEFORE INSTRUCTION SA GROUP N=126 %	SIX MONTH ASSESSMENT T GROUP N=124 %	SIX MONTH ASSESSMENT SA GROUP N=126 %
COMPLIES WITH LAB AND ANCILLARY TESTS				
Yes	96	99.5	97	99.5
No	4	.5	3	.5
TAKES MEDICATION				
Yes	96	86	94	96
No	2	4	.5	2
N/A	2	10	5.5	2
Don't Know	0	0	0	0
KNOWS DRUGS AND ACTIONS				
Yes	55	70	81	91
No	45	30	19	9
ADHERES TO LOW SODIUM DIET				
Yes	64	64	86	93
No	18	25	10	7
N/A	18	11	4	0
NUMBER OF CUPS OF COFFEE PER DAY				
0	15	25	29	42
1	16	17	15	21
2	18	16	23	15
3	23	15	15	11
4	17	10	12	6
5-9	9	11	6	2
10-19	2	6	0	2
20+	0	0	0	1

3 When considered individually, however, there was much variation in body weight in the six month period. If the original weight ± five pounds is considered as no change, then 82 (66 percent) of the T group and 93 (74 percent) of the SA group remained the same. Sixteen individuals of T group and 14 of the SA Group lost weight while 26 of the T and 19 of the SA gained.

4 No matter how it is measured this is not a great success. Neither group did well. This lack of success is more telling by the fact that 92 percent of the group were considered overweight. A perusal of the scientific literature indicates, from a cross section of methodologies, that other programs haven't been successful in long lasting weight reduction results.[39-47]

(e) Additional Baseline Measures.

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[39] Stare, J. F., "Comments on Obesity," World Wide Abstracts, 1963, 6:8.

[40] Alexander, M. M. and Stare, J. F., "Overweight, Obesity, and Weight Control," California Medicine, 1967, 106:437.

[41] Hammar, S. L., Campbell, M. M., and Campbell, V. A., "An Interciaciplinary Study of Adolescent Obesity," Journal of Pediatrics, 80:373, 1972.

[42] Mayer, J., Overweight (Englewood Cliffs, NJ, Prentice-Hall, Inc., 1968), 28-30.

[43] Jolliffe, N., Reduce and Stay Reduced on the Prudent Diet (New York, Simon and Schuster, Inc., 1963).

[44] Fletcher, A. P., "Effect of Weight Reduction Upon Blood Pressure of Obese Hypertensive Women," Quarterly Journal of Medicine, 1954, 23:331.

[45] Seltzer, C. C. and Mayer, J., "A Simple Criterion of Obesity," Postgraduate Medicine, 1965, 38:101.

[46] Stunkard, A. and Bert V., "Obesity and the Body Image," American Journal of Psychiatry, 1967, 123:1433.

[47] Craddock, D., Obesity and Its Management (Edinburg, E. and S. Livingston, Ltd., 1969).

1 Findings.

a The measurements of known drugs and their actions and the behavioral findings of complies with laboratory tests, takes medication, adheres to low sodium diet, number of cups of coffee, number of cigarettes per day; additional tension, and type of frequency of physical activity were, according to the patients report, all very high in positive compliance at the outset of the study.

b In two of the categories, complies with laboratory tests and takes medication, the patients in both groups initial report was so near total compliance that there was no possibility of measurable improvement.

c The number of patients who reported themselves as non-smokers at the onset of the study was high, 70 percent of the SA group and 71 percent of the T group. Although more of the smokers reported they were smoking less than reported an increase, there was no dramatic change and no difference between the two groups.

d In the categories decrease in tension and in both level and frequency of physical exercise there was a significant improvement in behavior in both groups. There was no difference in outcome between the SA & T groups.

e The measure of knowledge of drugs and their actions as well as the behavioral outcomes of adherence to a low sodium diet and the amount of coffee drunk, all showed that both the T and SA groups had highly significant improvement. When compared between groups by chi-square testing there was no apparent difference between the two groups. However, by doing comparison of match proportions[48] it was shown that the SA group did report a significantly better improvement than the T group.

f See Appendix B, p. 113, for tables of baseline and six month reports on the behavioral measures.

2 Discussion.

a To date most medical experts agree that the mechanisms of hypertension are still a mystery. However, most agree, that living patterns and genetic predisposition can determine whether a person will have hypertension. If fact, most medical experts agree

[48] Fleiss, J. L., Statistical Methods for Rates and Proportions (New York, John Wiley & Sons, 1973), 72-80.

2 X 2 TABLES OF RAW SCORES PRIOR TO CONVERSION: KNOWLEDGE OF DRUGS

SA Group

Initial \ 6 Months	Yes	No	
Yes	77	3	80
No	24	7	31
	101	10	111

T Group

Initial \ 6 Months	Yes	No	
Yes	57	8	65
No	36	13	49
	93	21	114

Figure 1

2 X 2 TABLES OF RAW SCORES PRIOR TO CONVERSION: ADHERENCE TO A LOW SODIUM DIET

SA Group

Initial \ 6 Months	Yes	No	
Yes	78	3	81
No	27	5	32
	105	8	113

T Group

Initial \ 6 Months	Yes	No	
Yes	78	1	79
No	13	9	22
	91	10	101

Figure 2

that specific aspects of behavior do relate to hypertension: salt intake, obesity, stress, and sedentary life style.[49,50]

b Both groups showed significant levels of improvement in their knowledge of drugs and in the change of behavior that they reported. With the total sample having a good result the SA group

[49] Ostfeld, A. M., and Frie[illegible], E., "Life Style Influences Hypertension," U.S. Medicine, 1 May 1977, [illegible]:1.

[50] Leonard, J. N., Hofer, J. L., and Pritikin, W., Live Longer Now (New York, Grosset & Dunlap, 1974), 64-72.

had an even better result than the T group in knowledge of drugs as well as adherence to a low sodium diet and reducing the amount of coffee drunk.

c In the one objective measurement of behavioral change over the six months, weight loss, there was no improvement in either group.

d The study protocol only had a six month follow-up assessment. This may have been a premature measurement. Perhaps if the measurements could have been taken over a longer period of time, one to five years, ultimately the combination of success variables pointed out above would have had an effect on lowering the patients' weight. Further, it could have been documented as to what combination would yield the most optimum outcomes. For example, if a patient had greater comprehension initially and frequent reinforcement to maintain retention over the long haul (one-five-ten years), would they have even greater behavioral gains in the crucial areas of decreasing salt intake, obesity, stress, and sedentary life style?

g. Patient Supplemental Variables for the Six Month Assessment.

In addition to the measures of retention and behavioral compliance the subjects were given an Internal-External Control Scale (Rotter, 1966), to measure their locus of control and the Nelson-Denny Form A, Reading Test, to measure their reading level.

(1) Rotter's Internal and External Scale.

(a) Findings. Table 11, p. 41, Results of the Rotter's Internal and External Scale (Locus of Control) for the Six Month Assessment, indicates that there were more internally controlled individuals in the SA group than the T group, although both groups scored high on internally controlled, 61 percent for the T group, and 74 percent for the SA group that were tested.

(b) Discussion.

1 After almost a decade of research involving the locus-of-control construct, the validity and usefulness of the distinction made by Rotter (1966) between an internal and an external person is widely accepted. Those who believe that they are in control of their lives and who provide their own reinforcement have been called "internals;" on the other end of the continum are the "externals," believers in the influence of events and factors outside of their control.

2 Many things are presently known about how learning, teaching, or aspects of instructional materials, are affected by locus of control. The problem is that both learning and locus of control can be measured with considerably more accuracy than "teaching."

TABLE 11

ROTTER'S INTERNAL AND EXTERNAL SCALE
(LOCUS OF CONTROL) FOR THE SIX MONTH ASSESSMENT

SCALE	T GROUP N=121 %	SA GROUP N=121 %
INTERNAL	61	74
EXTERNAL	39	26

TABLE 12

NELSON-DENNY READING SCALE
FOR THE SIX MONTH ASSESSMENT

SCALE	T GROUP N=81 %	SA GROUP N=101 %
8th GRADE AND BELOW	14	24
9th - 16th GRADE	86	76

Many differing kinds of teaching situations have been identified, but common measurable elements of these have not yet been discovered (Clark, 1975).[51] Using the instrument developed by Rotter (1966), many researchers have reported that as students perceive themselves as being more "in control" (internals) of their own reinforcement, they will perform better with materials and courses that emphasize a student's freedom to work at his/her pace.[52,53] This suggests that internally controlled patients would be much more receptive to the SA approach than externally controlled patients.

3 Generally, internals achieve higher levels than externals. In courses where a contract is required, internals will contract for, and ultimately receive, higher grades.[54] Perhaps this is one insight as to why the SA group had higher comprehension and retention levels than the T study group.

4 Internals exhibit more persistence and initiative in seeking achievement goals (e.g., Gozali, Cleary, Walster, and Gozali, 1973).[55,56,57] This could explain why both study groups had such high behavioral baselines.

5 Almost all studies suggest a relationship to achievement with a task's format, design or structure (e.g., Allen, Gait,

[51]Clark, R. E., "Constructing a Taxonomy of Media Attributes for Research Purposes," AV Communications Review, 1975, 23:197-215.

[52]Rotter, J. B., "Generalized Expectancies for Internal Versus External Control of Reinforcement," Psychological Monographs, 1966, 80: (1, whole No. 609).

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and Cherney, 1974).[58,59,60,61] Again, this aspect could be one contributing factor for the high achievement and behavioral scores for the SA group, the way the instructional strategy was designed.

6 The question of LOC's relationship to achievement may be found in the task structure of the instructional strategy. This aspect needs further examination. LOC might be a useful tool to detect personality types of patients (internal - external), to identify educational methodologies, or blends, to administer for optimum outcomes. Especially in degenerative illnesses where patient control is necessary (strength to change lifestyle), as in diabetes, hypertension, and atherosclerosis.[62]

(2) Nelson-Denny Reading Scale.

(a) Findings. See Table 12, p. 41, Nelson-Denny Reading Scale for the Six Month Assessment.[63] The results indicate an above 9th grade reading level for 86 percent of the population tested of the T group and 76 percent of the population tested of the SA group. Forty-three members of the T group and 25 of the SA group refused to take the 20 minute reading test.

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[58]Lefcourt, H. M., Lewis, L., and Silverman, I. W., "Internal vs. External Reinforcement and Attention to a Decision-Making Test," Journal of Personality, 1968, 36:663-682.

[59]Nord, W. R., Connally, F., and Daignault, G., "Locus of Control and Aptitude Test Scores as Predictors of Academic Achievement," Journal of Educational Psychology, 1974, 66:956-961.

[60]Johnson, W. G. and Croft, R. G. F., "Locus of Control and Participation in a Personalized System of Instruction Course," Journal of Educational Psychology, 1975, 67:416-421.

[61]Phares, E. G., "Differential Utilization of Information as a Function of Internal-External Control," Journal of Personality, 1968, 36:649-662.

[62]Lowery, B. J. and Ducette, J. P., "Disease-Related Learning and Disease Control in Diabetes as a Function of Locus of Control," Nursing Research,

[63]Nelson, M. J. and Denny, E. C., The Nelson-Denny Reading Rest Examiner's Manual (Boston, Houghton-Mifflin Company, 1974), p. 26.

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[63]Nelson, M. J. and Denny, E. C., The Nelson-Denny Reading Rest Examiner's Manual (Boston, Houghton-Mifflin Company, 1974), p. 26.

(b) Discussion.

1 The high reading levels in and of themselves did not indicate anything except to validate the results found in other areas pertaining to educational attainment, occupation, etc.

2 Of those that took the reading test in comparison to those who did not, their Rotter's score indicated an internally controlled individual. It can be concluded that the greater percentage taking the reading test had more self confidence, thus were not intimidated by an additional "test."

3 The question might be raised that if the average reading level of the active duty soldier isn't as high, can you still use the SA approach methodology successfully? An unequivocal, yes. The instructional strategy would simple be designed to address the target population, whether the population had a fifth, eighth, or twelfth grade reading level.

h. Patients' Opinion Toward the Systems Approach.

(1) Findings.

(a) There were 202 patients in the total SA group; only 180 of the 202 patients filled out the Likert scale response form.[64]

(b) See Table 13, p. 45, Patients' Opinion Toward the Systems Approach. The analysis of the opinion rating scale was as follows: viewing time; 91 percent felt it was ok; content interest, 38 percent felt it was ok, 61 percent found it fascinating; questions on topic, 23 percent said ok, 76 percent felt it really helped; pace, 84 percent responded ok, 13 percent felt it was too fast; content uniqueness, 43 percent said ok, 53 percent stated it was new; content value, 17 percent said ok, 83 percent said most valuable; non-professional paramedical health educator's style, 94 percent felt it was excellent; learning center, 88 percent responded excellent; preference for instruction, 49 percent preferred the audiovisual mode, 23 percent were neutral, and 10.5 percent preferred a live teacher; freedom to learn by audiovisual compared to professional health workers, 32 percent said equal, 66 percent felt more personal responsibility; patient attitude toward audiovisual modes for health education, 15 percent were neutral and 85 percent indicated an excellent attitude; patient viewing of commercial television in hours per day, 34 percent viewed less than one hour,

[64]Adapted from "Scales to Determine Student Attitude About TeleTutorial Lessons," by Volker, Simonson, R., and Simonson, M., As appeared in Audiovisual Instruction, November 1975, p. 51.

TABLE 13

PATIENTS' OPINION TOWARD THE SYSTEMS APPROACH

TOPIC AREA	OPINION RATING SCALE: N=180-%				
	1	2	3	4	5
VIEWING TIME	Too Short		OK		Too Long
	1	4	91	3	1
CONTENT INTEREST	Boring		OK		Fascinating
	1	0	38	39	22
QUESTIONS ON TOPIC	No Help		OK		Really Helped
	0	1	23	23	53
PACE	Too Slow		OK		Too Fast
	0	3	84	11	2
CONTENT UNIQUENESS	Old Stuff		OK		All New
	1	3	43	40	13
CONTENT VALUE	No Value		OK		Most Valuable
	0	0	17	21	62
NON-PROFESSIONAL PARAMEDICAL HEALTH EDUCATOR'S STYLE	Poor		OK		Excellent
	0	0	6	11	83
LEARNING CENTER	Poor		OK		Excellent
	0	0	12	17	71
PREFERENCE FOR INSTRUCTION	A/V Mode		Neutral		Live Teacher
	49	10.5	23	7	10.5
FREEDOM TO LEARN BY A/V COMPARED TO PROFESSIONAL HEALTH WORKERS	Less Freedom		Equal		More Freedom
	1	3	27	28	41
PERSONAL RESPONSIBILITY A/V COMPARED TO HEALTH WORKERS	Less		Equal		More
	2	0	32	29	37
PATIENT ATTITUDE TOWARD A/V MODES FOR HEALTH EDUCATION	Poor		Neutral		Excellent
	0	0	15	27	58
PATIENT VIEWING OF COMMERCIAL TV IN HOURS PER DAY	Less Than		Hours		More Than
	34	22	29	10	5

22 percent viewed two hours, 29 percent viewed three hours, 10 percent viewed four hours, and five percent viewed more than five hours per day.

(2) Discussion. The patients appeared to be extremely receptive. Scores were high in: content interest, uniqueness and value, the non-professional paramedical health educator's style, the learning center concept, audiovisual preference for instruction, more freedom to learn and greater personal responsibility for learning by audiovisual compared to usual instruction by professional health care workers. The patients' attitudes toward the audiovisual modes were excellent. The most serendipitous finding was the high patient acceptance of the non-professional health educator.

1. Comparison of a Traditional Sub-Group Having Had Two Years or More of Instruction with a Systems Approach Sub-Group Having no Prior Instruction.

(1) Introduction.

(a) In Section f., p. 33, Patient Baseline and Post Instruction Behavioral Outcomes it was pointed out that a six month assessment may have been a premature measurement. The postulation was that if measurements could have been taken over longer increments of time, a pattern of behavioral gain would have been seen in the SA group rather than the limited gains measured.

(b) A comparison was done of a group of patients who had had traditional instruction of at least two years previously, with expected reinforcement since, to an equal sized group of SA instructed patients who reported that they had received no previous instruction. This should put all the advantages to the T group.

(c) If both groups turned out to be equal in outcomes, or the SA group superior, then it could be inferred that the structural format of the SA approach does facilitate patient achievement.

(2) Clinic Patient Population for Sub-Group in Relation to Time of Instruction.

(a) Findings.

1 The breakdown of the 122 patients was as follows, (See Table 14, p. 47, Demographic and Socioeconomic Characteristics In Relation to Time of Instruction). Both groups had similar populations with only 2.5 percent of the total population active duty, again the lowest category represented. As with the other groups the largest group represented was the dependent wives comprising a little less than 60 percent female or a ratio of 2:3. The majority of the program participants were 40 years old and over, comprising over 95 percent of the population. Ninety-plus percent were married. The educational level

TABLE 14

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS
IN RELATION TO TIME OF INSTRUCTION

Demographic and Socioeconomic Variables	All Patients (N=122) %	Traditional (2 years or more) (N=62) %	Systems Approach (no prior instructio (N=60) %
RANK OF MILITARY			
Active Enlisted			
E-1 thru E-6		0	0
E-7 thru E-9		2	0
Active Officer			
Company Grade		0	0
Field Grade		0	3
	2.5		
Retired Enlisted			
E-1 thru E-6		2	3
E-7 thru E-9		5	5
Retired Officer			
Company Grade		6	7
Field Grade		26	
	8		
RANK OF SPONSORS OF DEPENDENTS			
Active Enlisted			
E-1 thru E-6		0	0
E-7 thru E-9		0	0
Active Officer			
Company Grade		0	3
Field Grade		3	10
Retired Enlisted			
E-1 thru E-6		2	0
E-7 thru E-9		16	15
Retired Officer			
Company Grade		6	5
Field Grade		32	27
	59.5		

TABLE 14 continued

Demographic and Socioeconomic Variables	All Patients (N=122) %	Traditional (2 years or more) (N=62) %	Systems Approach (no prior instructio (N=60) %
SEX			
Male	41	40	42
Female	59	60	58
AGE			
less than 30	2.5	0	5
30-39	2	2	2
40-49	20	10	30
50-59	50	50	50
60-69	20	32	8
70 and older	5.5	6	5
MARITAL STATUS			
Married	90.5	88	93
Widowed	5.5	8	3
Single	2	2	2
Engaged	0	0	0
Divorced	1	2	0
Separated	1	0	2
EDUCATION COMPLETED			
Elementary (grades 1-6)	1.5	3	0
Junior High (grades 7-8)	3.5	5	2
High School (grades 9-12)	30.5	29	32
1-3 Years College	34.5	37	32
Baccalaureate	19.5	13	26
Master's Degree	9.5	11	8
Doctor's Degree	1	2	0
OCCUPATION			
Unemployed or Retired	12.5	18	7
Housewife	42.5	38	47
Administrative (office work)	15.5	16	15
Technical Specialist (mechanical)	6.5	3	10
Professional (non-medical)	11.5	16	7
Combat Related (line groups)	1	0	2
Student (full time)	2.5	2	3
Blue Collar Work (custodial)	2	2	2
Medical Professional (RN,MD,DDS)	2.5	3	2
Other	3.5	2	5

was high; the highest percentage of participants were in the high school through baccalaureate categories. In type of occupation the highest number represented was housewife and office worker. Both sub-groups were comparable in all the demographic and socioeconomic variables.

2 See Table 15, p. 50, Historical Features of Hypertensive Illness and Education Provided in Relation to Time of Instruction. In the figures seen in Table 15, the T group had a sub-group of 100 percent diagnosed two years or more ago, with 26 percent of the patients receiving care from a physician and 74 percent receiving their instruction from a physician, 87 percent. The SA group were diagnosed at various times, 30 percent less than three months; eight percent, four to six months; three percent, seven to 12 months; 14 percent, one to two years; and 45 percent, more than two years. Eighty-eight percent of the SA group received care from a physician, and 12 percent received care from a nurse clinician. None of these individuals had ever received instruction.

(b) Discussion. The demographic and socioeconomic variables and similarities of this sub-group to the total population were apparent.

(3) Patient Comprehension and Retention for Sub-Groups in Relation to Time of Instruction.

(a) Findings. Upon examining Table 16, p. 51, Comparison Scores for the Initial Encounter and Six Month Assessment in Relation to Time of Instruction, it was evident that both groups had approximately the same entry level on the pre-tests. Eighty-five percent of the SA group attained the criterion level compared to only 11 percent in the T group. Again, noteworthy, was the low number of participants in the T group, two percent, who scored within the criterion level for the low sodium diet.

(b) Discussion. See Table 16, p. 51. Even though the T group had prior instruction, the entry level of the participants wasn't any different from the SA group who had received no instruction before the intervention. Furthermore, the learning gains (post-test) and retention were not very significant either. Consequently, one can infer from the data that the T group needs strengthening in either the area of methodology, design, patient interaction, or in all three areas, and that the SA group needs a follow-up learning strategy with a variable ratio schedule of reinforcement to heighten the patient retention levels.

(4) Patient Baseline and Behavioral Outcomes for the Sub-Groups in Relation to Initial Encounter and Six Month Assessment.

HISTORICAL FEATURES OF HYPERTENSIVE ILLNESS AND EDUCATION PROVIDED IN RELATION TO TIME OF INSTRUCTION

Historical Features	All Patients (N=122) %	Traditional (2 years or more) (N=62) %	Systems Approach (no prior instructio (N=60) %
TIME SINCE DIAGNOSIS			
Less Than 3 Months	15	0	30
4 to 6 Months	4	0	8
7 to 12 Months	1.5	0	3
1 to 2 Years	8.5	3	14
More Than 2 Years	71	97	45
HEALTH CARE PROVIDER			
Physician	57	26	88
Nurse Clinician	43	74	12
HAS HAD PRIOR INSTRUCTION			
Yes	51	100	0
No	49	0	100
	(N=62) %	(N=62) %	NA
TIME OF PRIOR INSTRUCTION			
Less Than 3 Months	0	0	
4 to 6 Months	0	0	
7 to 12 Months	0	0	
1 to 2 Years	0	0	
More Than 2 Years	100	100	
INSTRUCTION PROVIDED BY			
Physician	87	87	
Nurse Clinician	13	13	

TABLE 16

COMPARISON SCORES FOR THE INITIAL ENCOUNTER AND SIX MONTH ASSESSMENT IN RELATION TO TIME OF INSTRUCTION

GROUPS	0–29%	30–49%	50–69%	70–79%	80–100% (Criterion Level)
COMPOSITE SCORES					
Pre-Test: Traditional (2 years or more) N=62 %	2	23	66	10	0
Systems Approach (no prior instruction) N=60 %	*0*	*20*	*63*	*15*	*2*
Post-Test: Traditional	0	8	49	32	11
Systems Approach	*0*	*0*	*3*	*12*	*85*
6 Mo Ret: Traditional	2	9	68	18	3
Systems Approach	*0*	*5*	*38*	*42*	*15*
GENERAL INFORMATION					
Pre-Test: Traditional	2	14	42	26	16
Systems Approach	*3*	*18*	*39*	*25*	*15*
Post-Test: Traditional	0	11	28	21	40
Systems Approach	*0*	*2*	*15*	*22*	*61*
6 Mo Ret: Traditional	5	8	44	32	11
Systems Approach	*3*	*5*	*32*	*38*	*22*
LOW SODIUM DIET					
Pre-Test: Traditional	14	55	31	0	0
Systems Approach	*17*	*51*	*32*	*0*	*0*
Post-Test: Traditional	5	32	53	8	2
Systems Approach	*0*	*2*	*3*	*20*	*75*
6 Mo Ret: Traditional	10	34	51	5	0
Systems Approach	*0*	*20*	*58*	*20*	*2*
MEDICATIONS					
Pre-Test: Traditional	0	16	8	42	34
Systems Approach	*0*	*2*	*8*	*32*	*58*
Post-Test: Traditional	0	7	21	19	53
Systems Approach	*0*	*0*	*0*	*7*	*93*
6 Mo Ret: Traditional	0	7	19	34	40
Systems Approach	*0*	*2*	*12*	*18*	*68*

(a) Findings. Table 17, p. 53, Comparison Baseline and Behavioral Outcomes for the Initial Encounter and Six Month Assessment presents the patients' entry levels and six month outcomes for the T group who have had instruction for a minimum of two years or more in relation to the SA group who have not had prior instruction before the intervention. In reviewing the baseline behaviors there was variation in entry levels; however, the variation wasn't consistent enough to cite that the T group's baseline behavior was higher than the SA group. For instance, a higher percentage in the T group had a lower systolic entry level but a higher diastolic entry level. The T group had $\leq$ 140, 60 percent entry level compared to $\leq$ 140, 42 percent entry level for the SA group. The diastolic $\leq$ 90 entry level for the T group was only 65 percent compared to the $\leq$ 90 entry level for the SA group at 72 percent. Comparing the entry level and six month outcomes, there are gains in the desired directions, or no change for both groups. There is no statistical difference in the outcomes of the two groups.

(b) Discussion. The data suggests that the structure format of the SA approach does facilitate patient achievement and was a superior method compared to the T method. The T group had the benefit of two years or more of instruction and more or less continual reinforcement through health provider interaction whereas the SA subgroup for this set of data did not.

(5) Patient Supplemental Variables for the Six Month Assessment for the Sub-Group.

(a) Rotter's Internal and External Scale.

1 Findings. Table 18, p. 56, Rotter's Internal and External Scale (Locus of Control) for the Six Month Assessment Sub-Group, indicates approximately the same distribution of internally and externally controlled patients in both instructional groups and the main group. There were seven percent more internally controlled subjects in the SA group compared to the T group. Forty percent in the T group and 33 percent in the SA group were externally controlled.

2 Discussion. This set of data supports the suggestion made for the main group, that internally controlled patients may do better with a SA approach than externally controlled. However, caution should be used when interpreting the results because about two-thirds of each population had internals and one-third of each population had externals and on the whole the behavioral scores were comparable. The difference of the two groups appeared in the areas of comprehension and retention, and length of time of instruction versus no prior instruction in relation to behavioral gains. That could mean that higher priority should be given to instructional format design or structure rather than an individual's locus of control. This would indicate an even stronger argument for utilizing the SA approach methodology for patient education.

OUTCOMES	INITIAL ENCOUNTER: T Group (2 years or more) N=62/%	INITIAL ENCOUNTER: SA Group (no prior instruction) N=60/%	SIX MONTH ASSESSMENT: T Group N=62/%	SIX MONTH ASSESSMENT: SA Group N=60/%
COMPLIES WITH LAB AND ANCILLARY TESTS				
Yes	94	98	97	100
No	6	2	3	0
TAKES MEDICATION				
Yes	97	80	95	87
No	0	7	0	0
N/A	3	13	5	13
Don't Know	0	0	0	0
KNOWS DRUGS AND ACTIONS				
Yes	60	63	73	87
No	40	37	27	13
ADHERES TO LOW SODIUM DIET				
Yes	56	60	81	97
No	28	30	11	3
N/A	16	10	8	0
NUMBER OF CUPS OF COFFEE PER DAY				
0	11	29	23	52
1	15	17	18	18
2	21	12	25	13
3	28	18	18	12
4	11	13	11	3
5-9	11	8	5	0
10-19	3	3	0	2
20+	0	0	0	0

OUTCOMES	INITIAL ENCOUNTER T Group (2 years or more) N=62/%	INITIAL ENCOUNTER SA Group (no prior instruction) N=60/%	SIX MONTH ASSESSMENT T Group N=62/%	SIX MONTH ASSESSMENT SA Group N=60/%
COMPLIES WITH LAB AND ANCILLARY TESTS				
Yes	94	98	97	100
No	6	2	3	0
TAKES MEDICATION				
Yes	97	80	95	87
No	0	7	0	0
N/A	3	13	5	13
Don't Know	0	0	0	0
KNOWS DRUGS AND ACTIONS				
Yes	60	63	73	87
No	40	37	27	13
ADHERES TO LOW SODIUM DIET				
Yes	56	60	81	97
No	28	30	11	3
N/A	16	10	8	0
NUMBER OF CUPS OF COFFEE PER DAY				
0	1	29	23	52
1	1	17	18	18
2	2	12	25	13
3	3	18	18	12
4	1	13	11	3
5-9	3	8	5	0
10-19	3	3	0	2
20+	0	0	0	0

TABLE 17 continued

OUTCOMES	INITIAL ENCOUNTER: T Group (2 years or more) N=62/%	INITIAL ENCOUNTER: SA Group (no prior instruction) N=60/%	SIX MONTH ASSESSMENT: T Group N=62/%	SIX MONTH ASSESSMENT: SA Group N=60/%
NO. CIGARETTES PER DAY				
0	78	65	77	63
1-10	5	15	6	18
11-20	5	13	5	15
21-40	10	7	10	2
41+	2	0	2	2
DECREASE IN TENSION				
Yes	45	62	54	54
No	55	38	46	46
TYPE OF PHYSICAL ACTIVITY				
0	64	50	25	12
Sedentary	0	0	0	0
Light	13	8	10	5
Moderate	10	10	39	35
Vigorous	13	22	4	36
Strenous	0	10	2	12
FREQUENCY OF PHYSICAL ACTIVITY				
Daily	45	70	74	81
Twice Weekly	50	20	20	15
Weekly	5	10	6	4

TABLE 18

ROTTER'S INTERNAL AND EXTERNAL SCALE
(LOCUS OF CONTROL) FOR THE SIX MONTH ASSESSMENT SUB-GROUP

SCALE	T Group (2 years or more) N=60/%	SA Group (no prior instruction) N=60/%
INTERNAL	60	67
EXTERNAL	40	33

TABLE 19

NELSON-DENNY READING SCALE
FOR THE SIX MONTH ASSESSMENT SUB-GROUP

SCORE	T Group (2 years or more) N=41/%	SA Group (no prior instruction) N=47/%
8th GRADE AND BELOW	20	19
9th - 16th GRADE	80	81

(b) Nelson-Denny Reading Scale.

1 Findings. See Table 19, p. 56, Nelson-Denny Reading Scale for the Six Month Assessment Sub-Group. The results show that the reading levels were similar to the main group; that is, 80 percent of the T group tested and 81 percent of the SA group tested, had a reading level of 9th grade or above, while 20 percent of the T group tested and 19 percent of the SA group tested, had a reading level of 8th grade or below. Twenty-one subjects in the T group and thirteen in the SA group refused to take the reading test.

2 Discussion. The reading scores of the sub-group match those of the main group.

j. Comparison of Baseline Data in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician.

(1) Introduction. Another way of examining the data was to compare the entry levels of all patients, those that did not have the benefit of instruction to those who did, to estimate the effectiveness of the existing system of providing patient education via the traditional approach.

(2) Clinic Patient Populations With no Instruction, Instruction by a Physician or by a Nurse Clinician.

(a) Findings.

1 Table 20, p. 58, Demographic and Socioeconomic Characteristics in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician, shows that all three sub-groups are comparable in population, sex, age, marital status, education attained, and occupational distribution. All categories represented are similar to those breakdowns reported on previously.

2 See Table 21, p. 60, Historical Features of Hypertensive Illness and Education Provided in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician. Of a total of 402 patients seen, 133 of them reported never having had the benefit of any patient education, or about 33 percent of the total population. The health care provider for 75 percent of the sub-group that didn't receive education was a physician. Twenty-five percent of that same group had their health care provided by a nurse clinician.

(b) Discussion. A better method of patient education is needed in order for the AMEDD health care delivery system to be accountable to all hypertensive patients.

(3) Comparison of Baseline Scores in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician.

TABLE 20

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS IN RELATION TO NO INSTRUCTION, INSTRUCTION BY A PHYSICIAN OR BY A NURSE CLINICIAN

Demographic and Socioeconomic Variables	All Patients N=402 %	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=126 %
RANK OF MILITARY				
Active Enlisted				
E-1 thru E-6	.5	1	0	1.5
E-7 thru E-9	1	1.5	2	0
Active Officer				
Company Grade	.5	1.5	0	0
Field Grade	1	4	0	0
Retired Enlisted				
E-1 thru E-6	3	4	2	2
E-7 thru E-9	8	7	8	10
Retired Officer				
Company Grade	3	4	4	1
Field Grade	21	19	22	23
RANK OF SPONSORS OF DEPENDENTS				
Active Enlisted				
E-1 thru E-6	1	0	1	2
E-7 thru E-9	2	3	2	1.5
Active Officer				
Company Grade	2	3	1	2
Field Grade	9	9	10	6
Retired Enlisted				
E-1 thru E-6	3	2	3.5	5
E-7 thru E-9	15	15	14	16
Retired Officer				
Company Grade	5	3	3.5	3
Field Grade	25	23	27	27

TABLE 20 continued

Demographic and Socioeconomic Variables	All Patients N=402 %	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=126 %
SEX				
Male	39	41	38	36
Female	61	59	62	64
AGE				
less than 30	1	2	1	0
30-39	8	8	6	9
40-49	25	29	22	25
50-59	42	43	42	42
60-69	21	15	26	20
70 and older	3	3	3	4
MARITAL STATUS				
Married	90	90	95	84
Widowed	7	6	4	10
Single	1.5	2	0	3
Engaged	0	0	0	0
Divorced	.5	1	1	1
Separated	1	1	0	2
EDUCATION COMPLETED				
Elementary (grades 1-6)	2	2	2	3
Junior High (grades 7-8)	4	4	5	2
High School (grades 9-12)	38	37	35	41
1-3 Years College	29	27	31	29
Baccalaureate	18	22	14	19
Master's Degree	8.5	8	12	5
Doctor's Degree	.5	0	1	1
OCCUPATION				
Unemployed or Retired	13	9	17	13
Housewife	42	45	36	45
Administrative (office work)	19	11	22	22
Technical Specialist (mechanical)	7	10	4	6
Professional (non-medical)	11	12	12	8
Combat Related (line groups)	1	3	0	0
Student (full time)	.5	2	1	0
Blue Collar Work (custodial)	2	3	3	2
Medical Professional (RN,MD,DDS)	1.5	2	2	1
Other	3	3	3	3

HISTORICAL FEATURES OF HYPERTENSIVE ILLNESS AND EDUCATION PROVIDED IN RELATION TO NO INSTRUCTION, INSTRUCTION BY A PHYSICIAN OR BY A NURSE CLINICIAN

Historical Features	All Patients N=402 %	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=126 %
TIME SINCE DIAGNOSIS				
Less Than 3 Months	12	25	6	6
4 to 6 Months	8	10	8	3
7 to 12 Months	6	6	5	1
1 to 2 Years	18	15	16	24
More Than 2 Years	56	44	65	60
HEALTH CARE PROVIDER				
Physician	46	75	55	6
Nurse Clinician	54	25	45	94
HAS HAD PRIOR INSTRUCTION				
Yes	67	0	100	100
No	33	100	0	0
	N=269 %	N=0 %	N=143 %	N=126 %
TIME OF PRIOR INSTRUCTION				
Less Than 3 Months	18	0	10	26
4 to 6 Months	13	0	7	20
7 to 12 Months	4	0	6	5
1 to 2 Years	24	0	17	27
More Than 2 Years	42	0	60	22
INSTRUCTION PROVIDED BY				
Physician	53	0	100	0
Nurse Clinician	47	0	0	100

(a) Findings. Table 22, p. 62, Comparison of Baseline Scores in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician. Comparison of these three groups show no statistical difference in their pre-test results.

(b) Discussion. The finding that a history of past education by a nurse or by a physician, or by no one, made absolutely no difference in the pre-test score, is not a very good recommendation for the present system. Many reasons could be conjectured for this finding such as poor retention, teaching the wrong thing, the patient's definition of teaching, and so forth, but they are all academis. What is shown is that the SA approach could and did correct this common deficiency in the hypertensive patient.

Comparison of Baseline Behavioral Outcomes in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician.

(a) Findings. See Table 23, p. 63, Comparison of Baseline Behavioral Outcomes in Relation to no Instruction, Instruction by a Physician or by a Nurse Clinician. There was no difference between any of the groups on analysis of data.

(b) Discussion. All of this data, coupled with the previous data, indicates a need for a more effective, efficient, cost effective method of providing patient education than now exists in the AMEDD health care delivery system.

k. Cost Analysis for Program Evaluation.

(1) Introduction.

(a) Meaningful change can be effected in the health care delivery system by systematic and rational planning. Hopefully, better planning methods will be followed by higher levels of patient education productivity for the comprehensive health care dollar.

(b) Cost analysis is often viewed as an alternate to evaluation research, but essentially it is a logical extension of it. In order to affix dollar values to the benefits of a program, first there has to be some evaluative evidence of what kinds and how much benefit there has been as was described in the preceding section.[65,66,67,68]

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[65] McKean, R. N., Efficiency in Government Through Systems Analysis (New York, John Wiley & Sons, Inc., 1958).

COMPARISON OF BASELINE SCORES IN RELATION TO NO INSTRUCTION, INSTRUCTION BY A PHYSICIAN OR BY A NURSE CLINICIAN

GROUPS	0-29%	30-49%	50-69%	70-79%	80-100%
Criterion Level					
COMPOSITE SCORES					
No Instruction N=133/%	2	17	66	15	0
Physician N=143/%	2	19	64	14	1
Nurse Clinician N=126/%	2	14	63	20	1
GENERAL INFORMATION					
No Instruction	5	17	43	20	15
Physician	4	13	41	25	17
Nurse Clinician	5	11	38	26	20
LOW SODIUM DIET					
No Instruction	21	44	35	0	0
Physician	20	40	31	0	0
Nurse Clinician	14	47	36	3	0
MEDICATIONS					
No Instruction	1	4	13	28	54
Physician	1	8	15	36	40
Nurse Clinician	1	6	13	33	47

TABLE 23

COMPARISON-BASELINE BEHAVIORAL OUTCOMES IN RELATION TO NO INSTRUCTION, INSTRUCTION BY A PHYSICIAN OR BY A NURSE CLINICIAN

OUTCOMES	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=126 %
BLOOD PRESSURES			
Systolic			
≤ 140	47	59	65
> 140	53	41	35
Diastolic			
≤ 90	66	70	79
> 90	34	30	21
WEIGHT IN POUNDS			
Mean Weight in Pounds	169	164	164
RANGE OF WEIGHTS			
Range of Weights in Pounds	98 to 293	103 to 267	97 to 291

OUTCOMES	All Patients N=402 %	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=126 %
COMPLIES WITH LAB AND ANCILLARY TESTS				
Yes	97	97	96	98
No	3	3	4	2
TAKES MEDICATION				
Yes	88	80	89	95
No	3	5	3	2
N/A	9	15	8	3
Don't Know	0	0	0	0
KNOWS DRUGS AND ACTIONS				
Yes	59	54	55	69
No	41	46	45	31
ADHERES TO LOW SODIUM DIET				
Yes	65	61	62	74
No	22	26	23	17
N/A	13	13	15	9
NUMBER OF CUPS OF COFFEE PER DAY				
0	22	27	17	21
1	15.5	15	15	17
2	18	19	16	21
3	18	17	24	14
4	12	11	14	12
5-9	10	7	8	13
10-19	4	3	6	2
20+	.5	1	0	0

TABLE 23 continued

OUTCOMES	All Patients N=402 %	No Instruction N=133 %	Physician N=143 %	Nurse Clinician N=12 %
NO. CIGARETTES PER DAY				
0	71	70	75	70
1-10	9	11	9	7
11-20	11.5	14	8	13
21-40	8	5	7	10
41+	.5	0	1	0
EXPERIENCE TENSION OR NERVOUSNESS				
Yes	58	60	55	59
No	42	40	45	41
TAKES MEDICATION FOR TENSION				
Yes	30	18	42	31
No	70	82	58	69
TYPE OF PHYSICAL ACTIVITY				
0	50	50	53	45
Sedentary	.5	1	0	0
Light	11	6	12	15
Moderate	15.5	15	20	11
Vigorous	18	20	12	25
Strenuous	5	8	3	4
FREQUENCY OF PHYSICAL ACTIVITY				
Daily	67	63	64	75
Twice Weekly	25	31	31	19
Weekly	8	6	4	6

(c) Following is the documentation for the research and developmental, investment, and operating costs.[69,70,71,72]

(2) Findings.

(a) See Table 24, p. 67, Comparison of the Traditional and Systems Approach Groups in Relation to Research and Development, Investment, and Operating Costs. The table shows that the research and development costs for the traditional method are lower. The total research and development costs for the systems approach were approximately $6203.00 to include the one hour of baseline hypertension information (general information, low sodium diet, and medications). Additionally, the figure represents research and development costs for non-expendable equipment, cost of learning lab space and the cost of validating the instructional strategy by the PACOMED staff. The research and development costs are shown for comparative purposes only. If the Army initiates a prototype such as PACOMED, all research and development would be conducted at a central location. The cost then would not be incurred by the individual MEDDAC or MEDCEN as indicated here. See Appendix C, p. 121, Cost Model for Hypertension Patient Education, with accompanying explanation and Appendix E, p. 131, Communications Media.

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[66]Fox, P. D., "A Theory of Cost-Effectiveness for Military Systems Analysis," Journal of the Operations Research Society of America, March-April, 1965, Vol 13, No. 2.

[67]Churchman, C. W., Ackoff, R. L., and Arnoff, E. L., Introduction to Operations Research (New York, John Wiley & Sons, Inc., 1957).

[68]Heuston, M. C. and Ogawa, G., "Observations on the Theoretical Basis of Cost-Effectiveness," Journal of the Operations Research Society of America, March-April, 1966, Vol 14, No. 2.

[69]Haller, E. J., "Cost Analysis for Educational Program Evaluation," In W. James Popham (Ed.) Evaluation In Education (Berkeley, CA, McCutchan Publishing Corporation, 1974), 406-449.

[70]Anthony, R. N., "What Should Cost Mean?", Harvard Business Review, May, 1970, 48:121-131.

[71]Levin, H. M., "Cost Effectiveness Analysis in Evaluation Research," Palo Alto, CA, Stanford University, 1974, (mimeo).

[72]Buchanan, J., Cost and Choice (Chicago, Markham Publishing Co., 1969).

TABLE 24

COMPARISON OF TRADITIONAL AND SYSTEMS APPROACH IN RELATION TO RESEARCH AND DEVELOPMENT, INVESTMENT, AND OPERATING COSTS
(All Cost Values Are in Dollars and Cents)

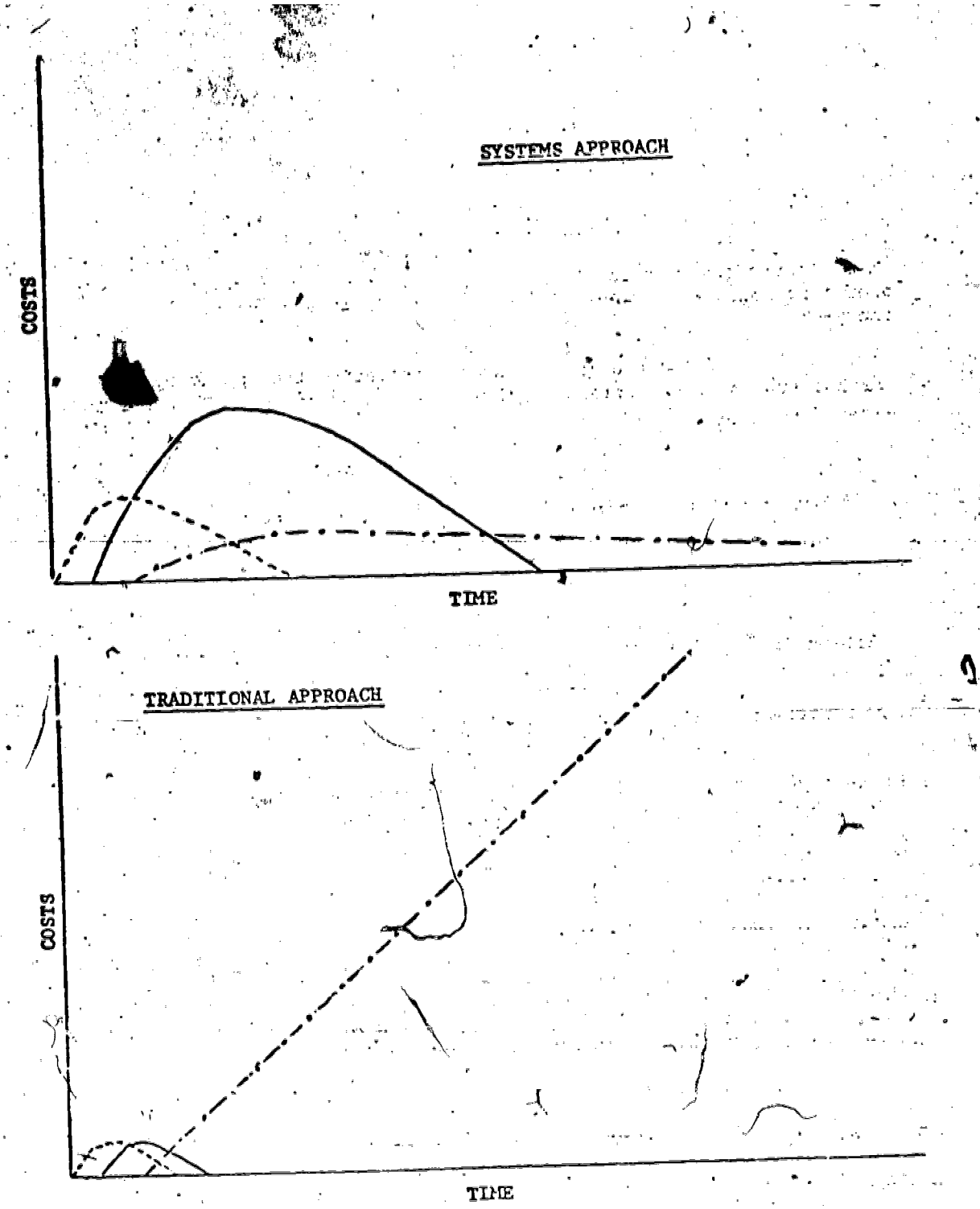
	Research and Development Costs		Investment Costs		Operating Costs / Patient		10 Patients		250 Patients		3000 Patients	
	Trad	SA	Trad	SA	Trad	SA	Trad	SA	Trad	SA	Trad	SA
PERSONNEL												
Physician - Major	0		0	17.85	17.85		178.50		4,462.50		53,550.00	
Nurse - Captain	0		0	9.45	9.45		94.50		2,362.50		28,350.00	
Non-Professional												
Health Educator - E-5		0		230.00		5.75		5.75		143.75		1725.00
INSTRUCTIONAL MATERIALS												
Books, Booklets, Mimeos, 35mm, 3/4" U-Matic cassette, etc.	0	459.00	0		0		0		0		0	
Non-expendable equipment						0.36		0.36		9.00		108.00
AV equipment	0	684.00	0	3,551.00	0		0		0		0	
Furnishings	0	0	0	3,382.00								
SPACE												
Office - Physician	0		1,848.00		0		0		0		0	
Office - Nurse	1,848.00		1,848.00		0		0		0		0	
Learning Lab		4,606.00		4,606.00		0		0		0		0
ADMINISTRATIVE COSTS												
Validating the instructional program or preparing the presentation — Physician	0		0		0		0		0		0	
Nurse	189.00		0		0		0		0		0	
		454.00		0		0		0		0		0
Typing, Reproduction for pre-post test, objectives, etc	0	0	0	132.00	0	0	0	0	0	0	0	0
Paperwork to individualize the strategy	0	0	0	0	0	0.09	0	0.90	0	22.50	0	270.00
TOTALS Physician	0		1,848.00		17.85		178.50		4,462.50		53,550.00	
Nurse	2,037.00		1,848.00		9.45		94.50		2,362.50		28,350.00	
Systems Approach		6,203.00		11,928.30		6.20		7.01		175.25		2,103.00

(b) There are no investment costs for the traditional method. The investment costs for the systems approach method were approximately $11,930.55. This included the hourly wage of a nurse or physician, the time needed for staff development in order that the professional knows how to utilize the systems approach for optimum benefit of the patient. See Appendix D, p. 125, Staff Development Outline, the cost for forty hours of instruction of a paraprofessional, the time needed for training an individual to operate and manage a patient learning center. See Appendix F, p. 143, Non-Professional Paramedic as Health Educator. Three-thousand five-hundred and fifty-one dollars of the total amount represents the cost of the non-expendable equipment and $3,382.00 represents the approximate cost of the furnishing for a learning center. See Appendix G, p. 155, Physical Facilities. These costs might appear excessively high, however, once the investment costs are made, the equipment and furnishings can be used for other learning systems as well. For example, DeWitt Army Hospital, Internal Medicine Clinic sees about 3,000 hypertensive patients per year. Giving their instruction via the systems approach, would have represented 300 operating hours or 10 weeks. There are still 40 working weeks left in the year.

(c) Below is a chart illustrating the operating costs for various groups of patients using both traditional and the systems approach.

		Traditional Approach	Systems Approach
1 patient :	Physician	$ 17.85	$ 6.20
	Nurse	9.45	
10 patients:	Physician	$ 178.50	$ 7.01
	Nurse	94.50	
250 patients:	Physician	$ 4,662.50	$ 175.25
	Nurse	2,362.50	
3,000 patients:	Physician	$53,550.00	$2,103.00
	Nurse	28,350.00	

Obviously the SA research and development costs and investment costs were more than the T group but, the operating costs became much lower with the greater number of patients seen, (economy of scale) in comparison to the T group operating costs, which became excessively higher (Fig 3, p. 69). Also, when the health care professionals provide the patient education, it lacks uniformity, standardization of baseline information, quality assurance, accountability, task structure, and the appeal to multiple senses needed for better comprehension.



Key To Graphs: Research and Development Costs - - - - - - - -
Investment Costs ————————
Operating Costs —•—•—•—

FIGURE 3

RELATIONSHIP BETWEEN COSTS AND THE LIFE CYCLE OF A PROGRAM

(3) Discussion.

(a) The above may seem overly simplistic and limited in scope, but it does depict an estimate of what the comparison costs of both groups were like for the model (hypertension) used in the study. The findings could then be extrapolated to include 50 models, for example. What we are unable to do is to quantify intangible benefits of a program. How much is it worth to the taxpayers for hypertensive patients to become more effective self-care agents? Dorfman calls this a case of "horse-and-rabbit stew." The rabbit is the small proportion of effects that are susceptible to measurement, while the flavor of the stew is dominated by the "horse" of social, psychological, and aesthetic considerations that defy measurements.[73]

(b) Even though comprehension and retention scores were higher for the systems approach group and behavioral outcomes as good or perhaps a little better, quality health cannot be ascribed solely to type of patient education any more than it can to type of medical care. Genetics and environment are also involved in quality of health.

(c) Even if the benefit cost ratios are higher for one type of program than another the decision will still depend in large part on the values the policymaker attaches to the goals. What is the policymaker willing to pay (or forgo) to achieve a given kind and level of benefit?

(4) An explanation to Table 24: Comparison of Traditional and Systems Approach in Relation to Research and Development, Investment, and Operating Costs.

(a) Research and Development Costs. EXPLANATION: See Table 24, p. 67, Comparison of Traditional and Systems Approach in Relation to Research and Development, Investment, and Operating Costs. Refer to Research and Development column.

1 There are no research and development costs involved because all categories of personnel have received their basic education and are utilized by the AMEDD whether or not they are involved in patient education.

2 Instructional Materials.

a Systems Approach. (See Appendix E, p. 131, Communications Media).

[73] Dorfman, R., "Introduction," Measuring Benefits of Government Investments, The Brookings Institution, Washington, DC, 1965, 1-11.

(1) The $459.00 expenditure under the Systems Approach column represents the cost of the PACOMED script (advanced organizer), low sodium diet, general medications, plus the purchase cost of the general information program. All costs represented are approximately three years old and an inflation kicker has not been added.

(2) The audiovisual equipment costs of $684.00 represents the cost of the 3M sound on slide and the "Voice of Music" pulser which were used for the instructional system design phase.

b Traditional Approach. The traditional approach required no instructional materials.

3 Space. Cost is represented by square feet of space and building cost per square foot which was approximately $14.00. Once the space is paid for, it remains a constant because it represents a sunk cost.

a Traditional Approach. No cost was incurred by the physician because no additional space was needed. A nurse clinician's cost of $1,848.00 would cover an office space of 132 square feet.

b Systems Approach. The space used under the systems approach was 329 square feet which included the learning lab and the health educator's office. The cost would be $4,606.00.

4 Administrative Costs.

a Traditional Approach. Physician: The physician did not have an organized program of instruction. Through personal conversations with several physicians, they stated that they relied mostly on the knowledge learned in medical school and then adjusted it to meet the needs of the patient. No learning objectives or formalized patient assessments (pre-post tests) were used.

b Systems Approach. The $454.00 for the developing of the instructional program included the hourly wage of the PACOMED staff to validate the program. For a further breakdown of the figures see Appendix C, p. 121, Cost Model for Hypertension Patient Education and accompanying information.

(b) Investment Costs. EXPLANATION: See Table 24, p. 67. Refer to Investment Costs column.

1 Personnel.

a Systems Approach. Physician: A cost of $17.85 for one hour of physician time in the systems approach column represents the time needed for staff development to introduce the physician to the PACOMED concept. The rank of "major" was the mean rank of physicians assigned to DeWitt Army Hospital and their hourly wage is based on eight

years service base pay, quarters allowance, subsistence, VIP category 1, medical pay, and 20 percent for fringe benefits.

b Nurse Clinician. A cost of $9.45 for one hour of nurse clinician time in the systems approach column represents the time needed for staff development to introduce the nurse clinician to the PACOMED concept. The rank of "captain" is the mean rank of nurse clinicians assigned to DeWitt Army Hospital and their hourly wage is based on four years service base pay, quarters, allowance, subsistence, and 20 percent for fringe benefits.

c Health Educator. A cost of $230.00 represents the cost of 40 hours of training time needed to enable an E-5 nonprofessional to operate the learning laboratory and related activities. An E-5's hourly wage is based on four years service, quarters allowance, subsistence, and 20 percent for fringe benefits.

2 Instructional Materials.

a Systems Approach. An expenditure of $6,933.00 represents the cost of the audio visual equipment that was selected once the research and development phase was completed. (This may or may not represent a cost. Most MEDDAC's have several Sony video tape players and receivers that may be utilized if not committed elsewhere.).

b Traditional Approach. The traditional approach required no instructional materials costs.

3 Space.

a Traditional Approach. The cost of $1,848.00 under this approach is for office space and is the same for physicians and nurse clinician.

b Systems Approach. The cost ($4,606.00) for space is the same as in the research and development section. This space was used for staff development as well as giving patient education. See the preceding section.

4 Administrative Costs.

a Systems Approach. The $132.00 for the systems approach covers the cost of typing and reproduction of pre-post tests, objectives, and other forms.

b Traditional Approach. This approach had no administrative costs.

(c) Operating Costs - 1 Patient. EXPLANATION: See Table 24, p. 67. Refer to Operating Costs - 1 Patient.

1 Personnel.

a Traditional Approach.

(1) Physician. Seventeen dollars and eighty-five cents represents the hourly wage, based on 60 minutes, the length of time needed to give baseline hypertensive information.

(2) Nurse Clinician. Nine dollars and forty-five cents represents the hourly wage, based on 60 minutes, the length of time needed to give baseline hypertensive information.

b Systems Approach. Non-Professional Health Educator. Five dollars and seventy-five cents represents the hourly wage, based on 60 minutes, the length of time the health educator would be in the learning laboratory.

2 Instructional Materials.

a Systems Approach. Refer to Appendix C, p. 121, Cost Model for Hypertension Patient Education. The $0.36 refers to the cost per hour of educational hardware and software used to include maintenance amortized for 6,000 hours of operation. (30 hours/week X 40 weeks/year X 5 years = 6,000 hours.)

b Traditional Approach. No instructional materials costs incurred.

3 Space. See preceding sections.

4 Administrative Costs. Systems Approach. Ninety cents represents one set of paperwork needed for each patient to individualize the instructional strategy.

(d) Operating Costs - 10 Patients.

1 Personnel.

a Traditional Approach.

(1) Physician. One hundred and seventy-eight dollars and fifty cents represents the cost for ten hours of physician time needed to give individualized instruction to ten patients.

(2) Nurse Clinician. Ninety-four dollars and fifty cents represents the cost for ten hours of nurse clinician time needed to give individualized instruction to ten patients.

b Systems Approach. Non-Professional Health Educator. Five dollars and seventy-five cents is the cost of giving

TABLE 12

PATIENT BEHAVIORAL BASELINES FOR THE INITIAL ENCOUNTER AND ONE MONTH ASSESSMENT: HYPERTENSION

OUTCOMES	INITIAL N=26-%	ONE MONTH N=26-%
BLOOD PRESSURE		
Diastolic		
To age 39		
91 mm Hg and above	12	4
90 mm Hg and below	4	12
Age 40 to 64		
91 mm Hg and above	27	19
90 mm Hg and below	57	65
Age 65 and older		
101 mm Hg and above	0	0
100 mm Hg and below	0	0
Systolic		
All Ages		
141 mm Hg and above	62	38
140 mm Hg and below	38	62
WEIGHT (pounds)		
Mean	194	188
High	265	254
Low	121	121
COMPLIES WITH LAB TESTS		
Yes	100	100
No	0	0
TAKES MEDICATIONS		
Yes	85	88
No	4	4
N/A	11	8
Don't Know	0	0
KNOWS DRUGS AND ACTIONS		
Yes	69	84
No	31	16

97

TABLE 12 cont.

OUTCOMES	INITIAL N=26-%	ONE MONTH N=26-%
ADHERES TO LOW SODIUM DIET		
Yes	58	88
No	42	8
N/A	0	4
NUMBER CUPS COFFEE/DAY		
4 or less	81	4
5 to 10	19	46
11 or more	0	50
NUMBER OF CIGARETTES/DAY		
None	58	58
1 to 10	12	42
11 to 20	15	0
21 or more	15	0
DO YOU USUALLY EXPERIENCE TENSION		
Yes	50	
No	50	
IF YES, DO YOU TAKE MEDICATION		
Yes	8	
No	92	
NOTICED A DECREASE IN TENSION		
Yes		31
No		69
MAINTAINS EXERCISE PROGRAM		
Yes	38	81
No	62	19
TYPE OF PHYSICAL ACTIVITY		
Sedentary	0	0
Light	0	5
Moderate	30	38
Vigorous	40	48
Strenuous	30	9
FREQUENCY OF PHYSICAL ACTIVITY		
Daily	80	81
Twice Weekly	10	19
Weekly	10	0

TABLE 13

PATIENT BEHAVIORAL BASELINES FOR THE INITIAL ENCOUNTER, ONE AND SIX MONTH ASSESSMENTS: HYPERTENSION

OUTCOMES	INITIAL N=7-%	ONE MONTH N=7-%	SIX MONTH N=7-%
BLOOD PRESSURE			
Diastolic			
To age 39			
91 mm Hg and above	14	0	14
90 mm Hg and below	0	14	0
Age 40 to 64			
91 mm Hg and above	14	0	0
90 mm Hg and below	72	86	86
Age 65 and older			
101 mm Hg and above	0	0	0
100 mm Hg and below	0	0	0
Systolic			
All ages			
141 mm Hg and above	43	14	14
140 mm Hg and below	57	86	86
WEIGHT (pounds)			
Mean	186	184	183
High	260	253	254
Low	150	148	144
COMPLIES WITH LAB TESTS			
Yes	100	100	100
No	0	0	0
TAKES MEDICATIONS			
Yes	86	86	86
No	0	0	0
N/A	14	14	14
Don't Know	0	0	0
KNOWS DRUGS AND ACTIONS			
Yes	71	86	100
No	29	14	0

TABLE 13 cont.

OUTCOMES	INITIAL N=7-%	ONE MONTH N=7-%	SIX MONTH N=7-%
ADHERES TO LOW SODIUM DIET			
Yes	57	86	
No	43	14	
N/A	0	0	0
NUMBER CUPS COFFEE/DAY			
4 or less	71	100	100
5 to 10	29	0	0
11 or more	0	0	0
NUMBER OF CIGARETTES/DAY			
None	57	58	72
1 to 10	14	14	0
11 to 20	0	14	14
21 or more	29	14	14
DO YOU USUALLY EXPERIENCE TENSION			
Yes	71		
No	29		
IF YES, DO YOU TAKE MEDICATION			
Yes	20		
No	80		
NOTICED A DECREASE IN TENSION			
Yes		43	43
No		57	57
MAINTAINS EXERCISE PROGRAM			
Yes	43	86	100
No	57	14	0
TYPE OF PHYSICAL ACTIVITY			
Sedentary	0	0	0
Light	0	17	14
Moderate	0	17	14
Vigorous	67	66	72
Strenuous	33	0	0
FREQUENCY OF PHYSICAL ACTIVITY			
Daily	100	67	100
Twice Weekly	0	33	0
Weekly	0	0	0

100

(4) Diabetes.

(a) Clinic Patient Population for the Initial Encounter.

1 Findings.

a Eighty-eight diabetic patients received initial health education on general information about diabetes, 46 returned the following week for the second section, diabetic diet. Seventeen of the original 88 diabetic patients were on insulin and received the third section, insulin therapy. Fifteen of the 88 returned for a three month follow-up and eight returned for the six month follow-up.

b Most of the dropouts in the three month group were due to poorly motivated patients. In fact, the diabetic patients appeared to be the least interested in their illness compared to the patients in the other disease categories. This probably was due to the difficulty of the subject matter; there was so much to learn and so many behaviors (habits) to change ~~in a~~ relatively short time. It could very well be that the patients were overwhelmed in the first session and therefore were reluctant to return. Their initial reaction was to flee from the situation and deny they had the disease. This should be recognized about the nature of the behavior patterns of those who have the disease. Because of the aforementioned it will utimately cost more to educate diabetic patients than most other patients. More time will need to be spent in trying to encourage the patients to stick with the treatment program.[115,116,117] Of the patients who did not receive the six month follow-up, the major cause of no-shows was due to the closing of the learning center.

c See Table 14, page 84 , Demographic and Socioeconomic Characteristics of Diabetic Patients: Initial Encounter. The demographic and socioeconomic breakdown follows: 6 percent were active duty, 48 percent retirees and 46 percent dependents, 59 percent male and 41 percent female, 76 percent were between the ages of 41 to 71 and 85 percent were married, 78 percent had a high school education, 1 to 3 years of college or a baccalaureate degree. All occupational categories were represented except for combat related (line groups).

[115] Etzwiler, D.D., "Who's Teaching the Diabetic?", Diabetes, Feb 67, 16: 111-117.

[116] Graber, A.L. et al, "Organization of a Diabetic Clinic at a Military Hospital: A Coordinated Team Approach," Military Medicine, Nov 68, 20: 900-903.

[117] Jernigan, A.K., "Diabetics Need to Know More About Diet," Journal of American Hospital Association, Nov 16, 1968, 42: 91-93.

TABLE 14

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF DIABETIC PATIENTS: INITIAL ENCOUNTER

Demographic and Socioeconomic Variables	Patients N=88 %
RANK OF MILITARY	
Active Enlisted	
E-1 thru E-6	3
E-7 thru E-9	0
Active Officer	
Company Grade	0
Field Grade	3
Dependent	46
Retired Enlisted	
E-1 thru E-6	8
E-7 thru E-9	20
Retired Officer	
Company Grade	3
Field Grade	17
SEX	
Male	59
Female	41
AGE	
less than 15	3
16-20	3
21-30	3
31-40	15
41-50	27
51-60	35
61-70	13
71 and older	1

TABLE 14 cont.

Demographic and Socioeconomic Variables	Patients N=88 %
MARITAL STATUS	
Married	85
Widowed	5
Single	7
Engaged	0
Divorced	2
Separated	1
EDUCATION COMPLETED	
Elementary (grades 1-6)	4
Junior High (grades 7-8)	9
High School (grades 9-12)	41
1-3 Years College	28
Baccalaureate	9
Master's Degree	9
Doctor's Degree	0
OCCUPATION	
Unemployed or Retired	15
Housewife	33
Administrative (office work)	10
Technical Specialist (mechanical)	7
Professional (non-medical)	10
Combat Related (line groups)	0
Student (full time)	4
Blue Collar Work (custodial)	6
Medical Professional (RN,MD, DDS)	2
Other	13

TABLE 15

HISTORICAL FEATURES OF DIABETIC PATIENT'S ILLNESS AND EDUCATION PROVIDED: INITIAL ENCOUNTER

Historical Features	Patients N=88 %
TIME SINCE DIAGNOSED	
Less Than 3 Months	27
4 to 6 Months	7
7 to 12 Months	4
1 to 2 Years	14
More Than 2 Years	48
HEALTH CARE PROVIDER	
Physician	72
Nurse Clinician	28
HAS HAD PRIOR INSTRUCTION	
Yes	65
No	35

	N=53 %
TIME OF PRIOR INSTRUCTION	
Less Than 3 Months	31
4 to 6 Months	9
7 to 12 Months	2
1 to 2 Years	12
More Than 2 Years	46
INSTRUCTION PROVIDED BY	
Physician	49
Nurse Clinician	51

d See Table 15, page 86, Historical Features of Diabetic Patient's Illness and Education Provided. The breakdown was as follows: 27 percent were diagnosed less than 3 months ago, 7 percent, 4 to 6 months, 4 percent, 7 to 12 months, 14 percent, 1 to 2 years and 48 percent more than 2 years ago. The health care provider for 72 percent was a physician and for the remaining 28 percent a nurse clinician. Sixty-five percent had prior instruction, 35 percent did not. Of those that had prior instruction, 31 percent had instruction less than 3 months ago, 9 percent, 4 to 6 months, 2 percent, 7 to 12 months, 12 percent, 1 to 2 years and 46 percent more than 2 years ago. Of the 65 percent who had instruction, 49 percent of the patients were given their instruction by a physician and 51 percent by a nurse clinician.

2 Discussion.

This population had more retirees than the other seven learning systems, 48 percent; and it was the only system that didn't have dependents as the highest represented group. This was also reflected in the sex breakdown, 59 percent of the population were male. All age groups were represented as well as all occupational groups. It was also interesting to note that only 65 percent of the population had had prior instruction and only 27 percent were diagnosed less than 3 months ago. This is a sad commentary on the state of the health care delivery system. This illness requires, perhaps, more than any other that the patient be an effective self care agent. It's important to note that a physician provided education to 49 percent of the patients that received instructions (53 patients out of the 88 diagnosed received instruction, 25 by a physician). The time involved to give quality baseline instruction for a diabetic patient requires anywhere from 2 to 5 hours, depending on the type of diet restriction and if they were on insulin. It's difficult to believe that a physician in the clinical area would have that amount of time to give to his or her patients. In addition in some MEDDACS and MEDCENS nurse clinicians were spending the majority of their time either giving diabetic or hypertension education. With the dearth of prepared physicians and nurse clinicians for the primary care areas this practice has to be questioned, especially when better methods are available that not only cost far less, and are more effective but save valuable professional time as well.

(b) Patient Comprehension for the Initial Encounter.

1 Findings.

a Prior to the educational intervention all patients completed a multiple-choice questionnaire (pre-test) to determine their knowledge and skills in reference to the following learning objectives (the objectives were identified by a physician consultant as feasible achievements for all diabetic patients):

DIABETES MELLITUS OBJECTIVES

Upon completion of this program the patient will be able to:

- Explain that diabetes is a condition that can be controlled.
- Explain that diabetes is a condition that must be taken care of everyday.

- Explain who gets diabetes.
- Define diabetes in simple terms.
- Explain the importance of diet.
- Name three (3) main types of food the body gets energy from.
- Define insulin and state its function (U-100).
- Define oral drugs and state function.
- Explain the importance of physical activity.
- Describe what steps to follow during an illness, infection, or severe emotional upset.
- Describe why urine testing is important to the diabetic.
- Explain urine testing for acetone.
- Explain diabetic acidosis.
- List the symptoms of insulin reaction.
- Describe what to do for an insulin reaction.
- Explain insulin reaction.

- Describe what to do for an insulin reaction.
- Explain the importance of having some form of medical identification.
- Describe why proper skin care and proper care of the feet and hands are important to the diabetic.
- List several foot conditions that should be brought to a physicians' attention.
- Explain the importance of a yearly eye examination.

DIABETIC DIET OBJECTIVES

Upon completion of this program the patient will be able to:

- Explain the types of food.
- Explain food exchange lists.
- Explain the importance of eating the exact amounts of food.
- Explain what to watch for when purchasing canned or packaged foods.
- Effectively plan menus using the exchange lists:
  a) Milk exchanges
  b) Vegetable exchanges
  c) Fruit exchanges
  d) Bread exchanges
  e) Meat exchanges
  f) Fat exchanges
  g) Foods allowed as desired
  h) Foods not on the exchange lists

SELF-INJECTION OF INSULIN OBJECTIVES

Upon completion of this program the patient will be able to:

- Describe the physicians order regarding his/her insulin dose including kind, strength, number of units, timing, and where indicated, the use of the sliding scale.

- Specify that changes in the insulin dose should be ordered by or guided by the physician.

- Explain that there are different kinds and strengths of insulin; that the shape of the bottle and color of the label help to identify the different kinds.
- Recognize that each insulin vial has a color coded cap to identify the strength and is stamped with an expiration date after which it should not be used.
- Recognize that insulin should be refrigerated but not frozen; that the vial in current use need not be refrigerated.
- Recognize that there are different kinds of insulin syringes and that the syringe must "match" the insulin, e.g., a U-40 syringe should be used with U-40 insulin - U-80 with the U-80 syringe - U-100 with the U-100 syringe.
- Recognize that the use of the dual-scale syringe is not recommended due to the great risk of grossly incorrect measurement.
- Identify the three parts of the syringe.
- Specify the angle of the needle when it is inserted and note how far it should be inserted.
- Explain the significance of small air bubbles in the barrel of the syringe.
- Recall whether a response is needed when there is a large air bubble in the barrel.
- Describe how to clean the top of the insulin bottle.
- Demonstrate how to fill the disposable syringe with the prescribed amount of insulin.
- Demonstrate how to withdraw the needle from the insulin bottle.
- Describe the steps in preparing the selected site for injection.
- Demonstrate how to pinch the skin at the injection site.
- Demonstrate the action of each hand for holding the syringe and pushing the plunger.
- Describe the recommended pattern for rotation of injection sites.
- Recognize the benefits of changing injection sites.
- Specify that at least one other person should know how to give insulin when necessary.

b Due to the length of the baseline diabetic instruction (2 consecutive weeks: first week, general information {2 hour session}, second week, diet information {2 hour session}, and if on insulin, insulin instruction, for a one hour session as soon as required) and difficulty of the subject matter there was a higher than usual dropout rate. Because of this it would be too confusing to list the baselines by composite score and/or by percentages. Instead the numbers of actual patients participating in each of the initial pre/post test series were given. See Table 16, page 92 , Number of Diabetic Patients That Achieved the Criterion-Level: Initial Encounter.

c For general information pre-test, 5 patients reached the criterion level, 48 patients reached the criterion level for the post-test. Diabetic diet, 24 patients were at the criterion level or higher for the pre-test compared to 36 patients for the post-test. This high baseline score was due to prior diet instruction by a dietician. For those on insulin the pre-test indicated 7 at the criterion level and 17 after the educational intervention.

2 Discussion.

a It was interesting to note that most of the patients who initially made low scores on the general information section were the very patients who didn't return for the diabetic diet instruction.

b All patients who did not reach the criterion level had to be recycled. This system required more reinforcement than any other system because of the length and difficulty of the subject matter. During the instructional design phase there was some question about breaking the sessions down into smaller units. However, most of the patients used for the formative evaluation balked at the idea because of the additional travel time, time away from work, etc, that would be involved.

(c) Patient Comprehension for the Initial Encounter and Six Month Assessment.

See Table 17, page 93 , Percentage of Diabetic Patients That Achieved the Criterion Level for the Six Month Assessment. The composite retention score for the eight patients that participated in the six month follow-up wasn't that high. Fifty percent achieved the criterion level and 50 percent did not. In examining the individual sections it appeared that the diabetes information section had the lowest retention rate, while the diabetic diet and insulin therapy sections did not. It was probably related to the fact that what knowledge you don't use you lose. The patients practiced diet and insulin therapy daily.[118] Due to the small number of subjects, eight, a score distribution wasn't done as was for the initial encounter.

(d) Patient Behavioral Baseline for Initial Encounter.

1 Findings.

See Table 18, page 94 , Diabetic Patient Behavioral Baselines: Initial Encounter. In relation to examining urine for sugar and ketones the baselines weren't too impressive, 58 percent didn't check urine at all and 73 percent didn't check for ketones. Only 50 percent followed the food exchange list and 48 percent did not and 2 percent were not on diet therapy. Fifty-two percent of the population were not on medication and of the 48 percent on medication, 44 percent knew the drugs and action. Fifty-four percent maintained an exercise program, of those 48 patients, 25 percent exercised moderately, 67 percent vigorously and 6 percent strenuously. Eighty-three percent of the 48 patients exercised daily, 15 percent twice weekly and 12 percent weekly. Ninety percent of the population maintained proper foot care.

[118] Ausubel, D.P., "A Subsumption Theory of Meaningful Learning and Retention," Journal of General Psychology, 1962, 66: 213-224.

2 Discussion.

Baselines were low in examining urine, perhaps this wasn't stressed by the patients' health care providers. Only 50 percent of 98 percent of the patients who were suppose to follow the exchange list did. It could be that the patients took the question literally and perhaps some of the 48 percent answered negatively because they may have had an idea of the amounts of foods (that came from practice) and felt they didn't need to use an exchange list. Or it could be an indication that they were becoming lax and not following orders, in which case they would need booster patient education. And only 54 percent maintained an exercise program. The data revealed that practically all the patients in the population could have benefited from some type of patient education whether they had prior instruction or not.

(e) Patient Behavioral Baselines for the Initial Encounter and Three Month Assessment.

See Table 19, page 96 , Diabetic Patient Behavioral Baselines for the Initial Encounter and Three Month Assessment. The behavioral results of the 15 patients follows: 13 percent more had negative urine results compared to the baseline and more patients were checking their urine for both sugar and ketones. Four percent more were following the food exchange lists. The mean weight decreased by five pounds. Additionally, 14 percent more were taking their medications and the same number knew their drugs and action. Seven percent more maintained an exercise program, although more changed their type of physical activity from vigorous to moderate. Seven percent increased frequency to daily. No change in maintained adequate sleep or rest and 33 percent more patients maintained proper foot care.

(f) Patient Behavioral Baselines for the Initial Encounter, Three and Six Month Assessments.

1 Findings.

See Table 20, page 98 , Diabetic Patient Behavioral Baselines for the Initial Encounter, Three and Six Month Assessments. The behavioral results of the eight patients follows: No significant change in testing urine for sugar and a decrease of 24 percent from the three month outcome for negative ketone. Seventeen percent more patients followed the food exchange list and a six pound loss in mean weight from the baseline and a three pound loss from the three month follow-up. Thirty-five percent more patients were taking their medications compared to the three month follow-up. All of those taking medications knew the drugs and actions. There was a 25 percent increase in patients who maintained an exercise program, type and frequency also changed in the desired direction. All patients now claimed they maintained adequate sleep, rest, and proper foot care.

TABLE 16

NUMBER OF DIABETIC PATIENTS THAT ACHIEVED THE CRITERION LEVEL: INITIAL ENCOUNTER

GROUPS	0-29%	30-49%	50-69%	70-79%	80-100%
					Criterion Level
GENERAL INFORMATION					
N=88					
Pre-Test	18	23	33	9	5
Post-Test	0	8	13	19	48
DIABETIC DIET					
N=46					
Pre-Test	1	1	12	8	24
Post-Test	0	1	4	5	36
INSULIN THERAPY					
N=17					
Pre-Test	1	1	4	4	7
Post-Test	0	0	0	0	17

TABLE 17

PERCENTAGE OF DIABETIC PATIENTS THAT ACHIEVED THE CRITERION LEVEL FOR THE SIX MONTH ASSESSMENT

N=8-%

GROUPS	INITIAL ENCOUNTER	SIX MONTH ASSESSMENT
COMPOSITE SCORES		
Below 80% Pre-Test	100	
Above 80% Pre-Test	0	
Below 80% Post-Test	37	50
Above 80% Post-Test	63	50
DIABETES INFORMATION		
Below 80% Pre-Test	100	
Above 80% Pre-Test	0	
Below 80% Post-Test	50	75
Above 80% Post-Test	50	25
DIABETIC DIET		
Below 80% Pre-Test	63	
Above 80% Pre-Test	37	
Below 80% Post-Test	50	25
Above 80% Post-Test	50	75
INSULIN THERAPY		
Below 80% Pre-Test	66	
Above 80% Pre-Test	34	
Below 80% Post-Test	0	25
Above 80% Post-Test	100	75

TABLE 18

DIABETIC PATIENT BEHAVIORAL BASELINES:
INITIAL ENCOUNTER

OUTCOMES	INITIAL N=88-%
RESULTS OF URINE TEST (sugar)	
Negative	19
1 Plus	10
2 Plus	8
3 Plus	4
4 Plus	1
Not Done	58
RESULTS OF URINE TESTS (ketones)	
Negative	22
Trace	2
Moderate	2
Large	1
Not Done	73
FOLLOWS EXCHANGE LIST	
Yes	50
No	48
N/A	2
WEIGHT (pounds)	
Mean	180
High	290
Low	108
TAKES MEDICATION	
Yes	48
No	0
N/A	52
Don't Know	0
KNOWS DRUGS AND ACTIONS	
Yes	44
No	56

TABLE 18 cont.

OUTCOMES	INITIAL N=88-%
MAINTAINS EXERCISE PROGRAM	
Yes	54
No	46
TYPE OF PHYSICAL ACTIVITY	
Sedentary	2
Light	0
Moderate	25
Vigorous	67
Strenuous	6
FREQUENCY OF PHYSICAL ACTIVITY	
Daily	83
Twice Weekly	15
Weekly	12
ADEQUATE SLEEP AND REST	
Yes	87
No	13
MAINTAINS PROPER FOOT CARE	
Yes	90
No	10

TABLE 19

DIABETIC PATIENT BEHAVIORAL BASELINES FOR THE INITIAL ENCOUNTER AND THREE MONTH ASSESSMENT

OUTCOMES	INITIAL N=15-%	3 Month N=15-%
RESULTS OF URINE TEST (sugar)		
Negative	27	40
1 Plus	13	27
2 Plus	0	13
3 Plus	7	13
4 Plus	0	0
Not Done	53	7
RESULTS OF URINE TEST (ketones)		
Negative	13	26
Trace	0	7
Moderate	0	7
Large	0	0
Not Done	87	60
FOLLOWS EXCHANGE LIST		
Yes	83	87
No	17	13
N/A	0	0
WEIGHT (pounds)		
Mean	171	166
High	296	290
Low	122	121
TAKES MEDICATION		
Yes	53	67
No	0	0
N/A	47	33
Don't Know	0	0
KNOWS DRUGS AND ACTIONS		
Yes	53	67
No	47	33

TABLE 19 cont.

OUTCOMES	INITIAL N=15-%	3 Month N=15-%
MAINTAINS EXERCISE PROGRAM		
Yes	73	80
No	27	20
TYPE OF PHYSICAL ACTIVITY		
Sedentary	8	0
Light	0	9
Moderate	17	27
Vigorous	67	55
Strenuous	8	9
FREQUENCY OF PHYSICAL ACTIVITY		
Daily	75	82
Twice Weekly	25	18
Weekly	0	0
ADEQUATE SLEEP AND REST		
Yes	93	93
No	7	7
MAINTAINS PROPER FOOT CARE		
Yes	67	100
No	33	0

TABLE 20

DIABETIC PATIENT BEHAVIORAL BASELINES FOR THE INITIAL ENCOUNTER, THREE AND SIX MONTH ASSESSMENTS.

OUTCOMES	INITIAL N=8-%	3 Month N=8-%	6 Month N=8-%
RESULTS OF URINE TEST (sugar)			
Negative	38	53	50
1 Plus	50	27	26
2 Plus	12	13	12
3 Plus	0	7	12
4 Plus	0	0	0
Not Done	0	0	0
RESULTS OF URINE TEST (ketones)			
Negative	25	87	63
Trace	0	0	12
Moderate	12	0	0
Large	0	0	0
Not Done	63	13	25
FOLLOWS EXCHANGE LIST			
Yes	8	83	100
No	12	17	0
N/A	0	0	0
WEIGHT (pounds)			
Mean	174	171	168
High	290	296	300
Low	121	122	125
TAKES MEDICATION			
Yes	75	53	88
No	0	0	
N/A	25	47	12
Don't Know	0	0	0
KNOWS DRUGS AND ACTIONS			
Yes	100	100	100
No	0	0	0

TABLE 20

OUTCOMES	INITIAL N=8-%	3 Month N=8-%	6 Month N=8-%
MAINTAINS EXERCISE PROGRAM			
Yes	73	75	100
No	27	25	0
TYPE OF PHYSICAL ACTIVITY			
Sedentary	12	0	0
Light	0	9	0
Moderate	25	27	33
Vigorous	63	55	50
Strenuous	0	9	17
FREQUENCY OF PHYSICAL ACTIVITY			
Daily	75	82	83
Twice Weekly	25	18	17
Weekly	0	0	0
ADEQUATE SLEEP AND REST			
Yes	83	93	100
No	17	7	0
MAINTAINS PROPER FOOT CARE			
Yes	63	100	100
No	37	0	0

2 Discussion.

It appeared from the data of the behavioral outcomes that it took patients at least six months to change all the outcomes in the desired direction. More time should be devoted to examining booster levels and long-term results of patient education.

(5) Weight Control.

(a) Clinic Patient Population for the Initial Encounter.

1 Findings.

a Seventy-one overweight patients received the initial health education on weight control. The initial session consisted of two, one hour appointments in two consecutive weeks. Ten returned for the three month follow-up and two for the six month follow-up.

b All of the overweight patients referred to the learning center were problem patients (lacked motivation) for either the physician, nurse clinician, or dietician. Most didn't want to come for an appointment to begin with. They were fat and happy and really didn't want to lose weight. Some follow-ups the health educator was unable to schedule because the learning center closed August 1977. However, the majority of the patients in this group were obese individuals who lacked motivation about their personal well being. These individuals lived to eat rather than ate to live.

c See Table 21, page 101, Demographic and Socioeconomic Characteristics of Weight Control Patients: Initial Encounter. The demographic and socioeconomic breakdown was as follows: Nine percent were active duty, four percent retirees, and 87 percent dependents. Eighty-nine percent were female and 11 percent male. All ages were represented except for 61 years and older. Eighty-seven percent were married and 13 percent were single. Twelve percent were in junior high school, which indicated a fair number of obese teenagers, 40 percent had a high school education, and 35 percent 1 to 3 years of college. The main occupation represented was housewife.

d Refer to Table 22, page 103, Historical Features of Weight Control Patients' Illness and Education Provided: Initial Encounter. Sixty-eight percent have been diagnosed more than two years ago, 15 percent, 1 to 2 years ago, 3 percent, 7 to 12 months, 8 percent, 4 to 6 months, and 6 percent, less than three months. The health care provider for the majority of the patients was a physician, 87 percent, and a nurse clinician for 13 percent. Forty-one percent of the patients never had weight control instructions, 59 percent had prior instruction. Forty-one percent received their instructions more than 2 years ago, 38 percent less than 3 months ago, the remaining 21 percent were somewhere in between. A dietician gave the instruction to 02 percent of those patients who had instruction, 24 percent were given instruction by a physician, and 14 percent by a nurse clinician. Thirty-nine percent had an overweight spouse, 25 percent overweight children, and 55 percent had parents who were overweight, either maternal, paternal, or both.

TABLE 21

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF WEIGHT CONTROL PATIENTS: INITIAL ENCOUNTER

Demographic and Socioeconomic Variables	Patients N=71 %
RANK OF MILITARY	
Active Enlisted	
E-1 thru E-6	6
E-7 thru E-9	1
Active Officer	
Company Grade	1
Field Grade	1
Dependent	87
Retired Enlisted	
E-1 thru E-6	0
E-7 thru E-9	1
Retired Officer	
Company Grade	0
Field Grade	3
SEX	
Male	11
Female	89
AGE	
less than 15	4
16-20	4
21-30	20
31-40	30
41-50	18
51-60	24
61 and older	0

TABLE 21 cont.

Demographic and Socioeconomic Variables	Patients N=71 %
MARITAL STATUS	
Married	87
Widowed	0
Single	13
Engaged	0
Divorced	0
Separated	0
EDUCATION COMPLETED	
Elementary (grades 1-6)	1
Junior High (grades 7-8)	12
High School (grades 9-12)	40
1-3 Years College	35
Baccalaureate	10
Master's Degree	1
Doctor's Degree	1
OCCUPATION	
Unemployed or Retired	1
Housewife	61
Administrative (office work)	13
Technical Specialist (mechanical)	3
Professional (non-medical)	4
Combat Related (line groups)	1
Student (full time)	7
Blue Collar (custodial)	0
Medical Professional (RN,MD,DDS)	0
Other	10

TABLE 22

HISTORICAL FEATURES OF WEIGHT CONTROL PATIENT'S ILLNESS AND EDUCATION PROVIDED: INITIAL ENCOUNTER

Historical Features	Patients N=71 %
TIME SINCE DIAGNOSED	
Less Than 3 Months	6
4 to 6 Months	8
7 to 12 Months	3
1 to 2 Years	15
More Than 2 Years	68
HEALTH CARE PROVIDER	
Physician	87
Nurse Clinician	13
HAS HAD PRIOR INSTRUCTION	
Yes	59
No	41
	N=43 %
TIME OF PRIOR INSTRUCTION	
Less Than 3 Months	38
4 to 6 Months	7
7 to 12 Months	0
1 to 2 Years	14
More Than 2 Years	41
INSTRUCTION PROVIDED BY	
Physician	24
Nurse Clinician	14
Dietician	62
	N=71 %
OVERWEIGHT SPOUSE	
Yes	39
No	61
OVERWEIGHT CHILDREN	
Yes	25
No	75
OVERWEIGHT PARENTS	
Maternal	35
Paternal	10
Both	10
None	45

2 Discussion.

The data clearly indicated that there was a need for a program such as PACOMED to save both valuable professional time and money. Further, the data revealed that the health care providers were not fully accountable in the area of patient education. It appeared that giving weight control instructions by health professionals (physicians, dieticians, nurse clinicians) to patients who had a familial history of obesity and were not motivated would not only be a professional bore, but counterproductive as well. Note that 87 percent of the obese dependent wives, 39 percent, claimed to have obese husbands.

(b) Patient Comprehension for the Initial Encounter.

1 Findings.

a Prior to the educational intervention all patients completed a multiple choice questionnaire (pre-test) to determine their knowledge in reference to the following learning objectives (the objectives were identified by a physician and dietician consultant as feasible achievements for all weight control patients):

GENERAL INFORMATION OBJECTIVES

Upon completion of this program the patient will be able to:

- Explain how to treat their digestive system.
- Define overweight/obesity.
- List four main causes of overweight/obesity. For example: overeating, social pressures, lack of exercise, lack of will power.
- List five diseases directly related to obesity. For example: hypertension, diabetes mellitus, heart disease, postsurgical complications, hypoventilation, strain on the back and joints, toxemia, etc.
- Explain what the overweight/obese patient's attitude toward weight control should be.
- List the main reasons to avoid "fad/crash" diets.
- Explain the importance of self-motivation.
- List what his/her ideal weight should be.
- List the advantages the patient will have after gaining control of his/her weight.

PHYSICAL ACTIVITY/FOOD EXCHANGE

Upon completion of this program the patient will be able to:

- **Explain the role of exercise in relation to weight reduction and control. For example: The benefit of balancing activity with caloric intake; The benefit of various types of exercise and how they relate to life style.**
- **Explain food exchange lists.**
- **Explain the types of food, i.e., protein, fat, fruits, etc.**
- **Explain the importance of eating the exact amounts and types of food recommended for daily consumption.**
- **Effectively plan menus using the exchange lists:**
  - **a) Milk exchanges**
  - **b) Vegetable exchanges**
  - **c) Fruit exchanges**
  - **d) Bread exchanges**
  - **e) Meat exchanges**
  - **f) Fat exchanges**
  - **g) Foods allowed as desired**
  - **h) Foods not on the exchange lists**

b See Table 23, page 106, Percentage of Weight Control Patients That Achieved the Criterion Level: Initial Encounter. For the composite scores 8 percent reached the criterion level on the pre-test and 92 percent did not. For the post-test, 89 percent reached the criterion level and 11 percent did not. See further breakdown of scores for general information and physical activity/food exchange.

2 Discussion.

The low baseline scores indicated that the previous instruction wasn't very informative and lasting, also a number of patients had never had instruction.

(c) Patient Comprehension for the Initial Encounter and Six Month Assessment.

See Table 24, page 107, Percentage of Weight Control Patients That Achieved the Criterion Level for the Six Month Assessment. One hundred percent of the patients were at the criterion level or above six months later. Since there were only two patients, no inferences can be drawn.

TABLE 23

PERCENTAGE OF WEIGHT CONTROL PATIENTS THAT ACHIEVED THE CRITERION LEVEL: INITIAL ENCOUNTER

N=71 -- %

GROUPS	0-29%	30-49%	50-69%	70-79%	80-100%
					Criterion Level
COMPOSITE SCORES					
Pre-Test	4	23	67	8	8
Post-Test	0	0	3	8	89
GENERAL INFORMATION					
Pre-Test	4	28	62	4	2
Post-Test	0	0	3	8	89
PHYSICAL ACTIVITY/ FOOD EXCHANGE					
Pre-Test	3	8	61	10	18
Post-Test	0	0	3	5	92

TABLE 24

PERCENTAGE OF WEIGHT CONTROL PATIENTS THAT ACHIEVED THE CRITERION LEVEL FOR THE SIX MONTH ASSESSMENT

N=2-%

GROUPS	INITIAL ENCOUNTER	SIX MONTH ASSESSMENT
COMPOSITE SCORES		
Below 80% Pre-Test	50	
Above 80% Pre-Test	50	
Below 80% Post-Test		
Above 80% Post-Test	100	100
GENERAL INFORMATION		
Below 80% Pre-Test	50	
Above 80% Pre-Test	50	
Below 80% Post-Test		
Above 80% Post-Test	100	100
PHYSICAL ACTIVITY/ FOOD EXCHANGE		
Below 80% Pre-Test	50	
Above 80% Pre-Test	50	
Below 80% Post-Test		
Above 80% Post-Test	100	100

(d) Patient Behavioral Baselines for the Initial Encounter.

a See Table 25, page 109, Weight Control Patient Behavioral Baselines for the Initial Encounter. Weights are not relevant until shown with comparative data. Fifty-four percent maintained an exercise program, 46 percent did not. Of the 54 percent that maintained an exercise program, 32 percent exercised moderately, 47 percent vigorously, and 18 percent strenuously. Sixty-six percent exercised daily, 26 percent twice weekly, and 8 percent weekly. Fifty-nine percent stated they understood their caloric limitations, 11 percent did not, and 30 percent felt they didn't have any limitations. Seven percent attended weight watchers, 18 percent did not, but felt a need, and 75 percent didn't feel a need for assistance in losing weight. Type of snacks consumed included: carbohydrates, 16 percent, protein, 3 percent, fat, 8 percent, fruit, 28 percent, milk, 4 percent, bread, 18 percent, and none, 23 percent. Sixty-six percent ate from 1 to 5 snacks per day other than their three meals, 8 percent from 6 to 10 snacks, 3 percent from 11 to 15 snacks and 23 percent had no snacks. Twelve percent were on medications for weight reduction, 50 percent of those on medication knew the drug and action while 50 percent did not. Eighty-eight percent didn't take medication for weight reduction and of the 12 percent on medications, 8 percent took their medications while 4 percent did not.

(e) Patient Behavioral Baselines and Outcomes for the Initial Encounter and Three Month Assessment.

a See Table 26, page 111, Weight Control Patient Behavioral Baselines and Behavioral Outcomes for the Initial Encounter and Three Month Assessment. The mean weight dropped 5 pounds for the 10 patients. Thirty percent more started an exercise program, however, 13 percent went from vigorous exercise to moderate, but 17 percent increased their frequency to daily. Twenty percent more claimed they understood they had caloric limitations and 40 percent were now attending weight watchers. Ten percent of one patient changed his snack from bread to protein. Twenty percent either decreased snacking or ceased altogether, and the 50 percent that formerly didn't know their drugs and action now did, and the compliance rate changed accordingly.

TABLE 25

WEIGHT CONTROL PATIENT BEHAVIORAL BASELINES
FOR THE INITIAL ENCOUNTER

OUTCOMES	INITIAL N=71-%
ACTUAL WEIGHT (pounds)	
Mean	176
MAINTAINS EXERCISE PROGRAM	
Yes	54
No	46
TYPE OF PHYSICAL ACTIVITY	
Sedentary	0
Light	3
Moderate	32
Vigorous	47
Strenuous	18
FREQUENCY OF PHYSICAL ACTIVITY	
Daily	66
Twice Weekly	26
Weekly	8
UNDERSTANDS LIMITATIONS OF CALORIC INTAKE	
Yes	59
No	11
N/A	30
REGULAR ATTENDANCE AT WEIGHT WATCHERS, ETC.	
Yes	7
No	18
N/A	75
TYPE OF SNACKS CONSUMED	
Carbohydrates	16
Protein	3
Fat	8
Fruit	28
Milk	4
Bread	18
None	23

TABLE 25 cont.

OUTCOMES	INITIAL N=71-%
NUMBER OF SNACK TIMES/DAY	
1 to 5	66
6 to 10	8
11 to 15	3
More Than 15	0
None	23
TAKES MEDICATIONS	
Yes	8
No	4
N/A	88
KNOWS DRUGS AND ACTIONS	
Yes	50
No	50

TABLE 26

WEIGHT CONTROL PATIENT BEHAVIORAL BASELINES AND OUTCOMES FOR THE INITIAL ENCOUNTER AND THREE MONTH ASSESSMENT

OUTCOMES	INITIAL N=10-%	3 Month N=10-%
WEIGHT (pounds)		
Mean	175	170
MAINTAINS EXERCISE PROGRAM		
Yes	30	60
No	70	40
TYPE OF PHYSICAL ACTIVITY		
Sedentary	0	0
Light	0	0
Moderate	33	50
Vigorous	67	50
Strenuous	0	0
FREQUENCY OF PHYSICAL ACTIVITY		
Daily	33	50
Twice Weekly	34	33
Weekly	33	17
UNDERSTANDS LIMITATIONS OF CALORIC INTAKE		
Yes	80	100
No	0	0
N/A	20	0
REGULAR ATTENDANCE AT WEIGHT WATCHERS, ETC.		
Yes	0	40
No	10	0
N/A	90	60
TYPE OF SNACKS CONSUMED		
Carbohydrates	10	10
Protein	0	10
Fat	0	0
Fruit	20	20
Milk	10	10
Bread	20	10
None	40	40

TABLE 26 cont.

OUTCOMES	INITIAL N=10-%	3 Month N=10-%
NUMBER OF SNACK TIMES/DAY		
1 to 5	40	40
6 to 10	0	0
11 to 15	20	0
More Than 15	0	0
None	40	60
TAKES MEDICATIONS		
Yes	0	10
No	10	10
N/A	90	80
KNOWS DRUGS AND ACTIONS		
Yes	0	50
No	100	50

(f) Patient Behavioral Baselines and Outcomes for the Initial Encounter, Three and Six Month Assessment.

1 Findings.

See Table 27, page 114, Weight Control Patient Behavioral Baselines and Outcomes for the Initial Encounter, Three and Six Month Assessments. The comparison data for the two patients follows: Mean drop in weight 14 pounds, 50 percent increase in exercise, 50 percent increase from moderate to vigorous, and no change in frequency. No change in understands caloric limitations or attendance at Weight Watchers. One hundred percent change in type of snack consumed, no change in number of snacks per day. Neither patient was on medications.

2 Discussion.

This data suggested that in addition to saving professional time and cost of patient education the SA approach was effective in changing behavior in the desired direction. Because of the high dropout rate for the weight control patients, perhaps more resources should be allocated to motivate the patients to return for follow-up visits. This could easily be done by sending a post card or letter approximately one week before the follow-up appointment and a telephone call to remind the patients again of their appointments one day prior to the visit.[119,120,121]

(6) Breast Self Examination.

(a) Clinic Patient Population for the Initial Encounter.

1 Findings.

a Fifty-six patients received initial health education on Breast Self Examination. Only eight were able to return for the six month follow-up.

b The rate of non returnees was high because the learning center was closed August 1977, and there wasn't sufficient time for follow-ups.

c See Table 28, page 116, Demographic and Socioeconomic Characteristics of Breast Self Examination Patients: Initial Encounter. The population categories of the 56 patients follows: Two percent were active duty while 98 percent were dependents. All patients were female, 67 percent were between 30 to 50 years of age and 94 percent were married. Seventy-three percent had either a high school or 1 - 3 years of college educational level. The majority, 67 percent, were housewives.

[119]Craddock, D., Obesity and Its Management (Edinburgh, E. and S. Livingston, LTD., 1969).

[120]Stare, J.F., "Comments on Obesity," World Wide Abstracts, 1963, 6: 8.

[121]Mayer, J., Overweight (Englewood Cliffs, Prentice-Hall, Inc., 1968), 28-30.

TABLE 27

WEIGHT CONTROL PATIENT BEHAVIORAL BASELINES AND OUTCOMES FOR THE INITIAL ENCOUNTER, THREE AND SIX MONTH ASSESSMENTS

OUTCOMES	INITIAL N=2--%	3 Month N=2--%	6 Month N=2--%
WEIGHT (Pounds)			
Mean	173	161	159
MAINTAINS EXERCISE PROGRAM			
Yes	50	100	100
No	50	0	0
TYPE OF PHYSICAL ACTIVITY			
Sedentary	0	0	0
Light	100	0	0
Moderate	0	100	50
Vigorous	0	0	50
Strenuous	0	0	0
FREQUENCY OF PHYSICAL ACTIVITY			
Daily	100	100	100
Twice Weekly	0	0	0
Weekly	0	0	0
UNDERSTANDS LIMITATIONS OF CALORIC INTAKE			
Yes	100	100	100
No	0	0	0
N/A	0	0	0
REGULAR ATTENDANCE AT WEIGHT WATCHERS, ETC.			
Yes	50	50	50
No	0	0	0
N/A	50	50	50
TYPE OF SNACKS CONSUMED			
Carbohydrates	50	0	0
Protein	0	0	0
Fat	0	50	0
Fruit	0	50	100
Milk	0	0	0
Bread	50	0	0
None	0	0	0

TABLE 27 cont.

OUTCOMES	INITIAL N=2--%	3 Month N=2--%	6 Month N=2--%
NUMBER OF SNACK TIMES/DAY			
1 to 5	100	100	100
6 to 10	0	0	0
11 to 15	0	0	0
More Than 15	0	0	0
None	0	0	0
TAKES MEDICATIONS			
Yes	0	0	0
No	0	0	0
N/A	100	100	100
KNOWS DRUGS AND ACTIONS			
There were no data for this section because neither of the patients were taking medication.			

TABLE 28

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF BREAST SELF EXAMINATION PATIENTS: INITIAL ENCOUNTER

Demographic and Socioeconomic Variables	Patients N=56 %
RANK OF MILITARY	
Active Enlisted	
E-1 thru E-6	2
E-7 thru E-9	0
Active Officer	
Company Grade	0
Field Grade	0
Dependent	98
Retired Enlisted	
E-1 thru E-6	0
E-7 thru E-9	0
Retire Officer	
Company Grade	0
Field Grade	0
SEX	
Male	0
Female	100
AGE	
less than 15	0
16 to 20	4
21 to 30	14
31 to 40	37
41 to 50	30
51 to 60	11
61 to 70	2
70 and older	2

TABLE 28 cont.

Demographic and Socioeconomic Variables	Patients N=56 %
MARITAL STATUS	
Married	94
Widowed	0
Single	4
Engaged	0
Divorced	0
Separated	2
EDUCATION COMPLETED	
Elementary (grades 1-6)	2
Junior High (grades 7-8)	10
High School (grades 9-12)	34
1-3 Years College	39
Baccalaureate	13
Master's Degree	2
Doctor's Degree	0
OCCUPATION	
Unemployed or Retired	2
Housewife	67
Administrative (office work)	14
Technical Specialist (mechanical)	4
Professional (non-medical)	2
Combat Related (line groups)	0
Student (full time)	2
Blue Collar (custodial)	2
Medical Professional (RN,MD,DDS)	0
Other	7

TABLE 29

HISTORICAL FEATURES OF BREAST SELF EXAMINATION PATIENTS AND EDUCATION PROVIDED: INTITAL ENCOUNTER

Historical Features	Patients N=56 %
HEALTH CARE PROVIDER	
Physician	98
Nurse Clinician	2
HAS HAD PRIOR INSTRUCTION	
Yes	46
No	54
TIME OF PRIOR INSTRUCTION	
Less Than 3 Months	38
4 to 6 Months	4
7 to 12 Months	4
1 to 2 Years	19
More Than 2 Years	35
INSTRUCTIONS PROVIDED BY	
Physician	85
Nurse Clinician	15
NUMBER OF CHILDREN	
1	14
2	36
3	27
4	11
5 or More	2
None	11
AGE WHEN FIRST CHILD WAS BORN	
15 to 20	8
21 to 25	68
26 to 30	16
31 to 35	6
36 to 40	2
40 and Above	0
AGE WHEN LAST CHILD WAS BORN	
15 to 20	9
21 to 25	24
26 to 30	30
31 to 35	22
36 to 40	13
41 and Above	2

TABLE 29 cont.

Historical Features	Patients N=56 %
DID YOU BREAST FEED	
Yes	44
No	56
HOW MANY CHILDREN	
1	41
2	41
3	10
4	4
5 or More	4
HOW LONG FOR EACH CHILD	
2 Weeks	4
1 Month	14
2 Months	9
3 Months	27
4 Months	14
5 Months or Longer	32
FAMILY HISTORY OF CANCER	
Yes	36
No	64
CANCER OF THE	
Colon	25
Breast	55
Uterus	10
Cervis	10
WHAT AGE AT MARRIAGE	
15 to 20	38
21 to 25	48
26 to 30	7
31 to 35	4
36 to 40	0
41 or Older	0
Not Married	4
PREVIOUS BREAST BIOPSIES	
Yes	100
No	0
DIAGNOSIS IF KNOWN	
Benign	32
Malignant	68

d See Table 29, page 118, Historical Features of Breast Self Examination Patients and Education Provided: Initial Encounter. The health care provider for 98 percent of the patients was a physician. Forty-six percent had prior instruction, 54 percent did not and of those 46 percent that did have instruction, 38 percent had instruction less than three months and 35 percent more than two years. Eighty-five percent of the instruction was given by a physician and 15 percent by a nurse clinician. Other historical features included: number of children, the majority had 2 or 3 children, 68 percent were between the ages of 21 to 25 when their first child was born, 76 percent were between the ages of 21 to 35 when their last child was born. Forty-four percent breast fed and 56 percent did not. Eighty-two percent only breast fed one or two of their children for a period ranging from two weeks to five months or longer. Thirty-six percent had a family history of cancer, 64 percent did not. Eighty-six percent were married between the ages of 15 to 25. All had previous breast biopsies and 68 percent were malignant and 32 percent benign.

2 Discussion.

The most glaring fact was that 54 percent had not had prior instruction. Of those referred, all had previous breast biopsies and 68 percent had a malignancy. The data certainly did indicate a need to save professional time as well as cost in this area. In addition the need for preventive patient education appeared to be great.

(b) Patient Comprehension for the Initial Encounter.

1 Prior to the educational intervention all patients completed a multiple-choice questionnaire (pre-test) and Betsi breast demonstration to determine their knowledge and skills in reference to the following learning objectives (the objectives were identified by a physician consultant as feasible achievements for all breast self examination patients):

BREAST SELF EXAMINATION OBJECTIVES

Upon completion of this program the patient will be able to:

- List the types of tissue in the breast, example: glandular, fibrous, and fat.
- Name the tissue which runs immediately under the breast skin.
- Describe the functions of Cooper's Ligaments.
- List two factors which determine the amount of fat tissue in the breast.
- State the function of the lymphatic system.
- Tell why the lymphatic system is significant in breast cancer patients.

- Define metastasis.
- Identify the breast as the most common site of cancer in women.
- List the expected cure rate when breast cancer is detected and treated in its early stages.
- Specify two things all women can do to help bring about a significant decline in the breast cancer death rate. Example: Professional and self examinination.
- Tell at what time during the menstrual cycle breasts should be examined.
- List changes in the breast to look for when doing breast self examination. Example: Dimpling, orange peel skin, discharge.
- Tell the reason for looking at the breasts with arms over the head and with hands squeezing the waist.
- Tell what the third part of the visual exam consists of, Example: Discharge from the nipple.
- Name two signs to look for in the third part of the breast self examination. Example: bleeding, other discharge, etc.
- Tell why to begin the examination when the skin is wet.
- Show how the fingers are held in relation to the breast to do correct breast self examination.
- Describe the correct technique for examining the breasts.
- Explain why a second examination is done in the prone position.
- Tell what should be done if a lump in the breast is found.
- With the aid of the Betsi Breast Teaching Model, the patient will demonstrate the following:
  1) Correct technique for breast self examination.
  2) Ability to detect breast lumps by finding four (4) lumps in the breast model.

2 See Table 30, page 122, Percentage of Breast Self Examination Patients That Achieved the Criterion Level: Initial Encounter. All patients were pre and post tested to include a Betsi breast demonstration. Two percent reached the 80 percent criterion level on the pre-test and 96 percent did not. Seventy percent failed the Betsi breast demonstration on the pre-test, 30 percent passed. For the post-test 77 percent reached the criterion level and 100 percent passed the Betsi breast demonstration.

3 Those patients not reaching the 80 percent criterion level were given additional instruction during their initial appointment and all reached the criterion level prior to leaving the learning center.

4 Again, notice the low baseline scores, even though 46 percent of the referrals had prior instruction. It appeared that the existing system was not providing adequate education, and it was lacking in both quality assurance and accountability.

TABLE 30

PERCENTAGE OF BREAST SELF EXAMINATION PATIENTS THAT ACHIEVED THE CRITERION LEVEL: INITIAL ENCOUNTER

GROUPS	0-29%	30-49%	50-69%	70-79%	80-100%
GENERAL INFORMATION					
Pre-Test	52	25	21	0	2
Post-Test	*0*	*0*	*2*	*21*	*77*

	PASS	FAIL
BETSI BREAST TEACHING MODEL		
Pre-Test	70	30
Post-Test	*100*	*0*

(c) Patient Comprehension for the Initial Encounter and Six Month Assessment.

1 Findings.

See Table 31, page 123, Percentage of Breast Self Examination Patients That Achieved the Criterion Level for the Six Month Assessment. Eighty-seven percent of the patients were at the criterion level or above six months later and 100 percent passed the Betsi breast demonstration.

2 Discussion.

Unfortunately, the number of subjects reported on for the six month assessment was small (N=8). Consequently the data were not subjected to statistical interpretation. The data reveal an exceptionally high retention rate when compared to the retention rates of other learning systems that have six month follow-ups in both the comprehensive and skill areas. What this suggested was that booster levels, and times of reinforcement were learning system dependent. In other words, different topic areas and learning objectives probably would require different time increments for optimum reinforcement in order to sustain desired outcomes.

TABLE 31

PERCENTAGE OF BREAST SELF EXAMINATION PATIENTS THAT ACHIEVED THE CRITERION LEVEL FOR THE SIX MONTH ASSESSMENT

N=8-%

GROUPS	INITIAL ENCOUNTER	SIX MONTH ASSESSMENT
GENERAL INFORMATION		
Below 80% Pre-Test	100	
Above 80% Pre-Test	0	
Below 80% Post-Test	38	13
Above 80% Post-Test	62	87
BETSI BREAST TEACHING MODEL		
Pass	100	100
Fail	0	0

(d) Patient Behavioral Baselines for the Initial Encounter.

See Table 32, page 124, Breast Self Examination Patient Behavioral Baselines for the Initial Encounter. The findings for the 56 women revealed that only 32 percent examined their breasts monthly, 68 percent did not. Seventy-nine percent did an incomplete examination, 21 percent a complete examination, 52 percent have detected a lump, 48 percent have not. Of the 52 percent who detected a lump, 86 percent were benign and 14 percent malignant.

(e) Patient Baselines and Behavioral Outcomes for the Six Month Assessment.

1 Findings.

See Table 33, page 125, Breast Self Examination Patient Baselines and Behavioral Outcomes for the Six Month Assessment. Sixty-two percent more women examined their breasts monthly after the educational intervention then they did prior to having the instruction. One hundred percent could perform a thorough examination. Previously 62 percent only could perform an incomplete examination and 38 percent couldn't perform one at all. Prior to being referred to the patient learning center 33 percent had benign lumps, 33 percent malignant lumps and 34 percent didn't know if they had any lumps. Six months later, 25 percent out of the 67 percent who didn't know if they had lumps (39 percent) or said they didn't have lumps (33 percent) discovered lumps. As of this writing

TABLE 32

BREAST SELF EXAMINATION PATIENT BEHAVIORAL BASELINES FOR THE INITIAL ENCOUNTER

OUTCOMES	INITIAL N=56-%
EXAMINES BREASTS MONTHLY	
Yes	32
No	68
THOROUGHNESS OF EXAMINATION	
Complete	21
Incomplete	79
DETECTION OF LUMP	
Yes	52
No	48
BENIGN OR MALIGNANT	
Benign	86
Malignant	14

none of the lumps had been biopsied, see N/A, 100 percent.

2 Discussion.

There appeared to be a great need for preventive patient education in this area. Certainly judging from the data, many lumps were going undetected. In fact, the education should be a routine part of the yearly GYN check-up. The PACOMED prototype can provide the service effectively at a very low cost, both in professional time saved and money, not to mention the ultimate savings in numbers of lives saved. With the growing numbers of women entering the Army this preventive education should be given a very high priority.

TABLE 33

BREAST SELF EXAMINATION PATIENT BASELINES AND BEHAVIORAL OUTCOMES FOR THE SIX MONTH ASSESSMENT

OUTCOMES	INITIAL N=8-%	SIX MONTH ASSESSMENT
EXAMINES BREASTS MONTHLY		
Yes	25	87
No	75	13
THOROUGHNESS OF EXAMINATION		
Complete	0	100
Incomplete	100	0
DETECTION OF LUMP		
Yes	33	25*
No	33	75
N/A	34	
BENIGN OR MALIGNANT		
Benign	33	
Malignant	33	100*
N/A	34	

*No biopsy of the detected lump was taken prior to the six month follow-up.

(7) Low Back Pain.

(a) Clinic Patient Population for the Initial Encounter.

1 Findings.

a Thirty-six patients with low back pain received the initial health education. Only five returned for the one month follow-up.

b The majority did not return because they claimed their back felt better. The other patients gave the following excuses: transportation problems, no time, wanted their appointment to coincide with physician appointment.

c See Table 34, page 127, Demographic and Socioeconomic Characteristics of Low Back Pain Patients: Initial Encounter. The demographic and socioeconomic breakdown of the thirty-six patients follows: 30 percent were active duty, 9 percent retirees, and 61 percent dependents. Twenty-eight percent were male and 72 percent female. Six percent were less than 20 years of age, 25 percent 21 to 30 years of age, 25 percent 31 to 40 years of age, 28 percent 41 to 50 years of age, and 16 percent 51 to 60 years of age. Eighty-three percent were married. The majority of the patients had an educational level of high school to baccalaureate degree, 92 percent. Occupations: 39 percent housewife, 25 percent administrative work, 11 percent technical specialist, 14 percent professional, 3 percent combat related, and 8 percent blue collar work.

d See Table 35, page 129, Historical Features of Low Back Pain Patients' Illness and Education Provided: Initial Encounter. The health care provider for all the patients was a physician. Seventy-two percent had prior instruction, and 28 percent did not. Forty-six percent of the patients had prior instruction less than 3 months ago, and 46 percent more than 2 years ago. Instructions were provided by a physician for 54 percent, nurse clinician for 4 percent, and physical therapist for 42 percent. Eighty-three percent had a history of back pain that started with trauma, 47 percent cited other causes.

2 Discussion.

a The clinic patient population represented a high percentage of active duty, 30 percent, and a much younger group than the hypertensive, diabetes, and weight control systems. Consequently, the occupational distribution was much more varied.

b Perhaps the low number of returnees for the one month follow-up was due to the high percentage of patients who had prior instruction, 72 percent. Additionally, 46 percent had their instruction less than 3 months ago before being referred to the learning center. The perceived need simply wasn't there. Note that a physician gave instruction to 54 percent of the patients.

TABLE 34

DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS OF LOW BACK PAIN PATIENTS: INITIAL ENCOUNTER

Demographic and Socioeconomic Variables	Patients N=36 %
RANK OF MILITARY	
Active Enlisted	
E-1 thru E-6	16
E-7 thru E-9	8
Active Officer	
Company Grade	3
Field Grade	3
Dependent	61
Retired Enlisted	
E-1 thru E-6	3
E-7 thru E-9	3
Retired Officer	
Company Grade	3
Field Grade	0
SEX	
Male	28
Female	72
AGE	
less than 20	6
21 to 30	25
31 to 40	25
41 to 50	28
51 to 60	16
61 to 70	0

TABLE 34 cont.

Demographic and Socioeconomic Variables	Patients N=36 %
MARITAL STATUS	
Married	83
Widowed	8
Single	3
Engaged	0
Divorced	6
Separated	0
EDUCATION COMPLETED	
Elementary (grades 1-6)	3
Junior High (grades 7-8)	3
High School (grades 9-12)	44
1-3 Years College	28
Baccalaureate	20
Master's Degree	2
Doctor's Degree	0
OCCUPATION	
Unemployed or Retired	0
Housewife	39
Administrative (office work)	25
Technical Specialist (mechanical)	11
Professional (non-medical)	14
Combat Related (line groups)	3
Student (full time)	0
Blue Collar (custodial)	8
Medical Professional (RN,MD,DDS)	0
Other	0

TABLE 35

HISTORICAL FEATURES OF LOW BACK PAIN PATIENTS' ILLNESS AND EDUCATION PROVIDED: INITIAL ENCOUNTER

Historical Features	Patients N=36 %
HEALTH CARE PROVIDER	
Physician	100
Nurse Clinician	0
Physical Therapist	0
HAS HAD PRIOR INSTRUCTION	
Yes	72
No	28
TIME OF PRIOR INSTRUCTION	
Less Than 3 Months	46
4 to 6 Months	4
7 to 12 Months	0
1 to 2 Years	4
More Than 2 Years	46
INSTRUCTIONS PROVIDED BY	
Physician	54
Nurse Clinician	4
Physical Therapist	42
HISTORY OF BACK PAIN	
Yes	83
No	17
HOW BACK PAIN STARTED	
Trauma	53
Long Trip	0
Other	47

(b) Patient Comprehension for the Initial Encounter.

1 Findings.

a Prior to the educational intervention all patients completed a multiple-choice questionnaire (pre-test) and posture demonstration to determine their knowledge and skills in reference to the following learning objectives (the objectives were identified by a physician consultant as feasible achievements for all low back pain patients):

LOW BACK PAIN OBJECTIVES

Upon completion of this learning program the patient will be able to:

- Define good posture.
- Identify who may acquire low back pain.
- Identify the most common cause of low back pain.
- Tell what part of the spine is affected when you have low back pain.
- Describe why being over weight can cause low back pain.
- Explain that exercise is the only real treatment/cure for low back pain.
- Demonstrate the proper exercises for low back pain.
- Describe the proper method to lift heavy loads, such as, children, groceries, etc.
- Tell how to properly use pillows while sleeping or relaxing.
- Demonstrate good posture.
- Explain how to properly select furniture.

b See Table 36, page 131, Percentage of Low Back Pain Patients That Achieved the Criterion Level: Initial Encounter. All patients were pre and post tested to include a posture demonstration. Thirty-three percent reached the criterion level on the pre-test, 67 percent did not. Sixty-one percent failed the posture demonstration on the pre-test, 39 percent passed. For the post-test 92 percent reached the criterion level and 100 percent passed the posture demonstration.

2 Discussion.

It is important to note that 72 percent of the population that was referred to the learning center had had prior instruction and 46 percent of them less than 3 months before referral, however, only approximately 33 and 39 percent passed the respective pre-tests. Eight percent of the patients who did not reach the criterion level were recycled in order to reach the criterion level.

TABLE 36

PERCENTAGE OF LOW BACK PAIN PATIENTS
THAT ACHIEVED THE CRITERION LEVEL: INITIAL ENCOUNTER

GROUPS	0-29%	30-49%	50-69%	70-79%	80-100%
GENERAL INFORMATION					
Pre-Test	3	11	31	22	33
Post-Test	*0*	*0*	*3*	*5*	*92*

	PASS	FAIL
CORRECT POSTURE DEMONSTRATION		
Pre-Test	39	61
Post-Test	*100*	*0*

(c) Patient Comprehension for the Initial Encounter and One Month Assessment.

1 Findings.

See Table 37, page 132, Percentage of Low Back Pain Patients That Achieved the Criterion Level for the One Month Assessment. All patients were at the criterion level or above one month later. Four (80 percent) passed the correct posture demonstration, one (20 percent) did not.

2 Discussion.

a The person who did not pass the posture demonstration for the one month visit was given a correct posture demonstration. The deficiency was corrected during that visit.

b The number of subjects reported on was small; therefore, the results were not subjected to statistical interpretation.

TABLE 37

PERCENTAGE OF LOW BACK PAIN PATIENTS THAT ACHIEVED THE CRITERION LEVEL FOR THE ONE MONTH ASSESSMENT

N=5-%

GROUPS	INITIAL ENCOUNTER	ONE MONTH ASSESSMENT
GENERAL INFORMATION		
Below 80% Pre-Test	60	
Above 80% Pre-Test	40	
Below 80% Post-Test	0	
Above 80% Post-Test	100	100
CORRECT POSTURE DEMONSTRATION		
Pass	100	80
Fail	0	20

(d) Additional Patient Behavioral Data: One Month Assessment.

See Table 38, page 133, Additional Low Back Pain Patient Behavioral Data: One Month Assessment. The only behavioral baselines that were taken in addition to the correct posture demonstration was history of back pain and how the pain started, as reported in Table 35, page 129, Historical Features of Low Back Pain Patients' Illness and Education Provided: Initial Encounter. For the one month follow-up the following additional data was elicited: maintained exercise program, 80 percent yes, 20 percent no, experiencing any discomfort, 80 percent yes, 20 percent no. For the four patients who were experiencing discomfort, 50 percent described the discomfort as constant and 50 percent as intermittent. Fifty percent associated the discomfort with standing and 50 percent with other, such as playing sports.

TABLE 38

ADDITIONAL LOW BACK PAIN PATIENT
BEHAVIORAL DATA: ONE MONTH ASSESSMENT

OUTCOMES	N=5 %
MAINTAINED EXERCISE PROGRAM	
Yes	80
No	20
EXPERIENCING ANY DISCOMFORT	
Yes	80
No	20
IF YES, DESCRIBE THE DISCOMFORT	
Constant	50
Intermittent	50
WHAT ACTIVITY IS THIS DISCOMFORT ASSOCIATED WITH	
Lifting	0
Auto Trips	0
Walking	0
Standing	50
More Than One Of The Above	0
Other	50

(8) Patient Consumer Response to the Systems Approach in a Prototype Patient Education Setting.

(a) Procedures.

The 307 patient referrals (professional or self) for the preceding five learning systems were given one additional measurement during their visit to the learning center. A Lickert scale response form reflecting the patient's opinion pertaining to the systems approach learning process.[122] The process evaluation included opinions on the following: viewing time, content interest, questions on topic, pace, content uniqueness, content value, non-professional paramedical health educator's style, learning center, preference for instruction, freedom to learn by audio-visual compared to usual instructions by professional health workers, personal responsibility for learning by audio-visual compared to usual instruction by health workers, patient attitude toward audio-visual modes for health education, patient viewing of commercial television in hours.

(b) Findings.

See Table 39, page 135, Patients' Opinion Toward the Systems Approach. The analysis of the opinion rating scale follows: viewing time, 92 percent felt it was OK; content interest, 38 percent felt it was OK, 61 percent found it fascinating; questions on topic, 26 percent said OK, 71 percent felt it really helped; pace, 82 percent responded OK and 14 percent felt it was too fast; content uniqueness, 54 percent said OK, 43 percent stated it was all new; content value, 24 percent said OK and 75 percent said most valuable; non-professional paramedical health educator's style, 16 percent felt it was OK and 84 percent felt it was excellent; learning center, 18 percent responded OK, and 82 percent responded excellent; preference for instruction, 38 percent preferred the audiovisual mode; 33 percent were neutral and 29 percent preferred a live teacher; freedom to learn by audiovisual compared to professional health workers, 39 percent said equal and 52 percent said they had more freedom; 56 percent said they felt more personal responsibility and 41 percent felt about the same; 27 percent had a neutral attitude toward audiovisual modes for health education, 62 percent had an excellent attitude; patient viewing of commercial television in hours per day, 28 percent viewed less than one hour, 21 percent viewed two hours, 31 percent viewed three hours, 12 percent viewed four hours, and 8 percent viewed television more than five hours per day. Refer to Appendix I, page 217, Patients' Opinion Toward the Systems Approach for the Individual Five Learning Systems.

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[122] Adapted from "Scales to Determine Student Attitude About TeleTutorial Lessons," by Volker, Simonson, R., and Simonson, M., as appeared in Audiovisual Instruction, November 1975, 51.

TABLE 39
PATIENTS' OPINION TOWARD THE SYSTEMS APPROACH

TOPIC AREA	OPINION RATING SCALE:				
	1	2	3	4	5
VIEWING TIME	Too Short		OK		Too Long
	1	4	92	2	1
CONTENT INTEREST	Boring		OK		Fascinating
	0	1	38	41	20
QUESTIONS ON TOPIC	No Help		OK		Really Helped
	1	2	26	23	48
PACE	Too Slow		OK		Too Fast
	1	3	82	12	2
CONTENT UNIQUENESS	Old Stuff		OK		All New
	1	2	54	28	15
CONTENT VALUE	No Value		OK		Most Valuable
	0	1	24	25	50
NON-PROFESSIONAL PARAMEDICAL HEALTH EDUCATOR'S STYLE	Poor		OK		Excellent
	0	0	16	17	67
LEARNING CENTER	Poor		OK		Excellent
	0	0	18	19	63
PREFERENCE FOR INSTRUCTION	A/V Mode		Neutral		Live Teacher
	33	5	33	7	22
FREEDOM TO LEARN BY A/V COMPARED TO HEALTH WORKERS	Less Freedom		Equal		More Freedom
	2	7	39	20	32
PERSONAL RESPONSIBILITY A/V COMPARED TO HEALTH WORKERS	Less		Equal		More
	1	2	41	20	36
PATIENT ATTITUDE TOWARD A/V MODES FOR HEALTH EDUCATION	Poor		Neutral		Excellent
	0	1	27	25	47
PATIENT VIEWING OF COMMERCIAL TV IN HOURS PER DAY	Less Than		Hours		More Than
	28	21	31	12	8

(c) Discussion.

1 For the most part the patients appeared to be extremely receptive. The findings were congruent with those found in the hypertensive study, "A Comparative Evaluation of the Traditional Versus A Systems Approach for Hypertensive Patient Education."[123] Scores were high in content interest, uniqueness and value, the non-professional paramedical health educator's style, the learning center concept, audiovisual preference for instruction, more freedom to learn and greater personal responsibility for learning by audiovisual compared to usual instruction by professional health workers. The patients' attitudes toward the audiovisual modes were excellent. There was also a higher than expected acceptance of the non-professional health educator.

2 It is important to point out that the majority of the dropouts didn't reflect a dissatisfaction with the systems approach concept. However, they reflected an attitude conveyed by their actions about the relative unimportance (in their value system) of patient or preventive health education per se. Therefore, more general education and information will be needed to change their current attitudes.

8. CONCLUSIONS.

a. Physical Facilities.

Due to time and space constraints the findings for the physical facilities were limited and can only be used as guidelines.

b. Communications Media.

Until approximately 1985 the videocassette format appears to be the most cost effective and efficient medium, for the AMEDD, in which to transmit the validated patient learning systems in hospitals and outpatient settings.

c. Non-Professional Paramedic as Health Educator.

(1) Graduates of the 91C20 clinical specialist course should be considered as potential health educators.

(2) The health educator would be qualified to perform the functions of: learning center operator, counselor, records manager, and coordinator of learning center activities.

(3) The Chief, Health and Environment or Chief, Nursing Education and Training (Educational Coordinator) should be considered for overall supervisor, coordinator, budgeting and program planner for the individual MEDCEN and MEDDAC learning centers.

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[123]Kucha, D.H., A Comparative Evaluation of Traditional Versus A Systems Approach for Hypertensive Patient Education, Phase 3, Final Report, HCSD, AHS, FSHTX, August 1977.

d. Program Development.

(1) Staff Development, Professional and Self Referral.

(a) The outcomes indicated on the whole that there wasn't any strong resistance on the part of the professionals toward PACOMED. However, they were reluctant to accept some features of the concept, especially in areas concerning professional roles. There was much ambivalance on the part of the professional staff concerning patient education.

(b) Giving additional benefits such as preventive and patient education to health consumers is not enough. Patient consumers need stronger motivators plus more mass education about the value of preventive medicine.

(c) Preventive patient education for the active duty soldier needs to be provided via his/her unit training system rather than a hospital based program.

(d) Part of the problem was that there wasn't enough time to develop the program planning and management systems properly. Consequently, many of the measurements and observations were premature. At best this study component only suggests the direction the various stages of program development may have taken.

(2) Accountability and Monitoring.

(a) All of the baseline data indicated a need for a more effective, efficient, cost effective method of providing patient education than now exists in the AMEDD health care delivery system.

1 Not all of the patients that should were receiving patient education.

2 In more cases than not, the health care provider was a physician rather than a nurse clinician. Therefore, most of the instruction that was provided was given by a physician. The cost was too high, it wasted valuable professional time and did not provide for quality assurance in the patient education area.

3 The instructions that were given weren't that effective, as indicated in the individual patient baseline scores, in the areas of comprehension, retention, and psychomotor skills.

4 The data revealed that patients were only getting part of the educational message. There were wide gaps in what behaviors were perceived to be most important and the priorities that were given those behaviors by the patients.

5 The PACOMED concept could provide the patient education at approximately 1/1000th the cost if the learning systems would be used in 30 to 50 MEDCENS, MEDDACS, or troop clinics.

(b) Judging from the demographic data it was documented that the five learning systems (hypertension, diabetes, weight control, breast self examination, and low back pain) all have wide application for the active duty soldier. Therefore, the implications of providing preventive patient education using the I.S.D. approach via some form of media for the active duty soldier that is cost effective could have far reaching consequences.

(c) The data suggest that booster levels and times of reinforcement were learning system dependent. In other words, different topic areas and learning objectives probably would require different time increments for optimum reinforcement in order to sustain desired outcomes.

(d) The analysis of the Patients' Opinion toward the systems approach indicated very positive findings in relation to the SA concept. Scores were high in content interest, uniqueness and value, the non-professional paramedical health educator's style, the learning center concept, audiovisual preference for instruction, more freedom to learn, and greater personal responsibility for learning by audiovisual compared to usual instruction by professional health care workers. The patients attitudes toward the audiovisual modes were excellent. There was a high acceptance of the non-professional as health educator.

(e) However, it is important to point out that many patient consumers reflected an attitude, conveyed by their actions, about the relative unimportance in their value system, of patient or preventive health education per se. Therefore, more general education and information about the value of consumer health education will be needed to change their current attitudes.

(4) This phase of the PACOMED project was too short. At least an additional one or two years would have been needed to examine the results of the outcomes properly. More subjects as well as long-term measurements in all areas were needed.

9. RECOMMENDATIONS.

a. Although the patient measurements were limited, the outcomes of this phase, like the hypertension study, demonstrated the efficiency of the SA approach in the areas of comprehension, retention behavioral influence and cost-effectiveness. It would appear desirable to start this type of patient education program in the AMEDD.

b. Consideration should be given by HSC and OTSG to institute action toward this end.

c. Additional research should be done in the following areas:

(1) Cost analysis studies in the areas of quantifying benefits more accurately and in the distribution of costs and utilization of patient education.

(2) Identification of threshold and booster levels as well as levels of diminishing returns.

(3) Development of common measurable predictors of success for a receptive attitude toward patient education and the various methodologies.

(4) The relationships between patient knowledge levels and patterns of disease control.

(5) Retention studies to evaluate the long-term worth (2,5,10 years) of different types of consumer educational programs.

(6) Studies to develop successful motivational techniques for health care providers and patient consumers.

d. The complete report and specifically the many findings and observations should be made available to those conducting research in patient education and operating or planning to operate a patient education program.