individualized instruction to ten patients. This was possible because of the individualized formalized systematic assessments inherent in the systems approach.

2 Instructional Materials.

a Systems Approach. Thirty-six cents is the cost based on the number of patients that could be seen per session (10 patients) in a small learning center. The $0.36 refers to the cost per hour of educational and software use to include maintenance. Once the validated educational system (audiovisual) is developed the cost per hour remains a constant whether one patient or ten patients are given the instruction. The number of patients seen per hour is contingent upon the size of the learning center, number of patients, and the type of referral system.

b Traditional Approach. No instructional materials cost incurred.

3 Space. See preceding sections.

4 Administrative Costs. Systems Approach - $0.90 represents the cost for ten sets of paperwork at $0.09 per set.

(e) Operating Costs - 250 Patients.

1 Personnel.

a Traditional Approach.

(1) Physician. Four thousand four hundred sixty-two dollars and fifty cents represents the cost for 250 hours of physician time. This is the time it would take to give individualized baseline instruction to 250 patients.

(2) Nurse Clinician. Two thousand three hundred sixty-two dollars and fifty cents represents the cost for 250 hours of nurse clinician time.

b Systems Approach. Non-Professional Health Educator. One hundred and forty-three dollars and seventy-five cents represents 25 hours of the paraprofessional's time. It was possible to give baseline individualized instruction to ten patients per hour via the systems approach.

2 Instructional Materials. Systems - $9.00 represents the cost per hour ($0.36) of educational software and hardware use for 25 hours.

3 Space. At this point it would be a constant.

4 Administrative Costs. Systems Approach - $22.50 represents the cost for 250 sets of paperwork at $0.09 a set.

(f) Operating Costs - 3,000 Patients.

1 Personnel.

a Traditional Approach.

(1) Physician. Fifty-three thousand five hundred and fifty dollars represents the cost for 3,000 hours of physician time, the time it would take to give all hypertensive patients who were seen at Andrew Rader US Army Clinic, Fort Myer, Virginia or those seen at DeWitt Army Hospital Internal Medicine Clinic, Fort Belvoir, Virginia in one year, one hour of baseline individualized instruction. Approximately 3,000 hypertensive patients per year are seen in each Internal Medicine Clinic.

(2) Nurse Clinician. Twenty-eight thousand three-hundred fifty dollars represents the cost for 3,000 hours of nurse clinician time, the time it would take to give all the hypertensive patients seen within one year, patient education at one or the other of the clinics.

b Systems Approach. Non Professional Health Educator. One thousand seven hundred twenty-five dollars represents 300 hours of the health educator's time. Ten patients/hour X 300 hours.

2 Instructional Materials.

a Systems Approach. One hundred and eight dollars represents the cost per hour of educational software and hardware use for 300 hours X $0.36 cost per hour.

b Traditional Approach. Neither the nurse clinicians nor the physicians used any form of nonexpendable equipment. Some physicians and nurse clinicians gave their patients pamphlets or similar literature. Most of the literature was donated by various companies or organizations. There was a lack of consistency between the physicians and nurses as to what was given the patients and when it was given.

3 Space. At this point it would be a constant.

4 Administrative Costs.

a Systems Approach. Two-hundred and seventy dollars represents the cost for 3,000 sets of paperwork at $0.09 a set.

b Traditional Approach. Neither the nurse clinician nor the physicians used any type of formalized systematic

assessment to measure the patients' entry knowledge level, their gain or deficiencies after the intervention.

5. CONCLUSIONS.

a. There is a need for a more effective, efficient, 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 patients were very positive in their opinion about the instructional experience.

(5) 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 norse 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 systems approach 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, reported 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 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.

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APPENDIX A

TECHNICAL, TABULAR AND GRAPHIC DATA PERTAINING TO SUMMARY STATISTICS OF TEST SCORES

APPENDIX A

TECHNICAL TABULAR AND GRAPHIC DATA PERTAINING TO SUMMARY STATISTICS OF TEST SCORES

1. INTRODUCTION.

a. As mentioned in the body of the report, when one uses criterion-referenced tests (as in the PACOMED study), one is interested in the proportion of patients who meet a criterion level of performance. Thus, as was represented in the text a graphic display of the results of a criterion-referenced test gave the percentage of patients who reached the criterion level. This is consistent with current thinking on the use of criterion-referenced measures when one is interested in determining whether patients have achieved a particular prespecified level of performance or not, rather than in placing an individual at a particular point along a scale.

b. What follows is the classical method of reporting the results of the evaluation study such as would be included in standardized achievement tests and many teacher-made tests of academic performance (norm-referenced tests).

c. Caution should be used when viewing the results for the reasons given.

d. Typical statistics obtained for use in prototype evaluation include measures of central tendency (usually averages) and measures of dispersion (often standard deviations).

e. Because the designer of a criterion-referenced test has little interest in discriminating among examinees, no attempt is made to select items to produce a test of maximum test score variability, and thus, that variance will typically be small if instruction is effective. Also, criterion-referenced tests are usually administered either immediately before or after small units of instruction. It is not surprising that frequently homogenous distributions are observed of test scores on pre-post tests, but centered at the low and high ends of the achievement scales, respectively. Additionally, it is well known from the study of classical test theory...that when the variances of test scores is restricted, correlational estimates of reliability and validity will be low. It seems clear that the classical approaches to reliability and validity estimation will need to be interpreted more cautiously (or discarded) in the analysis of criterion-referenced tests.[1,2,3,4,5,6]

[1] Swaminithan, H. and Hambleton, A.J., "Reliability of Criterion-Referenced Test: A Decision-Theoretic Formulation," Journal Of Educational Measurement, Winter, 1974, 11: 263-267.

[2]Popham, J.W., "Implications of Criterion-Referenced Measurement," Journal of Educational Measurement, 1969, 8: 79-89.

[3]Popham, J.W., Educational Evaluation (Englewood Cliffs, NJ, Prentice-Hall Inc, 1975), 20-44.

[4]Popham, J.W., (Ed.) Evaluation in Education: Current Applications (Berkeley, CA, McCutchan Publishing Corp., 1974), 533-585.

[5]Baker, E.L., "Beyond Objectives: Domain-Referenced Tests for Evaluation and Instructional Improvement," Educational Technology, 1974, 14: 10-16.

[6]Cleary, A.T., "Strategies for Criterion-Referenced Test Construction Using Classical Procedures," Paper presented at the Annual Meeting of the American Educational Research Association, 1971, 10.

TABLE 1-1

ANALYSIS OF PRE AND POST SCORES BY TYPE OF INSTRUCTION

GROUPS		MEAN	STANDARD DEVIATION	RANGE
COMPOSITE SCORE				
SA Group (N=202)	pre	43.6	8.3	7 to 60
	post	62.4	8.1	16 to 72
T Group (N=200)	pre	41.5	8.7	16 to 56
	post	47.5	8.4	22 to 68
GENERAL INFORMATION				
SA Group	pre	15.5	4.1	1 to 24
	post	19.5	3.3	3 to 24
T Group	pre	15.3	4.3	2 to 23
	post	17.1	4.1	5 to 24
LOW SODIUM DIET				
SA Group	pre	12.0	4.0	1 to 21
	post	24.8	3.8	9 to 29
T Group	pre	12.0	4.2	0 to 21
	post	15.5	4.5	0 to 26
MEDICATIONS				
SA Group	pre	15.3	2.6	1 to 19
	post	18.1	1.7	4 to 19
T Group	pre	14.2	2.8	7 to 19
	post	15.1	2.4	7 to 19

f. Table 1-1, Analysis Of Pre And Post Scores By Type Of Instruction, is a variant bar graph representing the pre-post test means, standard deviation and ranges.

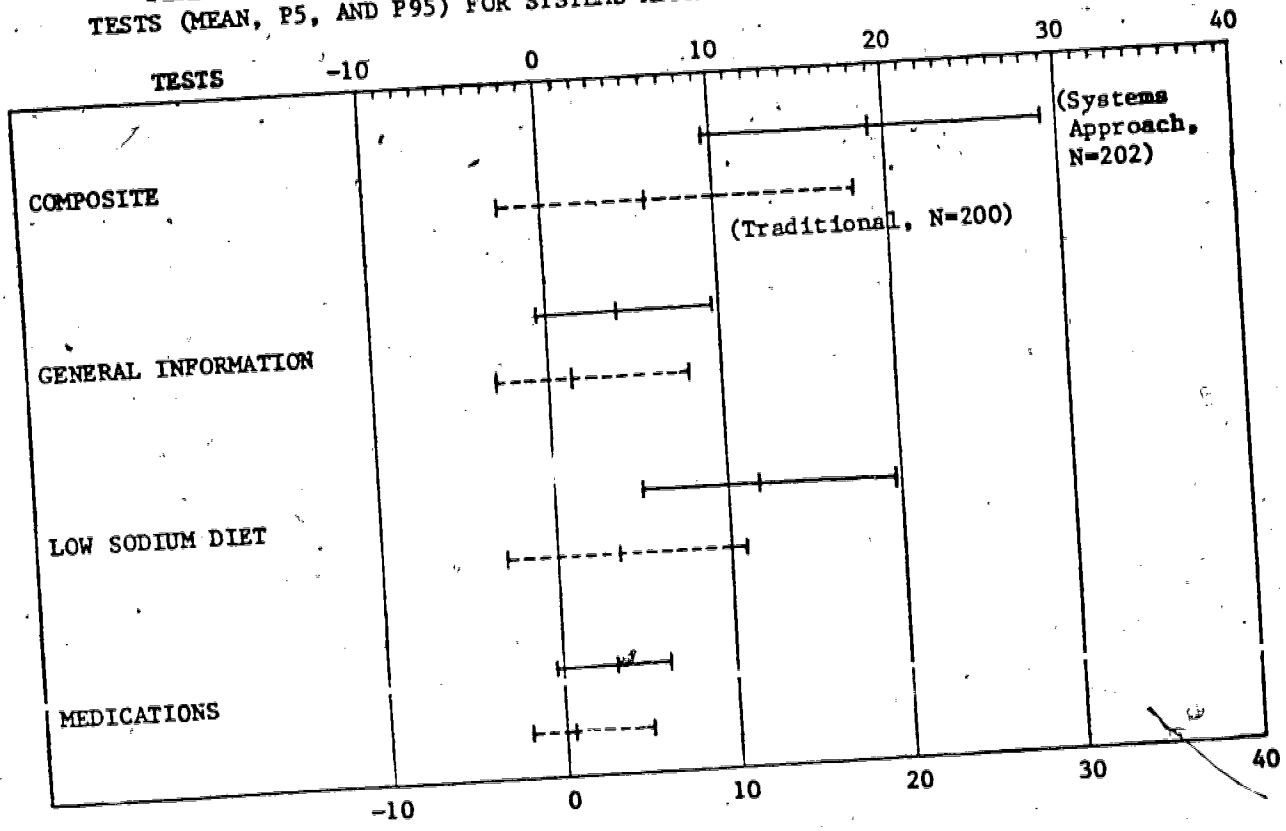
g. Notice that the mean of the SA group is considerably higher than that of the T group.

h. Not only does the mean of the SA group exceed the mean of the T group, but so do the different scores between the pre and post tests that fall between the fifth (P5) and ninety-fifth (P95) percentiles (this does not represent the lowest or the highest score). Percentile indicates the percentage of patients whose scores fall at or below a given score. Thus, at all levels patients in the SA group performed better than patients in the T group.

i. More than three quarters of the patients in the SA group exceed the mean of the T group in the composite and low sodium scores. See Table 1-2, p. 103, Performance Levels Of The Difference Between The Pre And Post Tests (Mean, P5, and P95) For Systems Approach And Traditional Groups.

TABLE 1-2

PERFORMANCE LEVELS OF THE DIFFERENCE BETWEEN THE PRE AND POST TESTS (MEAN, P5, AND P95) FOR SYSTEMS APPROACH AND TRADITIONAL GROUPS



j. Refer to Table 3, p. 20, Percentage Of Patients That Achieved The Criterion Level By Type Of Instruction For The Initial Encounter. Unfortunately, what these summary statistics fail to point out is that 81 percent of the SA group reached the criterion level compared to only 8.5 percent in the T group. The reason for this is that the scores between the 5 to 95 percentile were only represented. However, a consistency of results is seen. Clearly the greatest deficiency in the T group was in the area of low sodium diet.

TABLE 1-3

DIFFERENCE IN MEAN GAIN (POST-PRE) BETWEEN THE SYSTEMS APPROACH AND TRADITIONAL GROUPS

GROUPS POST-PRE SCORES	MEAN GAIN	STANDARD DEVIATION	Z	P
COMPOSITE				
SA Group (N=202)	18.77	.40	21.36	<.0001
T Group (N=200)	5.94	.45		
GENERAL INFORMATION				
SA Group	4.21	.23	4.28	<.0001
T Group	1.79	.24		
LOW SODIUM DIET				
SA Group	11.79	.29	20.77	<.0001
T Group	3.34	.29		
MEDICATIONS				
SA Group	2.77	.13	9.85	<.0001
T Group	.81	.15		

k. Table 1-3 gives the Difference In Mean Gain (Post-Pre) Between The Systems Approach And Traditional Groups.

l. In each case the difference in mean gain (post-pre) between the SA and T groups was statistically significant ($p < .0001$). The greatest difference between the two groups occurs for the sodium restricted diet test. This component contributed most to the difference in total scores.

m. Since the sample sizes (N=202,200) are quite large the test of significance for mean differences was based on the use of the Z test.[7]

n. Notice that a greater mean change (initial post score - 6 month score) occurred in the SA group for each of the three tests. However, the mean score was still higher for each test in the SA group. See Table 1-4, p. 105, Mean Test Scores On Subjects That Had The 6 Month Follow-Up and Table 1-5, p.105, Analysis Of Post-Minus Retention Scores By Type Of Instruction. Also see Tables 1-6,7,8,and 9, Performance Levels Of The Difference Between The Pre/Post And Six Month Tests (mean, P5, and P95) For SA And T Groups: Composite Scores, General Information, Low Sodium Diet, and Medications.

o. Although norm referenced test were not used in the study, it was interesting to note that even with the classical methods of measurement the SA group performed better.

[7] Culton, T., Statistics In Medicine (Boston, Little, Brown, and Co, 1974),139.

TABLE 1-4

MEAN TEST SCORES ON SUBJECTS THAT HAD THE 6 MONTH FOLLOW-UP

		SA GROUP (N=126)		T GROUP (N=124)	
TEST		MEAN	S.D.	MEAN	S.D.
COMPOSITE:	Pre	43.98	8.1	42.06	7.8
	Post	63.23	7.8	48.14	7.6
	Post-Pre	19.25	5.7	6.08	6.1
	6 Month	50.62	7.4	45.59	7.2
	6 Mo Loss	12.61	6.6	2.55	6.6
GENERAL INFORMATION:	Pre	15.11	4.2	15.52	3.8
	Post	19.71	3.7	17.24	3.8
	Post-Pre	4.60	3.2	1.72	3.2
	6 Month	16.90	3.4	15.75	1.9
	6 Mo Loss	2.81	3.8	1.50	3.7
LOW SODIUM DIET:	Pre	13.25	3.9	12.24	3.8
	Post	25.32	3.6	15.84	4.1
	Post-Pre	12.07	4.1	3.60	4.1
	6 Month	17.57	3.6	15.08	3.6
	6 Mo Loss	7.75	3.6	.76	4.4
MEDICATIONS:	Pre	15.63	2.3	14.30	2.8
	Post	18.21	1.6	15.06	2.4
	Post-Pre	2.58	1.6	.76	2.2
	6 Month	16.15	2.3	14.76	2.5
	6 Mo Loss	2.06	2.2	.30	2.3

TABLE 1-5

ANALYSIS OF POST-MINUS RETENTION SCORES BY TYPE OF INSTRUCTION

GROUPS	MEAN	S.D.	RANGE
COMPOSITE SCORE			
SA Group (N=126)	-12.6	6.6	-33 to 19
T Group (N=124)	- 2.6	6.6	-25 to 15
GENERAL INFORMATION			
SA Group	- 2.8	3.8	-16 to 8
T Group	- 1.5	3.7	-12 to 7
LOW SODIUM DIET			
SA Group	- 7.7	3.61	-16 to 5
T Group	- 0.8	4.43	-14 to 12
MEDICATIONS			
SA Group	- 2.0	2.2	-10 to 6
T Group	- 0.3	2.3	-10 to 5

TABLE 1-6

PERFORMANCE LEVELS OF THE DIFFERENCE BETWEEN THE PRE/POST AND SIX MONTH TESTS (mean, P5, and P95) FOR SA AND T GROUPS

COMPOSITE SCORES

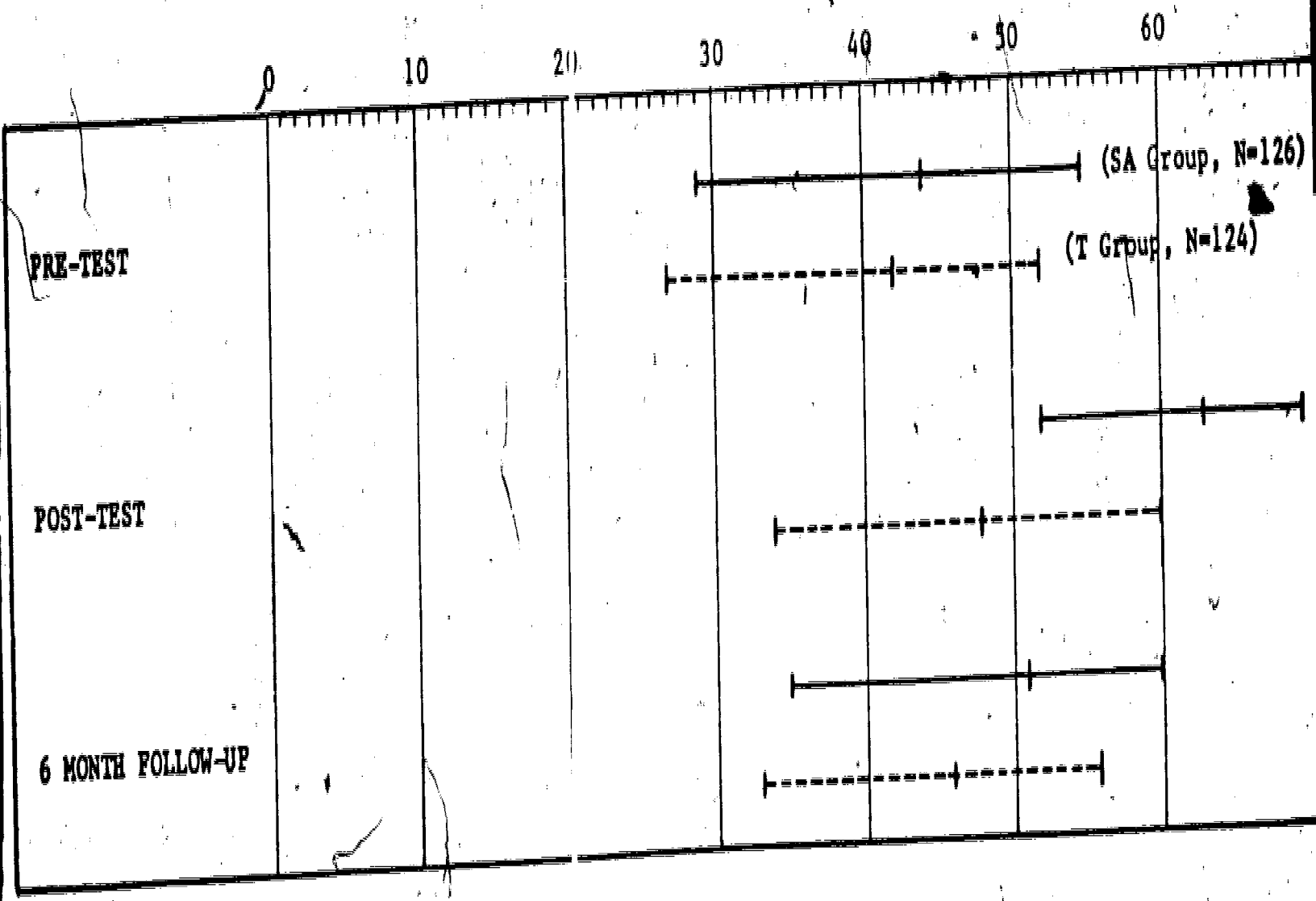


TABLE 1-7

PERFORMANCE LEVELS OF THE DIFFERENCE BETWEEN THE PRE/POST AND SIX MONTH TESTS (mean, P5, and P95) FOR SA AND T GROUPS

GENERAL INFORMATION

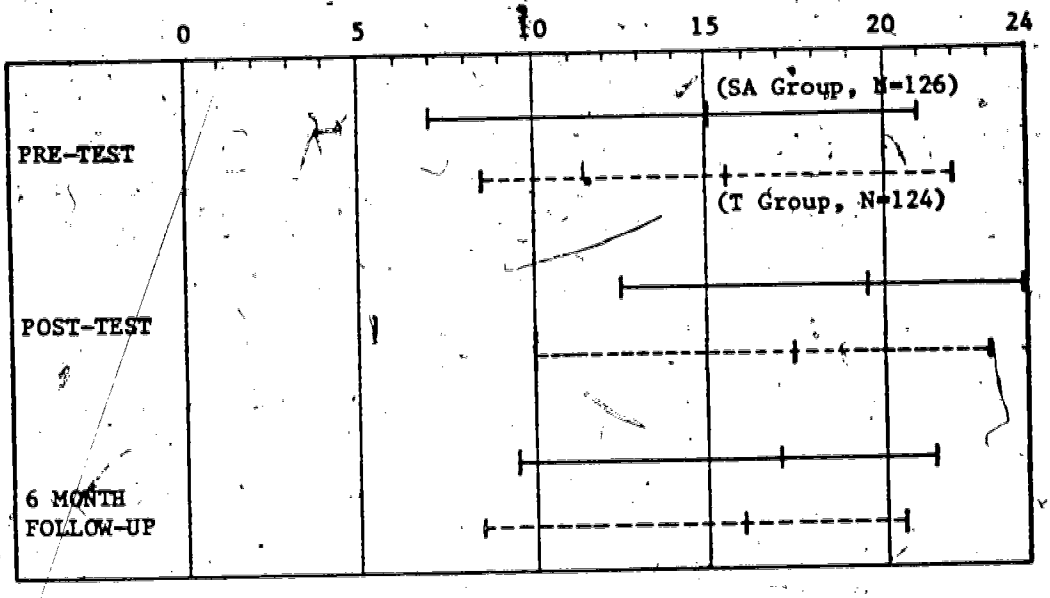


TABLE 1-8

PERFORMANCE LEVELS OF THE DIFFERENCE BETWEEN THE PRE/POST AND SIX MONTH TESTS (mean, P5, and P95) FOR SA AND T GROUPS

LOW SODIUM DIET

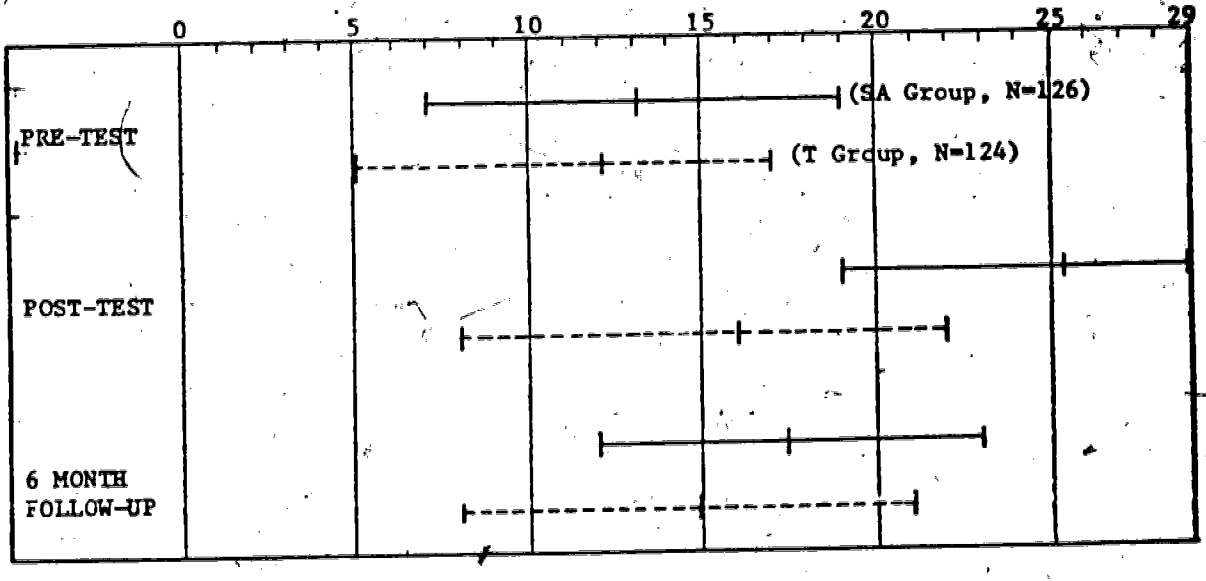


TABLE 1-9

PERFORMANCE LEVELS OF THE DIFFERENCE BETWEEN THE PRE/POST AND SIX MONTH TESTS (mean, P5, and P95) FOR SA AND T GROUPS

MEDICATIONS

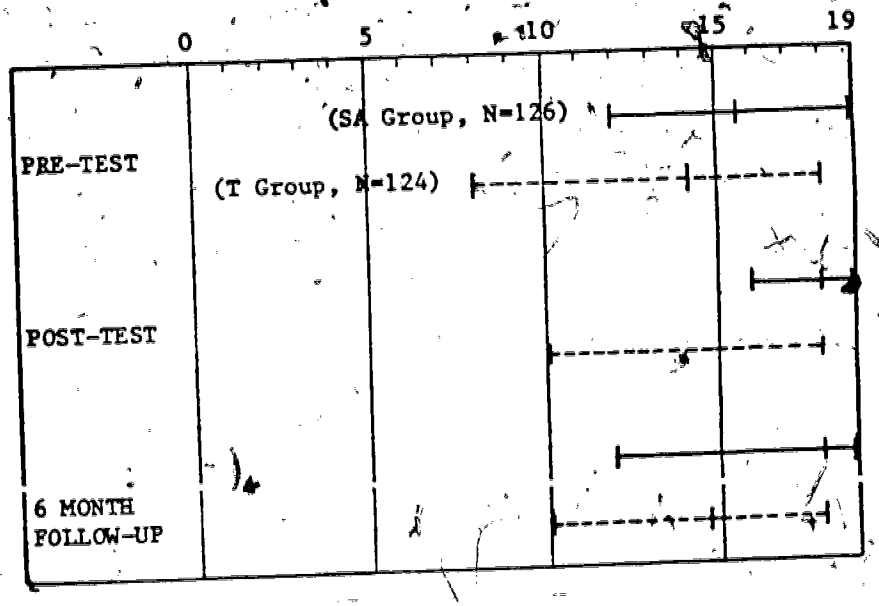


TABLE 1-10

CUMULATIVE DISTRIBUTION OF ROTTER'S TEST SCORES IN SA AND T GROUPS

	ROTTER'S SCORE	SA GROUP # Subj	SA GROUP Cum # Subj	SA GROUP Cum %	T GROUP # Subj	T GROUP Cum # Subj	T GROUP Cum %
Externally Controlled Internally Controlled	0	2	2	1.64	0	0	0
	1	4	6	4.92	3	3	2.46
	2	15	21	17.21	9	12	9.84
	3	16	37	30.33	10	22	18.03
	4	12	49	40.16	12	34	27.87
	5	15	64	52.46	7	41	33.61
	6	12	76	62.30	9	50	40.98
	7	7	83	68.03	8	58	47.54
	8	8	91	74.59	17	75	61.48
	9	5	96	78.69	11	86	70.49
	10	4	100	81.97	7	93	76.23
	11	5	105	86.07	7	100	81.97
	12	8	113	92.62	10	110	90.16
	13	4	117	95.90	4	114	93.44
	14	4	121	99.18	2	116	95.08
	15	1	122	100.00	4	120	98.36
	17	0	0	0	1	121	99.18
	18	0	0	0	1	122	100.00
	TOTAL	122*			122*		

*. Note: 4 missing (code 99) in SA group, (N=126).
2 missing (code 99) in T group, (N=124).

Referring to the Cumulative % columns, the SA group has 74.59 percent with scores less than or equal to 8 (0-8) whereas the T group has only 61.48 percent with scores ranging from 0 thru 8.

p. See Table 1-10, p.109 , Cumulative Distribution Of Rotter's Test Scores In SA And T Groups, and Table 1-10, Figure 1-1, p.110 , (constructed from the cumulative percentages in Table 1-10. Given are the distribution of Rotter Test Scores in the SA and T groups.

Figure 1-1 clearly shows that the SA group tends to have lower Rotter test scores (its cumulative distribution is shifted to the left). Or, the results show that more subjects are internally controlled in the SA group, 74.59 percent compared to 61.46 percent in the T group.

TABLE 1-10

CUMULATIVE DISTRIBUTION OF ROTTER'S TEST SCORES IN SA AND T GROUPS

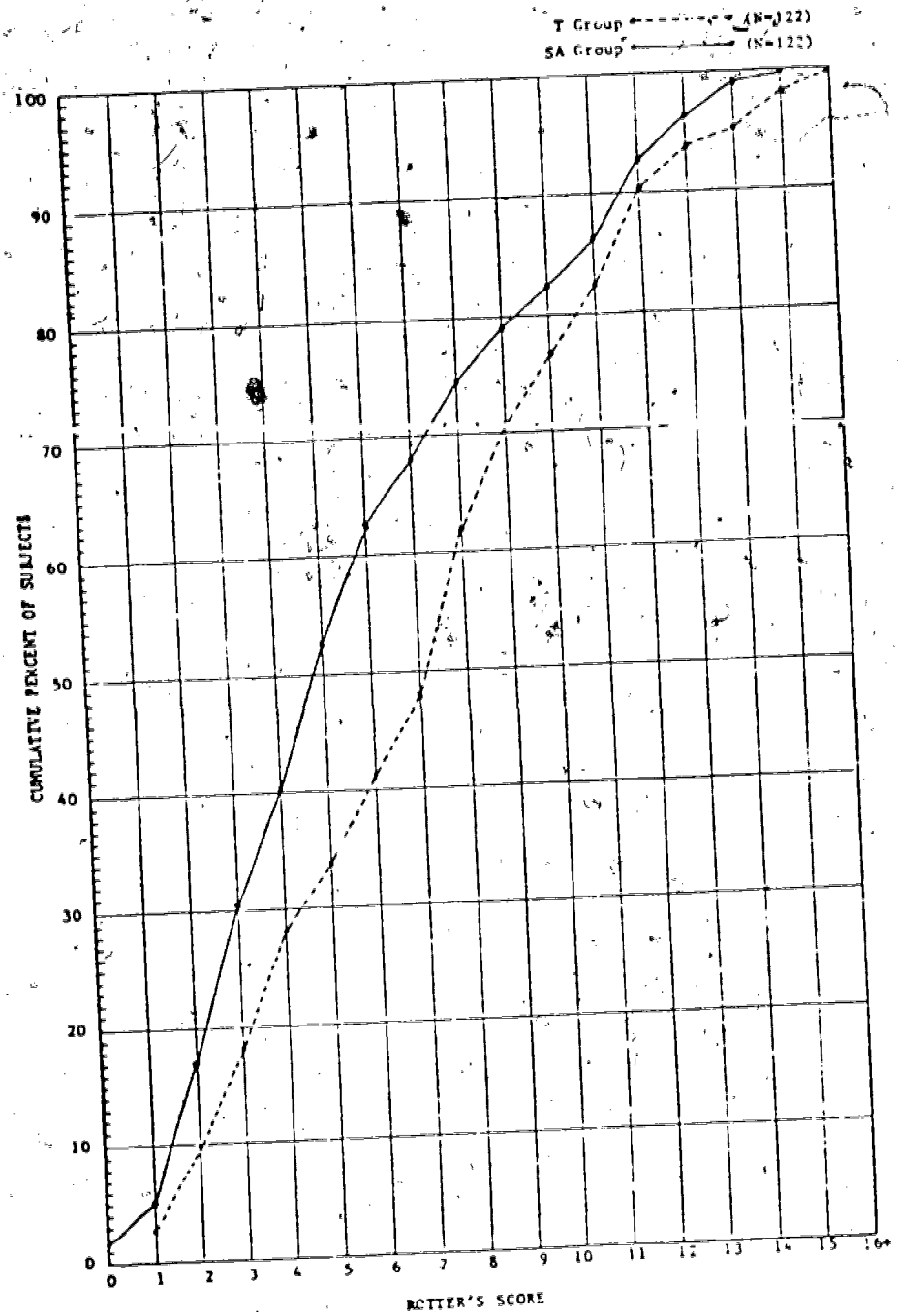


FIGURE 1-1

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APPENDIX APPENDIX B

RAW SCORES: RAW SCORES OF BASELINE AND 6-MONTH BEHAVIORAL MEASURES
PRIOR TO PRIOR TO CONVERSION TO PERCENTAGES

APPENDIX B

RAW SCORES OF BASELINE AND 6 MONTH BEHAVIORAL MEASURES PRIOR TO CONVERSION TO PERCENTAGES

SYSTEMS APPROACH GROUP (Initial and 6 Month) N=126

COMPLIES WITH LAB AND ANCILLARY TESTS

Initial \ 6 Month	0 (blank)	Yes	No	
0 (blank)	0	0	0	0
Yes	0	124	1	125
No	0	1	0	1
	0	125	1	126

TAKES MEDICATION

Initial \ 6 Month	0 (blank)	Yes	No	N/A	Don't Know	
0 (blank)	0	0	0	0	0	0
Yes	0	106	0	3	0	109
No	0	5	0	0	0	5
N/A	0	3	0	9	0	12
Don't Know	0	0	0	0	0	0
	0	114	0	12	0	126

KNOWS DRUGS AND ACTIONS

Initial \ 6 Month	0 (blank)	Yes	No	N/A	
0 (blank)	0	0	0	0	0
Yes	0	77	3	0	80
No	0	24	7	3	34
N/A	0	3	0	9	12
	0	104	10	12	126

ADHERES TO LOW SODIUM DIET

Initial \ 6 Month	0 (blank)	Yes	No	N/A	
0 (blank)	0	0	0	0	0
Yes	0	78	3	0	81
No	0	27	5	0	32
N/A	1	12	0	0	13
	1	117	8	0	126

NUMBER OF CUPS OF COFFEE/DAY

Initial \ 6 Month	0 (blank)	1	2	3	4	5-9	10-19	20+	
0 (blank)	27	2	1	1	0	0	0	0	31
1	4	15	1	1	0	0	0	0	21
2	6	6	5	2	0	1	0	0	20
3	3	2	6	7	1	0	0	0	19
4	6	1	4	1	0	0	0	1	13
5-9	6	0	2	2	3	0	1	0	14
10-19	1	1	0	0	3	1	2	0	8
20+	0	0	0	0	0	0	0	0	0
	53	27	19	14	7	2	3	1	126

NUMBER OF CIGARETTES/DAY

Initial \ 6 Month	0 (blank)	1-10	11-20	21-40	41+	
0 (blank)	86	1	0	0	0	87
1-10	1	10	2	0	0	13
11-20	1	1	13	0	0	15
21-40	0	2	5	3	1	11
41+	0	0	0	0	0	0
	88	14	20	3	1	126

DECREASE IN TENSION

Initial \ 6 Month	0 (blank)	Yes	No	
0 (blank)	0	0	0	0
Yes	0	44	39	83
No	43	0	0	43
	43	44	39	126

TYPE OF PHYSICAL ACTIVITY

Initial \ 6 Month	0 (blank)	Sedentary	Light	Moderate	Vigorous	Strenuous	
0 (blank)	15	0	2	22	16	2	57
Sedentary	0	0	0	0	0	0	0
Light	1	1	1	4	4	1	12
Moderate	1	0	0	7	6	1	15
Vigorous	0	0	1	7	23	1	32
Strenuous	1	0	1	0	2	6	10
	18	1	5	40	51	11	126

FREQUENCY OF PHYSICAL ACTIVITY

Initial \ 6 Month	0 (blank)	Daily	Twice Weekly	Weekly	
0 (blank)	15	31	8	3	57
Daily	1	50	1	0	52
Twice Weekly	0	6	4	0	10
Weekly	2	3	1	1	7
	18	90	14	4	126

TRADITIONAL APPROACH GROUP (Initial and 6 Month) N=124

COMPLIES WITH LAB AND ANCILLARY TESTS

Initial \ 6 Month	0 (blank)	Yes	No	
0 (blank)	0	0	0	0
Yes	0	115	4	119
No	0	5	0	5
	0	120	4	124

TAKES MEDICATION

Initial \ 6 Month	0 (blank)	Yes	No	N/A	Don't Know	
0 (blank)	0	0	0	0	0	0
Yes	0	114	0	4	0	118
No	0	0	0	3	0	3
N/A	0	2	1	0	0	3
Don't Know	0	0	0	0	0	0
	0	116	1	7	0	124

KNOWS DRUGS AND ACTIONS

Initial \ 6 Month	0 (blank)	Yes	No	N/A	
0 (blank)	0	0	0	0	0
Yes	0	57	8	2	67
No	0	36	13	5	54
N/A	0	2	1	0	3
	0	95	22	7	124

ADHERES TO LOW SODIUM DIET

Initial \ 6 Month	0 (blank)	Yes	No	N/A	
0 (blank)	0	0	0	0	0
Yes	0	78	1	0	79
No	0	13	9	1	23
N/A	0	16	2	4	22
	0	107	12	5	124

NUMBER OF CUPS OF COFFEE/DAY

Initial \ 6 Month	0 (blank)	1	2	3	4	5-9	10-19	20+	
0 (blank)	16	0	2	1	0	0	0	0	19
1	6	13	1	0	0	0	0	0	20
2	6	2	11	2	1	0	0	0	22
3	1	1	11	9	4	2	0	0	28
4	3	1	4	5	7	1	0	0	21
5-9	2	1	0	1	3	4	0	0	11
10-19	2	1	0	0	0	0	0	0	3
20+	0	0	0	0	0	0	0	0	0
	36	19	29	18	15	7	0	0	124

NUMBER OF CIGARETTES/DAY

Initial \ 6 Month	0 (blank)	1-10	11-20	21-40	41+	
0 (blank)	87	1	1	0	0	89
1-10	1	5	1	0	0	7
11-20	0	1	11	4	0	16
21-40	0	0	1	10	0	11
41+	0	0	0	0	1	1
	88	7	14	14	1	124

DECREASE IN TENSION

Initial \ 6 Month	0 (blank)	Yes	No	
0 (blank)	0	0	0	0
Yes	0	30	30	60
No	61	2	1	64
	61	32	31	124

TYPE OF PHYSICAL ACTIVITY

Initial \ 6 Month	0 (blank)	Sedentary	Light	Moderate	Vigorous	Strenuous		
0 (blank)	25	0	4	28	9	0	66	66
Sedentary	0	0	0	0	0	0	0	0
Light	0	0	4	10	4	0	15	15
Moderate	2	0	4	13	11	0	27	27
Vigorous	1	0	3	1	8	1	14	14
Strenuous	0	0	0	0	1	1	2	2
	28	0	9	52	33	2	124	124

FREQUENCY OF PHYSICAL ACTIVITY

Initial \ 6 Month	0 (blank)	Daily	Twice Weekly	Weekly		
0 (blank)	25	28	10	3	66	66
Daily	2	33	0	0	35	35
Twice Weekly	1	12	5	1	19	19
Weekly	0	3	1	0	4	4
	28	76	16	4	124	124

APPENDIX C

COST MODEL FOR HYPERTENSION PATIENT EDUCATION

APPENDIX C

COST MODEL FOR HYPERTENSION PATIENT EDUCATION

HARDWARE	RESEARCH & DEVELOPMENT COSTS	OPERATING COSTS PER HOUR
3M Sound on Slide	$459.00	Only for developmental purposes.
Voice of Music Recorder/ Pulser	225.00	
TOTAL	$684.00	
SOFTWARE	**RESEARCH & DEVELOPMENT COSTS**	**OPERATING COSTS PER HOUR**
PACOMED Script (Advanced Organizer)	$194.00	$0.032
MEDFACT: General Info Hypertension	65.00	.011
PACOMED + BRADY: Low Sodium Diet	100.00	.016
PACOMED + BRADY: General Medications	100.00	.016
SUB-TOTAL	$459.00	$0.075*
HARDWARE	**INVESTMENT COSTS**	**OPERATING COSTS PER HOUR**
Sony Video Tape Player (3/4 inch)	$884.00	$0.147
Sony Video Tape Rebaiver	487.00	.081
Headphones	14.00	.002
Listening Center	13.00	.002
Maintenance	For each piece of equipment = 1¢/Unit Hour	.05
SUB-TOTAL	$1,398.00	$0.282*
TOTAL**		$0.36
ADDITIONAL TRACKS		
MEDFACT: Weight Control	$65.00	$0.011***
Smoking	$65.00	$0.011***
ADMINISTRATIVE COSTS		
Developmental	$454.00	
Typing & Reproduction	132.00	
Paperwork to Individualize Strategy		$0.09
SUB-TOTAL	$586.00	$0.09
TOTAL**	$2,443.00	$0.45

* Cost per hour of educational hardware and software use remains a constant whether one patient, ten patients, or twenty patients are given the instruction.

** Total costs rounded to the nearest cent.

*** Extra tracks to individualize as required, costs can be added as indicated.

APPENDIX C

DEVELOPMENT OF COST MODEL FOR HYPERTENSION PATIENT EDUCATION

The information used for hypertension patient education was based on the optimum level of baseline knowledge needed by every hypertensive. (The optimum baseline knowledge was determined by the physician assigned, PACOMED Project Director, PACOMED staff, and a representative number of patients with the disease.) Enumerated are the costs of the educational hardware, software, administrative and personnel expenses necessary to operate the learning strategy. The time involved to administer the baseline learning strategy was approximately 50 - 60 minutes.

EXPLANATION

Cost Model for Hypertension Patient Education:

1. Categories: Educational hardware, software, maintenance, administrative and personnel costs.

2. The research and development, investment, and operating costs of the educational hardware and software.

3. The computed cost per hour of the educational hardware and software. This required an estimate of the useful life of the educational hardware and software in terms of hours of operation. In this case, the estimate is that all of the educational hardware and software that was compared will last five years (minimum) or for 6,000 hours of operation. This was based on 30 hours per week, times 40 weeks per year for 5 years. Amortized for 6,000 hours of operation. (30 Hrs/Wk X 40 Wks/Yr X 5 Yrs= 6,000 Hrs.)

4. It is also estimated that repairs and maintenance for each piece of equipment would cost one cent per unit hour.[1]

5. Administrative costs are self explanatory, i.e., the developmental costs were based on the hourly wage of the PACOMED personnel involved in the validation process, plus the material costs.

6. See various sub-components. The total costs would depend on the various combinations used. For example, (Sub-total) educational hardware and software + (Sub-total) administrative costs + (Sub-total) personnel = total. For purposes of this study only the three main components were used: general information, low sodium diet, and medications.

[1] Johnson, S.R. and Johnson, R.B., Developing Individualized Instructional Material (Westinghouse Learning Press: Palo Alto, CA, 1970).

REFERENCES

Johnson, S.R. and Johnson, R.B. Developing Individualized Instructional Material. Westinghouse Learning Press, Palo Alto, CA, 1970.

APPENDIX D

LESSON PLAN FOR PROFESSIONAL STAFF

APPENDIX D

LESSON PLAN FOR PROFESSIONAL STAFF

1. INTRODUCTION.

a. PACOMED (Patient and Community Health Education Model) is a pilot project for the development and evaluation of patient and community health education. The overall purpose of this effort is to utilize non-professional personnel and appropriate educational technology in the task of meeting some of the needs of patients and community health education.

b. Objectives of study.

(1) To identify cost-effective, feasible ways of delivering patient education.

(2) To guarantee an important resource for the professional in fulfilling his/her patient education responsibilities.

(3) To help minimize the medical workload.

(4) To assure medical accountability in the patient education area.

(5) To improve medical management.

(6) To decrease patient recidivism.

(7) To enhance patient satisfaction.

(8) To assist the patient consumer to be an effective self-care agent.

c. Evolution of PACOMED.

(1) Protocol initiated January 1974.

(2) Study conducted under the auspices of

Health Care Studies Division
Academy of Health Sciences
Fort Sam Houston, Texas 78234

(3) Study monitor.

Ambulatory Care Division
Health Services Command
Fort Sam Houston, Texas 78234

(4) Site selection.

Outpatient Facility
DeWitt Army Hospital
Fort Belvoir, Virginia 22060

(5) Personnel.

(6) Interface with Family Practice.

d. Systematic assessment of patient education needs.

(1) Professional personnel.

(2) Potential patient consumers.

(3) Patient consumers (Family Practice Clinic and AMIC).

(4) Baseline for patient teaching currently being done.

e. Development Component: Description of the Prototype System.

(1) Location of the Patient Education Center.

(2) Self-instructional units.

(3) Multi-media approach.

(4) Expanded role of patient as self-care agent.

(5) Non-professional as health educator.

(6) Validated audio-visual programs.

(7) Pre-set behavioral objectives.

(8) Individualized programs.

(9) Observable goals.

(Note: Show briefing tape)

f. Formative Evaluation: Validation of instructional strategies.

(1) Topic selection.

(2) Content consultant.

(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 (30 subjects for every topic).

(9) Data collection.

(10) Revision

(11) Physician evaluation.

(12) Cost Analysis.

(13) Final staff evaluation.

2. STAFF DEVELOPMENT.

a. In order for any comprehensive medical system to be effective, the professional user must have a general knowledge of all components (patient education, in this instance) being offered.

(1) All newly assigned physicians, nurse clinicians, dieticians, and physical therapists will receive an orientation to PACOMED as soon as possible.

(2) All will receive an introduction to each patient education system being offered prior to utilizing the system for patient referral.

b. Procedure.

(1) Physician, nurse clinician, dietician, or physical therapist initiates request on special form.

(2) Patient gives form to receptionist, who routes it to PACOMED staff.

(3) PACOMED staff schedules patient and notifies him.

(4) PACOMED staff provides feedback information to physician, nurse clinician, dietician, or physical therapist.

(a) when patient completes program,
(b) when patient does not comply, and
(c) to include any difficulties patient has with program.

(5) Return visits will be scheduled at time of initial encounter.

(6) Patients to receive more than one educational package will not be scheduled to receive the second until completion of the first.

c. Systems utilized and number of visits required (minimum).

(1)	hypertension	two visits
(2)	diabetes	two, three, if on insulin
(3)	weight control	two
(4)	breast self-examination	one
(5)	vaginitis	one
(6)	family planning	one
(7)	child growth and devel.	one
(8)	low back pain	one

Note: only exception to above will be if patient does not reach competency level and must return for additional information or reinforcement.

all patients obtaining scores of 80 percent or higher on pre-test will not be required to see that portion of the learning package.

3. SUMMARY.

a. The patient learning center can be an efficient, cost-effective source of health education if we:

(1) refer all the patients needing health education,

(2) tell the patients what they can expect,

(3) tell the patients what we expect,

(4) have a general knowledge of all programs, and

(5) approach the PACOMED concept with a positive attitude.

APPENDIX E

COMMUNICATIONS MEDIA

APPENDIX E

COMMUNICATIONS MEDIA

1. INTRODUCTION.

Health care personnel are correct in being concerned about having ready access to rich and varied collections of patient education materials, equipment and services. They are beginning to understand how such resources influence both the nature and the quality of their patients' medical management.[1]

The term "medium" has many definitions, from a solution for mixing paints to a person who purports to make contact with the dear departed. In all of its meanings, however, a medium is something in the middle, between other things, and most often it is considered as a vehicle or instrument for making something happen. In instruction or in advertising, to mention two common examples of systems which use communication, media includes all the different kinds of methods and devices that these systems use to achieve their disparate ends.[2]

Communication media have frequently been confused in many people's thinking with communication aids, particularly in instruction. The main obstacle to the application of media to the patient education process is inability or unwillingness to acknowledge the full consequences of the fundamental changes that have occurred in communications.[3] As audiovisual materials have been successively introduced into the health care environment, they have been dealt with on the basis of aids to those who used them. They have not been conceived of as self-contained instruction, and utilization procedures have assumed the necessity of a professional health care worker to complete the instructional task. All audiovisual aids have been subsumed under the health care personnel and there rested the final decision in regard to use.[4] Although certain studies and some programs, notably in the Armed Forces, have indicated that audio-visual materials could be far more than aids, tradition has definitely prevailed.

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[1]Kucha, D.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, Washington D.C., 1973), 93-123.

[2]Bretz, R., A Taxonomy of Communication Media (Englewood Cliffs, N.J., Educational Technology Publications, 971), 5.

[3]Allen, W.H., "Intellectual Abilities and Instructional Media Design," A/V Communication Review, 1975, 23: 139-170.

[4]Levie, H.W. and Dickie, K.E., "The Analysis and Application of Media," In R.M.W. Travers (Ed.), Second Handbook of Research on Teaching (Chicago, Rand McNally, 1973), 858-882.

When newer methods, such as television, language laboratories, and programmed instruction (including computer assisted instruction) were developed, attempts were made to make them conform to the traditional pattern. However, experience with new technologies of instruction indicates that rather than being aids, such technologies can be treated as self-contained instruction, permitting the user to assign with confidence major instructional tasks to mediated instruction. Concomitant with these developments has been the growing incorporation of traditional audiovisual materials, particularly films, into large packages intended not only to carry a major share of the instructional burden, but also to establish the entire instructional format.[5] While it is possible to reduce technologies of instruction to aids, it is apparent that their proper and intended use breaks the traditional instructional pattern. Mediated instruction does not extend the health care instructor, it represents alternate ways of achieving instructional goals. Programmed instruction, for example, is not an aid to health care instruction in the same sense as is the chalkboard or the overhead projector; it is designed to teach behavioral objectives set forth by another instructor, the programmer.[6]

While communication media cannot take over all the health education functions now performed by a good health care provider, they have enormous potential for increasing both the quality and quantity of available health education. A few generalizations can be made regarding the advantages of these resources:

(1) They can relieve the health care workers of repetition, thereby freeing them to use their time more creatively. It is inefficient to use the time of physicians and other health care workers to repeat basic instructions to a patient when various types of media and accompanying instructional systems can do the task equally well or better.

(2) Technology can free health education teaching from its stereotype. Through the use of films, videotapes, and storage retrieval systems, patients have access to better and more flexible instructional resources.

(3) Technology can raise the quality of patient education by providing more and better instruction. It can present information to patients who have varying abilities and allow all of them to learn at their own rate of speed. These resources have not been fully exploited in the task of meeting needs of patient education.

a. Purpose.

To identify and evaluate the most cost effective and efficient media in which to transmit the validated learning systems.

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[5]Ibid.

[6]Kanner, J.H. and Rosenstein, A.J., "Television and Army Training: Color vs Black and White," A/V Communication Review, 1960, 8: 243-252.

b. Background.

When video tape first became available, in 1956, it started a revolution in the television industry which was very far-reaching in its effects. Television has been primarily a full telemedium which produced its own software, even though films had always been an important ingredient of television programming and the broadcast of kinerecordings had been increasing. With video tape, there seemed little advantage in doing much live programming anymore. Television changed rapidly from a telecommunication medium to a transmission medium. The chief recording medium transmitted continued to be sound film, but video tape soon became a close second.

In instructional television, where the technical costs of equipment and recording stock are proportionately larger budget items than they are in entertainment production, video tape provides a more feasible medium than film for many purposes. This has been increasingly true with the development of inexpensive, portable video tape recorders. At the present writing, there are about 40 manufacturers of protable video tape equipment. From the 1956 cost of $75,000 for the first VTR machines that appeared on the market, the cost of equipment providing comparable picture quality dropped to around $25,000, and equipment designed to somewhat lower quality standards went down to $12,000, then $8,000, then $3,000. In the middle sixties, VTR machines costing under $1,000 appeared in department stores for sale to the home market. The outlook is that the cost of such machines may eventually be reduced to under $750. Standard broadcast machines use 2-inch tape; the less expensive models generally use 1-inch, 3/4-inch, or 1/2-inch tape. Two Japanese firms introduced 1/2-inch and 3/4-inch video tape in cassette form during 1969. Since video recorders are only slightly more complicated to operate than audio-recorders, and the tape is similarly reusable, video tape now ranks with audio tape as a leading home--or local--production medium.[7]

Audio-still-visual media are capable of all the representations of information that class I media can provide, except that they cannot represent visual images in motion. However, they have the advantages of being very much less expensive and of having simpler hardware, simpler production procedures and simpler transmission problems.

Still-picture television is the most promising unexplored telecommunication medium. It appears to approach both television's universality of use and radio's inexpensiveness.[8]

[7] Op. Cit. Bretz, 101-107.

[8] Ibid.

2. OBJECTIVES.

a. To identify a medium that would maximize the Army's (and the AMEDD's) existing resources;

b. To identify a medium which would be acceptable for adult education;

c. To identify a medium that would be compatible with the systematic approach to designing instruction;

d. To identify a medium which would be the most successful for relaying objectives that are mostly cognitive, but that was relatively effective with skill and affective objectives;

e. To identify a medium that has acceptable picture and sound quality;

f. To identify a medium that would allow for ease of operation, portability and have minimal maintenance;

g. To identify a medium that would have medium to low duplication costs.

3. METHODOLOGY AND FINDINGS.

a. Procedures.

(1) In July 1976 the final report for the Strategy For Instructional Systems Design Process and Formative Evaluation was submitted. In that report under Findings, the results of testing three different types of educational hardware were given. In essence the findings were: the PACOMED staff found the video cassette format was cost-effective and reliable. Additionally, the playback unit allowed for: (a) ease of operation, (b) could be reversed for review without losing a portion of the program, (c) was very quiet during operation, (d) was less expensive to reproduce a program than the other formats, and (e) could be a cost savings since most Army hospitals already have the video playback units available to them.[9]

(2) Following is a description of the selection of the "messenger to carry the message" (the format and/or media selection).

[9]Kucha, D.H. and Everett, S.H., Strategy for Instructional Systems Design Process and Formative Evaluation (Final Report, July 1976, HCSD, AHS, FSHTX), 13-15.

4. DISCUSSIONS.

a. Utilizing the Army's Existing Resources.

(1) The Army started using video units in late 1970 (Recommendations were derived from a study conducted by the Combat Training Board 1970). Then after standardization on 3/4 inch tape by several major companies, the Army did their "major buy" between the years of 1971 and 1974. Because of the Army's enormous investment in studios, equipment, etc., this format will be used until at least 1985. Consequently, in light of cost effectiveness the format was basically predetermined prior to the conception of project PACOMED. In most military installations and hospitals other than lectures, television is the primary medium of instruction. Therefore in this area, no major investments would be needed to utilize the 3/4 inch videocassette format for patient education.[10]

b. Adult Education.

(1) America leads the world in Adult Education. Almost any issue of any popular magazine or Sunday supplement will provide advertisements for a dazzling display of self-improvement courses. The total number of adults occupied in adult education is conservatively estimated to be half of our population. This apparent thirst for self-improvement can be used to advantage by health planners and providers alike by giving the consumers the health information and education they are seeking and asking for. One does not need to be a Jules Verne to grasp the possibilities and potential outlets for vidiocassettes. In fact, in the not too distant future the patient education programs can be given to the patients to play in the covenience of their homes. Videocassette (and soon vidiodisc) technology has the power and the mode to spread patient education and information more widely and make its surface attractions even more interesting to the general public through proper programming and advertising. Also, through evaluation hazards may be prevented, and losses may be anticipated. It requires, first, prescience and second, organization, before the technology of videocassettes inundates the consumer patient education market, that is, soon. Videocassettes also represent a potential liberation for the health care provider by being able to provide accountability in the area of health education to every patient for a nominal cost.[11]

[10] Telecon, 23 February, 1977, Major Russell, Director of the United States Army Audio Visual Activity, Pentagon, HDQ's, Dept. of the Army.

[11] Gordon, G.N. and Falk, I.A., Videocassette Technology in American Education (Englewood Cliffs, N.J., Educational Technology Publications, 1972), 106-119.

c. Compatability with the Instructional Systems Design Process.

(1) When used for patient education, videocassette would require a clear distinction between the delivery system and the development system. This distinction is necessary because the initial instructional content needs to be stored in a modifiable medium. (PACOMED used primarily the 3m Sound on Slide for developmental purposes). A completely separate system with easily modifiable storage allows for development, evaluation and revision of the instructional content. Only after the developmental process is completed can the instructional content be recorded on a master video-tape. The master tape can then be used for duplication purposes.[12]

(2) Implementing these kinds of systems will not be a matter of simply waiting for the appropriate hardware. The major feasibility questions do not revolve around the communications technology, but around an instructional technology. To be really cost-effective, videocassettes must be duplicated in reasonable numbers (economy of scale); and, therefore, a reasonable number of health care facilities, professionals and patients must agree to use them. This acceptance will not occur unless the instructional content put on the videocassette really works well. And it's not likely to work well unless it was developed and tested by people who have a pretty good idea of how to do the job right the first time. Unfortunately, instructional developers of such caliber are very few in number. Most videocassettes have been developed as if they were to be given as class lectures, and as a result they haven't turned out to be much of an improvement over presentations that they were designed to replace.[13]

d. Relaying Instructional Objectives.

(1) The thinking in education has been changing its direction. The great body of research in the early years, generated seemingly in the hopes of finding some magical quality of the television medium itself that was independent of content and teaching strategy, came up with the unanimous but disappointing verdict: No significant difference. It was still the same lock-step instruction--presentation of information--with learning measured by the same tests. Mainly because objective tests were used, it was only cognitive learning that was being investigated. Instruction in skills was considered inappropriate to television, or beyond its capabilities. The achievement of affective objectives was considered totally beyond measurement.

[12]Carl, D.R., "Instructional Development In Instructional Television," Educational Technology, May 1976, 16 (5): 10-24.

[13]Ibid.

(2) Today the thrust is more in the direction of individualization. In patient education emphasis is upon the patient assuming more responsibility and to assume an active role for managing his own disease, within the range of choices allowed by the health care facilities and health care providers.

(3) The new approach reduces the role of lesson presentation by the health care provider, and tends to emphasize other roles for health care provider and patient alike. Interestingly the technology of television has now become better adapted for use in these other instructional activities, such as skills learning and can be used in the individual mode as well as "instructional TV" that was researched so widely some two decades ago. The technology has vaulted ahead of the research conclusions.[14,15]

e. Videocassette and Cartridge Capabilities.

(1) Names.

(a) MAGNETIC TAPE: (1/2 inch or 3/4 inch tape); Ampex (Instavision); Avco (Cartrivision); Japan Victor; Panasonic; Philips (VCR); Sony (U-Matic); and 3M Company.

(2) Compatibility and Standardization: No possibility among the several systems except for Sony, JVC, and 3M, who have agreed on 3/4 inch tape cassette format. The other companies have a 1/2 inch reel to reel.

(3) Recording Potential: Yes, instant.

(4) Cost of Playback Equipment: Medium to high, about $1,000 to $1,500.

(5) Cost of Recording Medium: High, about $18,000 to $22,000.

(6) Video Picture Quality: No single system has an inherent substantial picture quality advantage over any other using broadcast standards as a reference.

(7) Reliability of System: Average, 200 to 300 runs. It is dependent on the operator and preventive maintenance.

(8) Ratio of Playing Time to Duplication Time: No high speed duplication.

(9) Cost of Duplication of 12 Copies: Low.

(10) Cost of Duplication of 500 Copies: Medium, $20.00/hr.

(11) Cost of Duplication of 10,000 Copies: Low.

(12) Ability Erase Reuse Record Medium: Yes.

[14]Bretz, R., "In School Television and the New Technology," Educational Technology, May 1976, 16 (5): 50-53.

[15]Op Cit., Gordon and Falk, 150-153.

(13) Playing Time: All systems may, one way or another, achieve equivalent playing time up to one hour.

(14) Single Frame Storage Potential: [redacted], can only freeze in place.

(15) Video Playback Pickup Method: Helical scan magnetic head pickup.

(16) Major Market Control: Consortia of US and Japanese.

5. CONCLUSIONS.

Until approximately 1985 the videocassette format is the most cost effective and efficient medium (for the Army) in which to transmit the validated patient learning systems.

6. RECOMMENDATIONS.

a. By 1980 thought should be given to evaluating the use of videodiscs for the patient education format. The hardware advantages are already superior to the videotape players. The optical videodiscs are free of the wear factors characteristic of videotape players, provide very high density of information storage, and compared with the prior art, are delightfully easy on the pocketbook: a player will cost about $500.00 and the discs should cost about $2.00 to $5.00 each, depending upon program material. In addition the cost of duplication drops quite rapidly with any real volume (See Table 1, Typical Costs of A/V Reproduction Equipment and Table 2 , Per Copy Costs for a One-half Hour Motion Visual Program, p.140). And over a five year period by using videodiscs instead of videotapes the average annual cost can be reduced by 42 percent. It is important to realize that the economic advantage of videodiscs is due to their durability and ruggedness, as well as to their low purchase costs. Videotape cassettes are good for two to three hundred plays. With optical videodiscs, fingerprints, dust and surface scratches can't penetrate the plastic "sandwich" that protects the inner reflective surface. When the disc is played, its outer surface, dust, scratches and all, is outside the focal range of the microscope objective. The player can show the same frame, hour after hour, without any degradation of the television image.[16]

b. Videodiscs will set new standards for inexpensive large-scale media distribution. Educational use of videodiscs for the presentation of conventional linear motion pictures will probably catch on like "wildfire". Non-linear, interactive applications will make a real contribution to the quality of education, but not until instructional development becomes a matter of production, instead of experimentation.

[16]Schneider, E.W., "Videodiscs, or the Individualization of Instructional Television," Educational Technology, May 1976, 16 (5): 53-59.

TABLE 1

Typical Costs of AV Reproduction Equipment

1.	8mm video player and monitor	$1,592.00
2.	3/4" videotape cassette player and monitor	1,500.00
3.	Optical videcdisc player and monitor	900.00
4.	16mm projector and screen	825.00
5.	8mm projector and screen	554.00

TABLE 2

Per-copy Costs for a One-half Hour Motion Visual Program

MEDIUM	QUANTITY			
	1	10	100	1000
16mm film	$417.00	$108.00	$84.52	$66.17
8mm film	285.00	66.00	52.00	44.76
3/4" videocassette	70.00	31.00	21.25	18.50
Videodisc	450.00	46.00	3.01	.63

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APPENDIX F

NON-PROFESSIONAL PARAMEDIC AS HEALTH EDUCATOR

APPENDIX F

NON-PROFESSIONAL PARAMEDIC AS HEALTH EDUCATOR

1. INTRODUCTION.

The notion of efficient manpower utilization centers on the appropriate use of skilled personnel. In the health field, where physician compensation is extremely high, inappropriate use of physician services results in inefficiency, lower productivity, and ultimately higher costs to the consumer. Currently, inappropriate use of physician services is a frequent occurrence, a physician's level of medical proficiency is not required for many of the services performed by physicians today. This situation continues to exist for at least three reasons. One is the very limited supply of paramedical personnel available due to the only relatively recent discovery of their potential in the health field. A second is that restrictive licensure legislation still applies to paramedics, either by limiting their activities or by health providers refusing entirely to sanction their use. Finally, physician resistance to paramedics is often strong for a variety of reasons, including economic self-interest, the role a physician sees for him/herself (specialist or generalist), and the problem of medical responsibility. Nevertheless, the cost control potential of paramedics remains high. Appropriate use of paramedical personnel can help to alleviate shortages by delegating to paramedics the simple, more routine physician tasks and freeing the physician to handle patients more in need of their highly skilled level of training. Such a physician-paramedic tandem ought to reduce fees for basic services due to the lower compensation levels of paramedics, or, if applied in an ambulatory setting, increase the comprehensiveness of benefits, which if properly utilized simply amounts to another form of cost control.[1,2]

a. Purpose.

In order to improve health and health care services, ongoing systems of health education must be planned, implemented, and documented. The maintenance of health and the prevention of disease can be achieved by a cooperative effort between knowledgeable and motivated consumers and health care personnel. One facet of the overall purpose of this effort was to utilize non-professional paramedical personnel and appropriate educational technology in the task of meeting some of the needs of patient and community health education.[3]

[1]Decker, B. and Bonner, P., PSRO: Organization for Regional Peer Review (Cambridge, Mass, Ballinger Publishing Company, 1973), 134-135.

[2]Weckwerth, V.E., "How to Use and Misuse Average Length of Stay Data," Modern Hospital, October 1965, 105: 114-117, 176.

[3]"Health Education: Role and Responsibility of Health Care Institutions," Statement, American Hospital Association, Chicago, Illinois, 1975.

b. Background.

Until recently there has been no way for physicians, regularly, to provide education for their patients across a wide spectrum of medical and surgical practice or both except to do it themselves. And in a reasonable proportion of cases they were probably not able to do it entirely satisfactorily, for a variety of reasons. It seems obvious that the physician's office is a logical base for much patient education. Only a small proportion of the patients a doctor sees in the ambulatory setting have to enter a hospital.

But let's face facts. Physicians are seldom suited to carry out all the education themselves. They are not really trained to play the ongoing, supporting role required. Even if they are a good communicator they don't have enough time to do the job thoroughly, and at the end of the day they will probably not cover the essential information as completely as they would have earlier in the day. Even when individual patients know the right questions to ask (which takes some education in itself), they are often afraid to ask them, either because they believe the doctor is too busy or they don't want to appear ignorant.

Physicians want to remain in control of their patients' education, and of course, they should. They can direct it and they can prescribe its content, but they should not attempt to do all of it themselves. Or, as Dr. Robert E. Canfield of the College of Physicians and Surgeons at Columbia University has written, "While the physician must play a very special role in helping the individual patient apply this knowledge to his specific disease situation, the physician should be supplied with some teaching assistance to promote better communication of information to the patient and also to lower the labor cost of the process."[4]

2. OBJECTIVES.

a. To utilize the non-professional paramedic in the role of health educator.

b. To recommend the prerequisites for a potential non-professional paramedic health educator.

c. To identify the functions and tasks that could serve as guidelines for the role of a non-professional paramedic health educator.

d. To determine the cost saving of a non-professional paramedic health educator.

[4]Jamplis, R.W., "The Practicing Physician and Patient Education," Hospital Practice, October 1975, 93-99.

3. METHODOLOGY.

a. Overview.

(1) One aspect of the study plan called for the utilizing of a non-professional paramedic as health educator. It was suggested by the project director in the original study protocol that, if possible, the technician should have a non-professional paramedical background, i.e., 91C or LPN. This was necessary in order to study the feasibility of having a non-professional coordinate the utilization of the patient education packages once the instructional models were developed. If the results of utilizing this caliber of personnel proved positive it would save professional time and be much more cost-effective. Further, it was hypothesized that the individual selected to develop the role would possess qualities needed for the evaluative aspect of the study, but qualities not necessarily needed to manage a patient learning center. Therefore, a mature 91C, E/7, was selected.

b. Procedures.

(1) In order to prepare the non-professional paramedical health educator to assume and critically develop the role, a series of logical, systematic planned experiences were accomplished. The potential health educator joined the staff April 1975, after the assessment phase was completed, physical area decorated and furniture and equipment ordered. Consequently, the first three months were spent in learning about the concept, study plan and study outcomes completed up to that time. From July of '75 to July of '76, the eight learning systems were developed, revised, and validated. During the instructional systems development and formative evaluation phase the study plan called for developing the health educator's role and revising it (adding or deleting functions) until a point was reached when it was felt that the 91C could assume the full responsibility. In the year's time, the health educator was coached, given selected reading materials, continuing education and an array of simulation exercises. Additionally, he assisted with the patients used for the validation process, and gained in competence with each succeeding system.

(2) Within six months of opening the learning center, by Dec '75, it became apparent that one health educator was not enough due to the additional evaluation functions required (i.e., collecting data on the control group at Ft. Myer, telephoning subjects for follow-up and the clerical and administrative duties associated with studies). And, as was mentioned earlier, one of the primary thrusts of Project: PACOMED had been to improve cost-effectiveness in the utilization of non-professional personnel for patient education. It was postulated that the technical-mechanical aspects could be administered by an E/4 or E/5. In practice, it became apparent that a well-qualified individual of this low rank could carry out many of the functions that were being performed by persons

of higher rank and education. In April 1976, an E/5 was added to the staff enabling this element of the protocol to be implemented and evaluated.

4. FINDINGS (and Related Discussions).

a. Prerequisites.

(1) Educational Qualifications

(a) Graduate of the 91C20, Clinical Specialist course.

(b) The scope of instruction for the 91C20 includes: Military publications and correspondence; medical records and reports; interpersonal relations; techniques of instruction; techniques of management; Army medical field service; emergency medical and dental care; medical management of mass disaster casualties; military preventive medicine; introduction to medical science; pharmacology and patient care; concepts of patient care; medical surgical nursing; mental health and mental illness, care of obstetrical patient and the new born; care of the pediatric patient; dispensary procedures; surgery in the Army dispensary and health facility; and clinical experience.

(c) Length: 40 weeks.

(d) Prerequisites to attend the 91C20, Clinical Specialist course.

(e) High school graduate or the equivalent as measured by GED tests. Must have credit for high school level course in mathmatics or have a standard score of 45 or higher in GED test 5, high school level. An interview by and written recommendation from an Army Nurse Corps officer or, when not available, a Medical Corps officer, as to the applicant's interest in patient care, potential and physical suitability for the course. Standard score of 100 or higher in aptitude area GT or ST. Must have sucessfully completed 91B10 training conducted at the AHSUSA, and have a minimum of 18 months clinical experience. Twenty-four months or more of active duty service remaining after completion of the course. No security clearance is required.[5]

(2) Physical and Behavioral Characteristics.

Be well groomed, possess military bearing, have normal weight, be a non-smoker, and moderate to light in alcoholic and caffeine consumption. It is desirable that the health educator be a role model and help teach individuals how to cope with medical problems that are self-induced or caused by factors existing within the environment. More often than not the health educator's efforts were directed toward attacking self-imposed "diseases of choice", including smoking, alcoholism, and nutritional abuses that may ultimately lead to hospitalization.

[5]Army Medical Department Course Catalog, Fiscal Year 1976 (1 Jul 75--30 Jun 76) and Fiscal Year 7T (1 Jul 76--30 Sep 76), 6-7, 6-10.

(3) Pay Grade--E/4 or E/5.

(4) Tour.

A minimum stabilization tour of two to three years. This would allow for job security, satisfaction, and continuity of care for the patients.

(5) Training Time.

Based upon the PACOMED's staff experience, it is considered that five working days in a patient learning center are necessary. This aspect would include the following functions: (a) operating the learning center, (b) counseling, (c) maintaining records, and (d) coordinating activities. Of course, much is contingent upon each individual's background and prior educational preparation. Therefore, it is suggested that if a centralized learning center is ever developed for preparing these health educators that some type of competency testing be done. For instance, it is not uncommon for some college graduates to refuse or be denied a commission for various reasons, many of whom become 91C20s. It could be that an individual of this caliber (especially if she or he was a former teacher) would need very little in the way of new skills, but only need to learn how to implement the standardized procedures. On the other hand, it could be possible that a borderline individual would meet the prerequisites and screening procedures. This person would undoubtedly need additional training time.

b. Operating the Learning Center.

(1) Because the validated learning systems have accompanying directions and flow charts for their administration, the tasks involved in operating the learning center are minimal and elementary in nature. The tasks that were identified are as follows: (a) Prepare learning center environment for learning systems presentation: 1) Insure that audiovisual equipment is operational, to include lighting and sound system, 2) Prepare individual folders for each patient. The folders contain the necessary forms for each system, 3) Insure that pencils and paper are at each carrel. (b) Insure that forms for each system are properly completed by the respective patients. (c) Prior to showing the advanced organizer give the patient a brief description of PACOMED and the educational program to be received. (d) Provide, collect, and score pre/post tests. (e) Show audiovisual programs. (f) Assist patients as needed. (g) Maintain learning center in readiness for the following sessions. (h) Maintain form level for each system. (i) Provide first-echelon maintenance on the audiovisual equipment. (j) Conduct monthly equipment inventory and maintain inventory records. (k) Insure that the learning center is kept in a high state of cleanliness. (l) Maintain an additional set of tapes for each system in case of damage to the original. (m) Insure that the learning center and adjacent facilities are properly secured at all times.

(2) Seventy-five percent of the health educator's time was devoted to the function of operating the learning center. All of the above tasks are ongoing and not likely to change with this prototype. Forms completed by the health educator and test scoring were done while the patients were viewing the audiovisual programs. This feature maximizes the health educator's time, and eliminates delay and unnecessary waiting for the patient.

c. Counselor.

(1) The health educator must establish rapport with each patient and family member. An open line of communication must be developed and maintained during the entire series of sessions. The initial interview is important in that the patient must feel he or she has been accepted and that there is a sincere desire for the health educator to help. The health educator worked with each patient on a personal basis. The patient was assisted to develop a sense of accomplishment initially in order to sustain motivation.[6,7] The tasks that were identified are as follows: (a) Review consultation sheets. (b) Interview patients to find out their needs. (c) Collect baseline data. (d) Determine deficiencies. (e) Develop a plan of action. (f) Provide explanations or reinforcement. (g) Encourage compliance to treatment plan. (h) Give feedback to the health care provider as needed. (i) Collect follow-up data. (j) Terminate sessions when appropriate. (k) Return consultation sheet to health care provider, denoting patient's progress.

(2) In addition the elements of good human relations should be mastered. These include: respect, acceptance, objectivity, protection, observation, evaluation, listening, communication, and action (interpersonal relations are given in the scope of instruction for the 91C20). Only when the health educator has learned successful interaction with the patient can he or she achieve their full potential in the role.[8]

[6]Dorroh, T.L., Between Patient and Health Worker (New York, McGraw-Hill Book Company, 1974), 224-251.

[7]Teachey, W.G. and Carter, J.B., Learning Laboratories (Englewood Cliffs, N.J., Educational Technology Publications, 1971), 13-26.

[8]Dorroh, Op. Cit., 251.

(3) Ten percent of the health educator's time was devoted to counseling.

d. Records Management.

(1) The health educator also serves as a record-keeper in maintaining accurate and adequate reports on each patient.

(2) A chief criticism of the patient learning center could be that it entails extensive record-keeping because of the personalized learning practiced and the necessity to account for this learning. Record-keeping is a very important factor to the success of the patient learning center. It was necessary, therefore, to devise procedures that kept record-keeping to a minimum.

(3) The health educator maintains a checklist for each system to insure consistency, individualization, standardization, quality assurance and accountability for each patient.

(4) The patients' personal files and cumulative records were maintained under the same regulation that all patients records are kept, AR 40-400, change 4, 1 Nov '76, MEDICAL SERVICES PATIENT ADMINISTRATION.

(5) The records were stored in locked file cabinets in the health educators' office(s). (In addition the offices had security locks on their doors.)

(6) The tasks for the record-keeping are covered in sections b, Learning Center Operator and c, Counselor.

(7) The original itemized forms for each system appear in the final report for the Formative Evaluation Phase of PACOMED, July 1976.

(8) The time spent in management of records was five percent.

e. Coordinator of Activities.

(1) The tasks enumerated in this section are not to be confused with program planning. The main focus here were the managerial functions associated with the ongoing activities of the learning center.

(2) The tasks identified that the 91C20 could successfully perform were: (a) Maintain accurate calendar of events, to include: scheduling patients, attending meetings and briefings that were germane to the operation of the learning center. (b) Insure that activities centered around the learning center were coordinated to eliminate confusion and provide optimum time utilization. (c) Establish priorities insuring that activities not directly involving the patient were secondary in nature. (d) Give initial staff orientation pertaining to the learning center. (e) Schedule ongoing orientation for newly assigned personnel. (f) Periodically reinforce professional staff. (g) Maintain liaison with professional users. (h) Give briefings to visitors of the learning center.

The time consumed in this function was approximately ten percent.

(3) Because of the evaluative nature of the study it was imperative that the health educator control the scheduling of the patients. However, it is suggested that for the future the health educator provide a monthly calendar to the central appointment section that would include times and dates for scheduling the learning systems. This could save the health educator half of the ten percent that was being spent in the task.

(4) One of the most important tasks of the health educator is staff (user) orientation. In order for the learning center to be successful and utilized to maximum potential the professionals should refer all patients that need health education to the learning center. To facilitate the process the professionals need to understand the services being offered, know how to refer patients and most importantly be familiar with the contents of the learning systems. Only in this way can the communication between the consumer and health care provider be maximized and economy of medical resources and minimization of medical workload be realized.

f. Program Planning.

(1) During the year that the learning center was fully operational, July '76 to Aug '77, it was felt that perhaps the non-professional health educator could also function in the area of program planning. It was found that this was not the case.

(2) In order to successfully formulate and gain acceptance of new policies in an organization, a person must have knowledge of the decision-making structure and how it operates. The larger and more diffuse organizations present complicated problems of analysis in terms of identifying the leadership and in using influence. To successfully maneuver through such complexities, in order to obtain program support across the many networks, requires competencies in analytical and organizational areas.

(3) Program planning requires skills applicable to all settings. These include knowledge of how to work with committees in the selection and recruitment of members; determination of goals; agenda building; development of appropriate background information; report writing; follow-up procedures; and solicitation of feedback.

(4) The program planner should possess facilitation skills necessary for effective problem analysis, decision-making, and problem solving. These processes require a person who is creative and receptive to input from many sources.

(5) Implied in the above are written and verbal communications skills as well as an understanding of ways interpersonal relationships are established and maintained. It is also important to have a knowledge of the health field in terms of the patterns of organizations, professional orientations, and role relationships and a knowledge of the culture of hospitals.[9]

(6) Finally, professional assertiveness is essential in order to introduce new concepts with broad-based support. Additionally, in the military because of the rank structure, there are some tasks enlisted people are "not allowed" to do even if they possess the ability. This became very apparent when the health educator for PACOMED attempted to initiate a feature story and follow-up in the Fort Belvoir newspaper, The Castle. At other times, people were not so blatant, but the nuances were apparent. The project director was approached on numerous occassions throughout this phase of the study with "Don't you think it would be better for an officer to present this?"

g. Costs.

The cost effectiveness of the prototype will be addressed in a separate report. However, it can be noted that by using an E/4 or E/5 in the position of health educator the cost in labor was 50 percent or less than by using an O/3 or O/4 Army Nurse Corps officer or 300 to 400 percent less than by using a Medical Corps officer O/4 or O/5 based on their respective hourly wages for mean time in grade. That doesn't take into consideration the advantages or benefits of the prototype in addition to the savings.[10]

5. CONCLUSIONS.

a. A graduate of the 91C20, clinical specialist course should be considered as the potential (non-professional paramedical) health educator for the PACOMED prototype.

b. The health educator is qualified to perform the functions of: learning center operator, counselor, records manager, and coordinator of the learning center activities.

c. The health educator should not function in the role of program planning.

d. The cost control potential of utilizing a non-professional in the role of health educator remains high.

[9]Patient Education Workshop: Summary Report, U.S. Department of Health, Education, and Welfare; Public Health Service, Center for Disease Control, Atlanta, Georgia, 1976, 8-9.

[10]Kucha, D.H. and Everett, S.W., Strategy for Instructional Systems Design Process and Formative Evaluation, Final Report, HCSD, prepared for HSC (HSA-PA-A) FSHTX, July 1976, Appendix 9.

e. Added are the advantages of increasing the comprehensiveness of benefits to patients and professional users alike.

6. RECOMMENDATIONS.

a. The feasibility of utilizing civilian LPN's rather than 91C20's as health educators should be given first priority. This would eliminate prerequiste training costs, cost of military benefits, retaining the person in the system, career options, and the wage paid the LPN would ultimately be lower.

b. The feasibility of utilizing a 91B10, basic medical specialist as health educator should be studied.

c. The chief, occupational health and environment (Army Health Nurse) or chief, nursing education and training (Educational Coordinator) should be considered for overall supervisor, coordinator, budgeting, and program planner for the individual MEDDAC learning centers.

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Army Medical Department Course Catalog, Fiscal Year 1976 (1 Jul 75-30 Jun 76) and Fiscal Year 7T (1 Jul 76-30 Sep 76), 6-9, 6-10.

APPENDIX G

PHYSICAL FACILITIES

APPENDIX G

PHYSICAL FACILITIES

1. INTRODUCTION.

The systematic human engineering of customized learning centers and spaces remains as a challenge to educators, health care workers, and vendors. The state of the art in learning environments and carrel design shows contrasting opinions on some very fundamental issues.[1]

Learning center and carrel design is not yet based on soundly derived empirical principles, but rather implements the untested notions of the persons planning or buying customized learning centers and carrels. Performance, it is assumed, is influenced by the degree to which the physical facilities fit the needs of the patients.[2] Factors which may impact on the design of patient learning centers are discussed, and recommendations for future AMEDD patient learning centers are given.

a. Purpose.

The learning center and carrels offer a specialized learning area that facilitates the activities for patient learning.

Use of the learning center and carrels as the focus of the instructional effort is based upon a family of philosophical 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.[3] A patient centered philosophy of instruction places the responsibility on the patient for his own performance and usually permits some level of patient self-pacing.[4]

Instructional activities designed to meet clearly stated and well defined objectives are modularized and built upon previously achieved goals. Presentation of information in multiple sensory modalities is often included as in the requirement for patient involvement in learning by doing.

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[1]Ellsworth, R.E., Academic Library Buildings (Boulder, CO, The Colorado Associated University Press, 1973).

[2]Canter, D., "Office Size," Architects Journal, 24 April 1968, Sfb (92): As3: UDC 725-23-301.151, 881-888.

[3]Vogel, C.W., "A Prolegomenon to Study Carrel Planning," Educational Product Report, 1968, 2(Z): 8-13.

[4]Amaria, R.P., Biran, L.A., and Leith, G.O.M., "Individual Versus Cooperative Learning," Educational Research, 1968/9, 11: 905-1103.

b. Background.

The casual visitor, and even primary health care providers are sometimes deceived by the smoothness with which patient learning activities are managed in the PACOMED learning center. Patients and health educator(s) work together, use materials, operate equipment, discuss, read, listen and view audio visual programs, and engage in a variety of activities - all with a minimum of confusion or delay.

Things running so smoothly do not "just happen." The very important logistical management of the patient educational process requires careful planning, organization, teamwork, financial support, and professional insight. But perhaps equally important, it also requires an adequate physical environment.[5] This environment must be recognized as a crucial element of the "system" that affects patients and health educator(s) in many ways.

2. OBJECTIVES.

a. To engineer requirements for a patient learning center;

b. To pilot test the existing patient learning center;

c. To recommend general requirements for a patient learning center based on empirical evidence derived from summative evaluation.

3. METHODOLOGY.

a. The PACOMED learning center, and additional rooms, was located in the Outpatient Facility, adjacent to the Family Practice Clinic, U.S. Army MEDDAC, DeWitt Army Hospital, Fort Belvoir, VA 22060. Seven rooms were needed in total for the developmental evaluation support, i.e., project director's office, administrative and computational offices. Four of the seven rooms were used for patient education purposes.

b. The physical facilities of the PACOMED learning center were based on the project director's prior experience, field trips to instructional media centers, review of the literature, and space allocations, supply and service, budget and personnel constraints.

c. The PACOMED learning center and facilities were developed, as described Sept '74 -- Jul '75.

[5] Van der Ryn, S. and Silverstein, M., "The Room, A Student's Personal Environment," In R. Gutman (Ed.), People and Buildings (New York, Basic Books, 1972), 370-383.

d. The findings, discussions, conclusions, and recommendations were drawn based on utilization of the facilities from Jul '75 — Jul '76, formative evaluation phase and during Jul '76 — Jul '77, summative evaluation phase.

e. Description of the PACOMED Learning Center.

(1) The PACOMED learning center, was approximately 23' deep X 10' wide. Cool biscayne blue walls complimentcd the four double rows of fluorescent lights, providing excellent lighting of the entire room.

(2) The room was furnished from back to front with a 54" circular mahagony top table with four deep blue posture conforming chairs. Against the left wall were five rows (from floor to ceiling) of 48" shelves, one 5 drawer legal size file cabinet, three study carrels with deep blue posture conforming chairs, an attractive mahagony lectern on wheels, and another set of 48" shelves. The right wall contained one 18" X 35" X 60" grey steel storage cabinet, a 5 drawer legal size file cabinet, and three study carrels. A Sony video cassette player and monitor contained within a wheeled metal cabinet was against the wall next to the door for good visual contact for all patients.

(3) The shelves nearest the door contained video cassettes, film strips and cassettes, programmed study booklets, "[illegible] breast reaching models, and screens for the relevant visual system.

(4) The shelves at the far end contained projector/recorder cartridges, programmed study booklets, cassette tape recorders, a 3m sound on slide projector recorder, a 3m sound on slide playback unit, film strips, and recorded cassettes.

(5) Contained within the storage cabinet were additional educational materials including; pamphlets, booklets, video cassettes, etc..

(6) The file cabinets contained blank forms for each of the eight systems, to be used in patient charts.

(7) Strategically placed around the learning lab were SPENCO visual educational aids addressing drug abuse moking, family planning, alcoholism, and a guide to coronary care.

(8) Each learning carrel contained a note pad, pencil, privacy act statement, and an audio head set for individualized internal sound.

f. Primary Learning Center: (Room #1)

(1) Size — 10' X 23': was large enough to accommodate six patients comfortably. However, may seat ten patients.

(2) Furniture and Facilities.

(a) one 54" circular table with four posture conforming chairs,

(b) two sets of five wall mounted shelves,

(c) one lectern,

(d) two legal size five drawer file cabinets,

(e) six study carrels with posture conforming chairs,

(f) one metal cabinet (LUXOR, Portable) A/V, containing Sony television monitor unit and a Sony 3/4" video cassette play back unit, and

(g) one 18" X 35" X 60" metal, double door storage cabinet.

SEE DIAGRAM 1: Primary Learning Center, p. 162.

g. Secondary Learning Center: (Room #2)

(1) Size -- 6' X 12': was large enough to accommodate one patient comfortably. Also used for storage.

(2) Furniture and Facilities.

(a) one study carrel,

(b) two posture conforming chairs,

(c) one metal cabinet (LUXOR, portable) containing a Sony television monitor and a Sony 3/4" video cassette playback unit.

(d) one 2' X 5½' built in storage cabinet with stainless steel sink, and

(e) two 25" X 31" wall hung metal cabinets.

SEE DIAGRAM 1: Secondary Learning Center, p. 162.

h. Secondary Learning Center: (Room #3)

(1) Size -- 7' X 9': large enough to accommodate two patients.

(2) Furniture and Facilities.

(a) two study carrels,

(b) one metal cabinet (LUXOR, portable) containing a Sony television monitor and a Sony 3/4" video cassette playback unit,

(c) one 24" X 37" X 38" built in storage cabinet with stainless steel sink, and

(d) one 13" X 32" X 36" wall hung metal cabinet with sliding glass door.

SEE DIAGRAM 1: Secondary Learning Center, p. 162.

i. Health Educator's Office.

(1) Size: 9' X 11'

(2) Furniture and Facilities.

(a) one study carrel,

(b) two 18" X 28" legal size five drawer file cabinets,

(c) one 34" X 44" single pedestal desk,

(d) three posture conforming chairs,

(e) four rows of 12" X 48" wall hung shelves,

(f) one 24" X 37" X 38" built in storage cabinet with stainless steel sink,

(g) one 13" X 32" X 36" wall hung metal cabinet with sliding glass doors, and

(h) one T.V. monitor.

SEE DIAGRAM 1: Health Educator's Office, p. 162.

j. General description common to learning center and additional facilities:

(1) Room size and Cloistering: Although several separate rooms satisfactorily fulfilled the learning center requirements, one large learning center would have been more desirable.

(2) Wiring: Adequate double outlets were not present. The deficiency was compensated for by purchasing several spider boxes. Raceways were provided for in the construction of the new outpatient facility.

(3) Artificial Light Control: Adequate, all rooms had four double rows of diffused flourescent lights. However, a dimmer switch was lacking.

(4) Acoustical Conditioning: None, very distracting.

(5) Air Control: Provided by engineer controlled thermostats. Very poor.

(6) Color: The rooms had cream colored walls but were very soiled. The PACOMED staff painted (and the project director paid for) the walls a biscayne blue.

(7) Reflective Surfaces: Adequate. A dimmer switch was needed to enhance the visual presentations.

(8) Rest Room Facilities: Co-educational.

(9) Seating and Table Surfaces: Excellent.

(10) Study Carrels: Excellant.

(11) Audio-visual Hardware: Excellent.

4. FINDINGS.

The existing patient learning center and accompanying office spaces functioned fairly well as small-groups*, and individual study facilities. The physical limitations soon become apparent, but did not hamper the main evaluative efforts.

5. DISCUSSION.

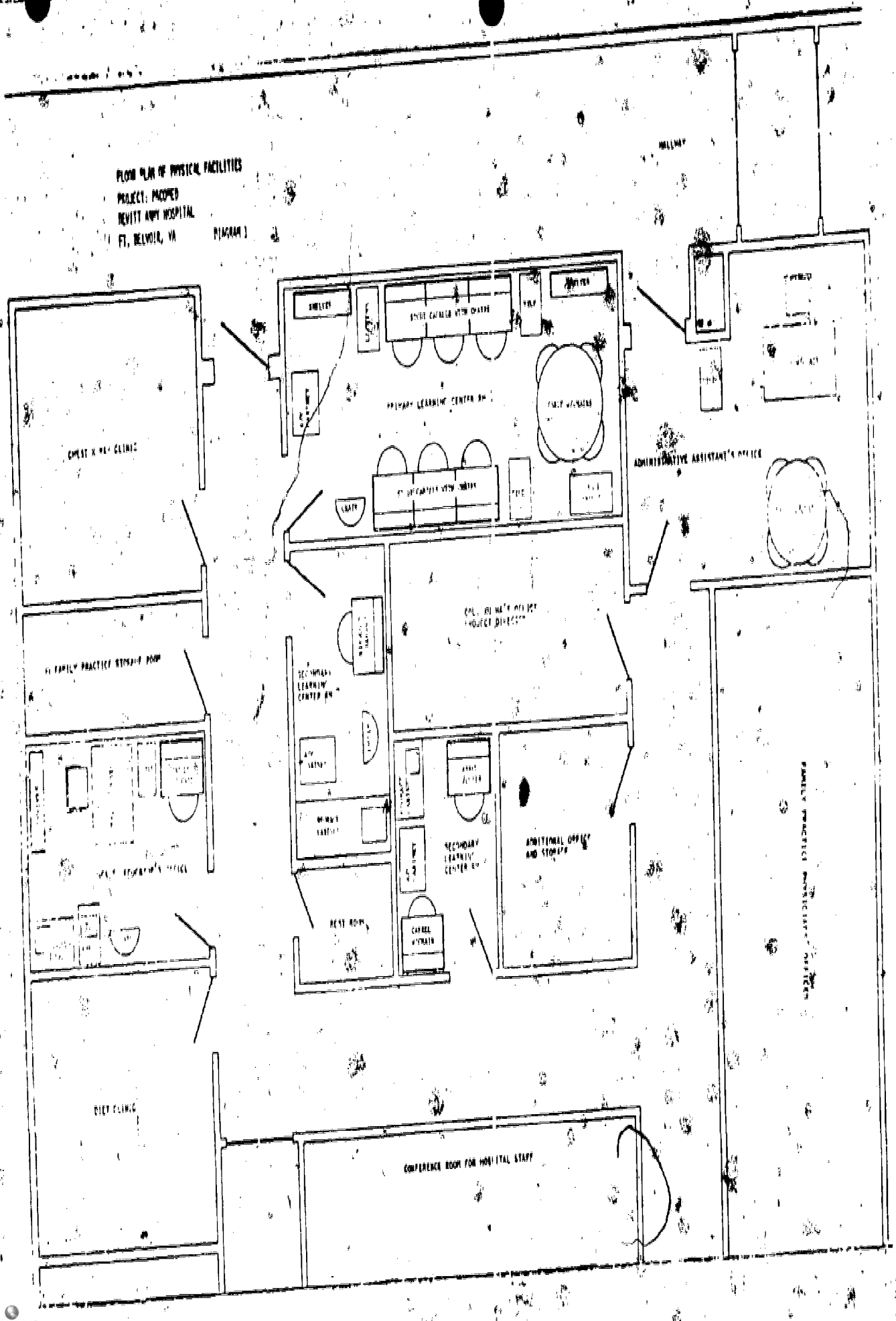
a. Room Size and Cloistering.

In the main PACOMED learning center the issue of cloistering was reflected in the level and manner of seclusion provided by a carrel. Unfortunately portions of the pilot test of the existing patient learning center were hampered due to room size. For example, the effects of different levels of cloistering and size of the cloistered area effects on patient performance could not be readily tested. Nor could the revalidation of previous studies be conducted, that suggest that performance decreases as room size increases because of the time and space constraints of the overall study.[6,7]

*Small-group facilities (Typically designed to accommodate 5 to 10 patients).

[6]Rapaport, A. and Kantor, R.E., "Complexity and Ambiguity in Environmental Design," American Institute of Planners Journal, 1967, 33: 210-221.

[7]Sommer, R., Personal Space: The Behavioral Basis of Design (Englewood Cliffs, N.J., Prentice Hall, 1969).


FLOOR PLAN OF PHYSICAL FACILITIES
PROJECT: PACOPED
HEWITT ARMY HOSPITAL
FT. BELVOIR, VA
DIAGRAM 1
HALLWAY
ADMINISTRATIVE ASSISTANT'S OFFICE
FAMILY PRACTICE PHYSICIAN'S OFFICES
ADDITIONAL OFFICE AND STORAGE
DIET CLINIC
CONFERENCE ROOM FOR HOSPITAL STAFF

b. Wiring.

(1) Wiring arrangements for instructional areas must take into account the need for access to both power and communication channels. With respect to the first, care should be taken that the system is adaptable to future needs and can be altered easily and inexpensively. At least two double outlets (minimum) should be placed on each wall of a small sized patient learning center. Each such outlet should be grounded and fused for no less than 20 amperes at 110 volts AC. If these power requirements do not exist, spider boxes can be used quite effectively at a minimal cost ($12.00/spider box).[8]

(2) Raceways should be provided for communication units both within the learning center and between other areas of the hospital care facility (to the television studio, as in the new Eisenhower Army Hospital, for example). This posed no problem for the study because closed circuit television was not used. However, it would be shortsighted not to include this additional contingency in any new AMEDD construction.

c. Artificial-Light Control.

(1) Experts generally agree that light should be adequately diffused and shadow-free in all parts of the learning center. The Institute of American Architects and the Illuminating Engineering Society Standards for Schools recommend 30 footcandles as the minimum light level.

(2) Illumination on work surfaces should be equal to or greater than that on other surfaces in the field of view. Dimmer switches should also be considered in planning.[9,10]

d. Acoustical Conditioning.

(1) Increasing uses of audio-visual resources of many kinds make it essential to provide adequate acoustical conditioning of instructional areas. This is not a problem in most clinical environments because the building plans include specifications pertaining to maximum reverberation, as well as maximum sound transmission through walls, heating ducts, and the like. This was done to insure patient and health care provider privacy as well as meet American Hospital Association Standards for environmental conditions.

[8]Green, A.C., et al., Educational Facilities With New Media, National Education Association, Washington, 1966.

[9]Setting Up A Room: Creating An Environment For Learning, 16mm film, sound, color, Carpus Film Distributors, 1967.

[10]Teachey, W.G. and Carter, J.B., Learning Laboratories: A Guide to Adoption and Use (Englewood Cliffs, N.J., Educational Technology, 1972), 29-32.

(2) This did present a problem for PACOMED in that the study area was the only area in the new outpatient facility at DeWitt Army Hospital, Ft Belvoir, VA that had not had acoustical conditioning. But, because of the deficiency the noise level factor was able to be examined. Additionally it is recommeded that rugs be put on the floors to improve room acoustics, thus heightening the effectiveness of various communications experiences. Again, this does not represent an additional problem or cost, most modern health care facilities are using carpeting to muffle sound and lower maintenance and housekeeping costs.

(3) The room noise level itself should be no greater than 35 to 40 decibels.[11] If acoustical conditioning is not possible (as was the situation for PACOMED) it is felt that the use of individual headphones is an efficient cost effective way to reduce distraction and enhance patient concentration.

(4) This phase of the study demonstrated by observation, not by measurement, that for many patients, noise stands out more and is more distracting against a background of silence than one of general ordered activity. It was also noted that unexpected noise distractions detrimentally affected task performance efficiency and decreased the tolerance for frustration. These findings are congruent with studies conducted by Sanders, 1961, and more recently Theologus and others, 1974.[12,13] Their data show that unexpected noise distraction or unexpected variations in noise level appear to require some adaptation by the individual at some psychic cost. Dansereau and others (1975) developed and assessed a learning strategy program that included practice in coping with distractions while applying techniques to help the learning of prose materials (three 1,000--word passages under different levels of audio distraction). During post-hoc analysis they found that the mean total performance of Rotter scale division externals was significantly lower than internals when reading under conditions of audio distraction.[14]

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[11]Ibid.

[12]Sanders, A.E., "Influence of Noise On Two Discrimination Tasks," Ergonomics, 1961, 4: 243-257.

[13]Theologus, G.C., Wheaton, G.R., and Fleishman, E.A., "Effects of Intermittent, Moderate Intensity Noise Stress On Human Performance," Journal Of Applied Psychology, 1974, 59(5): 539-547.

[14]Dansereau, D.F. and others, Development and Assessment of An Effective Learning Strategy Program, AFHRL-TR-75-41, Lowry AFB, CO, Technical Training Division, Air Force Human Resources Laboratory, June 1975.

It was noted by observation that the PACOMED subjects in the hypertension study that scored high on internals also performed better under conditions of distraction.[15] It could probably be inferred that the internals are better able to concentrate. The effects of distraction on learning would appear to require further careful study noting that individual differences would be involved.[16]

e. Air Control.

(1) Heating, cooling, and ventilating systems should cause neither drafts nor noise. Each health educator should be able to control ventilation in the patient learning center. At any one time, a ventilation system should provide six to ten complete changes of air per hour, and at least 10 cubic feet of air per patient each minute.[17]

(2) The air control for PACOMED was very poor and dependent upon the monitoring of the hospital engineers. During the summer months it was especially close, causing discomfort for all participants.

f. Color.

(1) Biscayne blue was the color of the PACOMED rooms. The color was attractive and offered a non-competing background for the health education posters and realia that brightened the areas.

(2) Room colors should be chosen with careful consideration to room orientation and general effects required. Colors may vary considerably, depending upon the room's exposure. Pastel colors are suggested to help with lighting and light control.[18]

g. Reflective Surfaces.

(1) Reflective surfaces did not present a problem because only a television receiver was used. However, the use of a dimmer would have provided more optimum conditions. For effective use of most projected material, illumination in the room, and on the screen itself, should not exceed 1/10 footcandles.[19]

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[15]Kucha, D.H., A Comparative Evaluation of the Traditional Versus a Systems Approach for Hypertensive Patient Education, Final Report, Aug 1977, HCSD, AHS, FSHTX, 47-49.

[16]Glass, D.C. and others, "Psychic Cost of Adaption to an Environmental Stressor," Journal of Personality and Social Psychology, 1969, 12: 200-210.

[17]Brown, J.W., Lewis, R.B., and Harcleroad, F.F., AV Instruction Media and Methods (New York, McGraw-Hill Book Company, 3rd Edition, 1969), 72-75.

[18]Ibid.

[19]Ibid.

i. Study Carrels.

(1) The patients and staff felt the study carrels used for the pilot test were adequate.

(2) When constructing a study carrel, Orr (1972) states that there is no need to make vertical dividers over two feet above the table, since the possibility of visual distraction is restricted while avoiding a claustrophobic situation.[20] Brucker (1970) compared learning performance in a carrel to learning performance in a small seminar room. He found that high anxiety (Sixteen Personality Factor Questionnaire median split) subjects in an enclosed environment (carrels) performed significantly poorer than the other three groups. Personality and environment interact, and sometimes negatively.[21]

(3) It can be concluded that while privacy does not have a high absolute positive value in and of itself, when there is limited choice, properly designed study facilities to ensure individual seclusion would be extremely important for some patients. Since certain kinds of tasks performed during learning would require disciplined concentration, seclusion can be of assistance.[22]

j. Social Interaction.

(1) High levels of individualized seclusion inhibit social interaction. One potentially critical interaction is between the patient and the health educator. When the carrel design does not permit patient/health educator interaction, another location must be provided. PACOMED found that having a separate health educator's office was highly successful. It afforded privacy for individual patient counseling, enhanced the authoritative role of the health educator, provided the patient assurance of help when required, and provided variety in the learning locale.[23]

[20] Orr, J.M., Designing Library Building for Activity (New York, Academic Press, 1972).

[21] Brucher, B.J., "Effects of an Enclosed Individual Learning Environment Interacting With Two Personality Traits on the Achievement and Opinion of College Students Learning Through the Use of Programmed Instruction," Dissertation Abstracts, 1970, vol. 52A-53A.

[22] Jussim, E., "Personal Space and the Media Center," School Media Quarterly, 1974, 2(3): 189-193.

[23] Hall, E.T., "Environmental Communication," In A. Esser (Ed.), Behavior and Environment (New York, Plenum Press, 1977), 247-256.

(2) Throughout the project it was customary to have six to ten patients per session, however at times due to professional priorities or minimum referrals, the scheduling was arranged with just one patient. It was difficult to detect if the isolation inhibited the learning process. Whether patients learn best by themselves remains in doubt.[24] Sullivan and others (1974) report in their survey of learning centers that when the program of the learning center isolates students during instruction, those objectives in which personal interaction is an important element may be ignored.[25] Lee (1968) emphasizes the need for grouping in an individualized program as she suggests that groups are formed differently, for different lengths of time.[26] Payne (1968) observes that with programmed materials the most satisfactory social group contains between four and ten pupils.[27]

(3) It was apparent through observation by the PACOMED staff that group size, in the PACOMED Learning Center was dependent upon the topic area and the social characteristics of its constituents.[28] It was very desirable to have group interaction after individual study with the breast self examination module. However, individual study alone was much preferred for the vaginitis module.

k. Seating and Table Surfaces.

(1) The chairs, desks, and tables ordered for PACOMED were not designed to be easily movable. Not infrequently the patients and health educators complained. Therefore, it was agreed that seats and tables should be movable (designed for flexible groupings), quiet, comfortable (the right height with good posture support). Swivel chairs with casters would be ideal.[29]

[24]Love, W.P., "Individual Versus Paired Learning of an Abstract Algebra Presented by Computer Assisted Instruction," Tallahassee, CAI Center, Florida State University, 1969, (AD 696-126).

[25]Sullivan, D. and others, A Survey of the Present-State-of-the-Art in Learning Center Operations, AFHRL-TR-74-11, Lowry AFB, CO, Technical Training Division, Air Force Human Resources Laboratory, 1974.

[26]Lee, D., "Do We Group in an Individualized Program," Childhood Education, 1968, 45: 197-199.

[27]Payne, K., "Social Factors in the Classroom," In W. Dunn and C. Holroyd (Eds), Aspects of Educational Technology (Vol 2, London, Methuen and Co.,,1968).

[28]James, J., "A Preliminary Study of the Size Determinant in Small Group Interaction," American Sociological Review, 1951, 16: 474-477.

[29]Van Cott, H. and Kinkade, R.G., Human Engineering Guide to Equipment Design, Washington D.C., U.S. Government Printing Office, 1972, (Ref. Ed.).

6. CONCLUSIONS.

The approach was to design, pilot test, and recommend general requirements for a patient learning environment that would optimize the learning process for the specific selected learning activities. Based on the observations and experience of the PACOMED staff and a study of the literature the following criteria for the physical facilities of a learning center are listed.

a. Physical Facilities.

(1) General Requirements.

(a) Size. A small-group facility would be designed to accomodate six to ten patients. The minimum room size would be 300 square feet, preferably 450 square feet (15' X 30'). The size will be dependent on space allocations, type of installation, and patient flow.

(b) Wiring. Minimum requirements of a small sized learning center would be two double outlets on each wall. The outlets should be within easy access to each study carrel and either end of the room. Raceways should be provided for communications units both within the learning center and between other areas of the hospital care facility.

(c) Artificial-Light Control. The light should be adequately diffused and shadow free in all parts of the learning center. Thirty (30) footcandles is recommended as the minimum ligh level. Light control with dimmer switch should be in the immediate area of the health educator's station.

(d) Acoustical Conditioning. The acoustical conditioning should be controlled by wall coverings (acoustical tile or plaster) and rugs on the floors plus the use of headphones for each patient. Cutting down on the reverberation and noise level improves room "climate" and reduces tensions.

(e) Air Control. Heating, cooling, and ventilating systems should cause neither drafts nor noise. The temperature range as per governmental energy control standards, should be from 68 degrees F. in the winter to 78 degrees F. in the summer and the humidity between 45 and 55 percent with adequate air circulation. It should also be thermostatically controllable and monitored by the health educator.

(f) Color. Colors may vary considerably, depending upon the room's exposure. Pastel colors are suggested to help with lighting and light control.

(g) Reflective Surfaces. For effective use of most projected material, illumination in the room should not exceed 1/10 footcandle.

(h) Rest Room Facilities. Should be provided for both men and women in the immediate area.

b. Furniture and Arrangement.

(1) Carrels. To afford flexibility a "mix" of types of carrels is recommended, rather than a standardized type. The vertical dividers should not be over two feet above the table area. Study carrels should be used for individualized instruction with a minimum of six and preferably ten patients per small sized learning center.

(2) Cloistering of Carrels. If feasible the carrels should be broken up visually so that they do not have a barnlike, regimented appearance. If space is at a premium there should be no more than five carrels along one wall. Carrels should be arranged to ease the traffic flow, since patients leave at different times.

(3) Social Interaction and Group Size. The interaction and size of the group is dependent upon the topic area (disease entity) and the social characteristics of the patients. The optimum group size is between six to ten patients.

(4) Conference Table. At least one round conference table should be included in the furniture to provide opportunities for various forms of interaction and face-to-face learning activities. When patients are in the carrels the conference table may also serve as the health educator's station.

(5) Seating and Table Surfaces. Seats and table should be movable (designed for flexible grouping), quiet, comfortable, the right height, with good posture support. Swivel chairs with casters are suggested.

(6) Learning Materials Storage. The learning center should include shelving both open and visible and hidden (cabinets) shelves to store booklets, 3/4" audiovisual cassettes, etc.

SEE DIAGRAM 2: General Requirements for a Patient Learning Center, p. 170.

c. Additional Facilities.

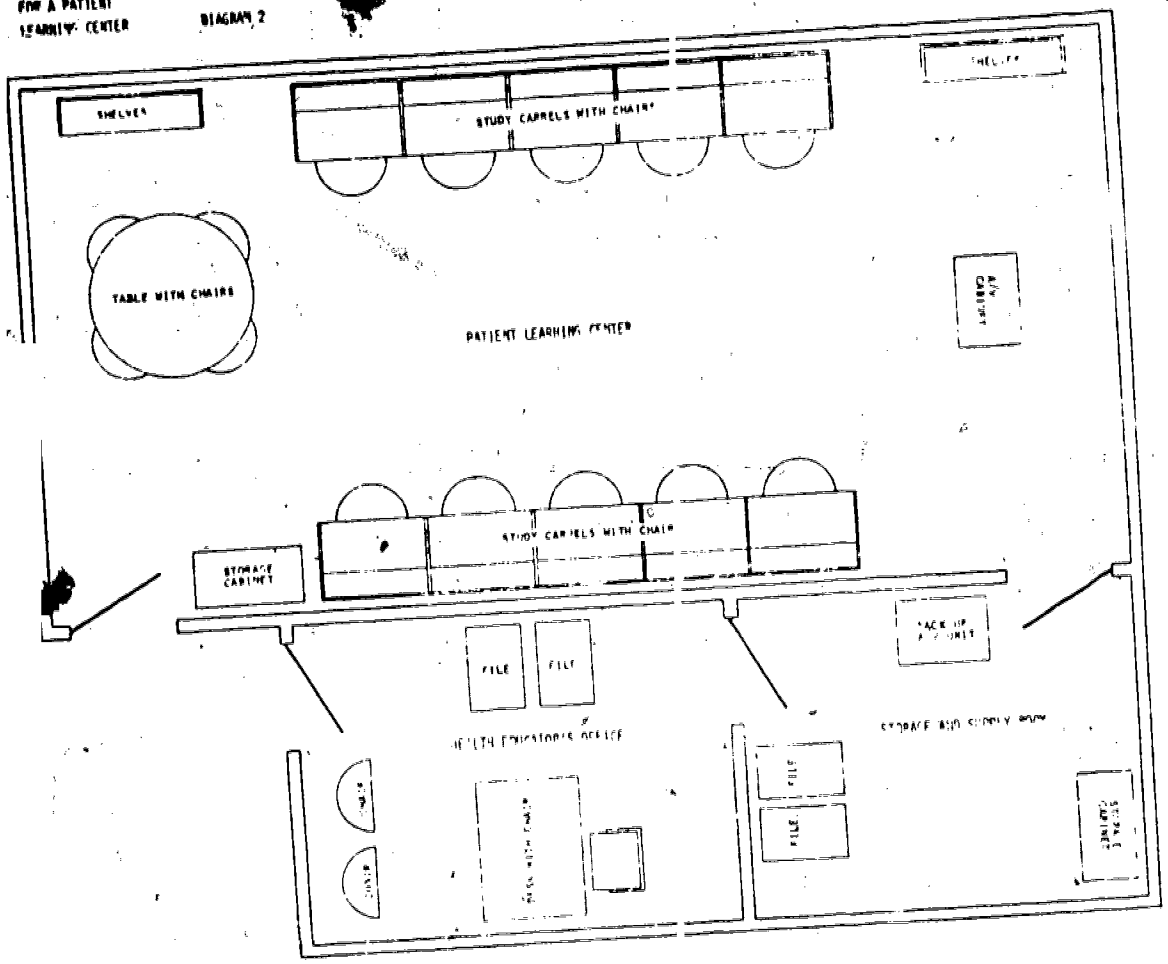
(1) Health Educator's Office. Should include a desk, two chairs, and a minimum of two file cabinets. The number of file cabinets would be dependent on the patient case load. This office is essential for baseline collection and individual counseling.

(2) Storage Area and Supply Room. Should be large enough to adequately store blank forms, patient charts, and additional (back-up) audiovisual equipment, including two file cabinets. The recommended room size is 9' X 11'. However, it may be smaller.

SEE DIAGRAM 2: General Requirements for a Patient Learning Center, p. 170.

GENERAL REQUIREMENTS
FOR A PATIENT
LEARNING CENTER

DIAGRAM 2



d. Audiovisual Hardware. See Appendix E, Communications Media, p. for an indepth discussion.

(1) 3/4" video cassette playback unit, 21" color T.V. receiver and console. This proved to be the most cost effective and reliable mode. In addition it is recommeded to have the hardware stored in a console for safety, dust free environment and flexibility of movement. Units have been known to fail, so having a backup component is advised.

(2) Headphones. Should be used to afford the patients a better opportunity to concentrate. Eleven for a small sized learning lab is recommended. Ten for patients plus one for the health educator's monitoring function.

e. Location of the Learning Center.

The learning center should be readily accessible to patients and have an adequate waiting area. And if possible a physical location that is convenient for parking.

f. Costs.

(1) General Requirements. Space allocations and general requirements do not have a cost attached because existing resources will be utilized. This would be a cost to the AMEDD with or without the patient learning center. Pointed out in the discussion was the fact that all health care facilities have similar general requirements because of American Hospital Association Standards and other clinical factors.

(2) Furniture, Shelves, and Cabinets

(a)	10, one station carrels	@139.00	$1,390.00
(b)	one 48" diameter table	@107.50	107.50
(c)	16 chairs-plastic posture forming shell	@ 22.39	356.84
(d)	2 sets of display shealves (5 shelves/set and hangers)	@ 53.60	107.20
(e)	two storage cabinets (18" X 35" X 60") with shelves	@ 85.00	170.00
(f)	4 file cabinets	@250.00	1,000.00
(g)	one desk--Pedestal	@250.00	250.00
		cost	$3,381.64

(3) Audiovisual Hardware

(a) 2 color T.V. receivers—21" screen	@487.00	$ 974.00
(b) two 3/4" video cassette playback units	@884.30	1,768.60
(c) 2 cabinet, consoles	@329.00	658.00
(d) 11 headphones	@ 13.70	150.70
	cost	$3,551.30
Estimated Maximum Cost	Approximately	$7,000.00

7. RECOMMENDATIONS.

a. Unfortunately, many existing AMEDD health facilities will not have the potential to develop the patient learning center and additional facilities just described. In most cases some of the desirable requirements will be lacking, or else they will fall far below the standards suggested here. Some space allocations may have lights but no power outlets, others may need paint, or lack proper ventilation. Such problems need not keep the conscientious health care worker from making adequate use of patient education media. Inventive health care workers all over the country have devised ways to use media despite unfavorable conditions. An environment favorable to learning can be created in almost any room in a health care facility. All that may be needed is some "creative imagination." The general requirements and costs were based on the maximum needed, not the minimum. For example, the PACOMED project did not purchase all the furniture or audiovisual hardware to conduct the study, most of the furniture and equipment was borrowed very easily because of under-utilization of existing resources. Two 3/4" video cassette playback units, two, 21" television receivers and two consoles were loaned to the project for two years. The space allocations given to conduct the study were rooms previously used by another study group, plus two vacant storage rooms. When requirements couldn't be met any other way improvisations were accomplished. Even in older buildings, relatively inexpensive improvements can be made to facilitate the patient education process.

b. The maximum requirements would not cost more than $7,000.00 to set up a patient learning center, health educator's office and storage. Or to draw an analogy, not more than the existing cost for patient information (given by physicians and nurse clinicians based on Hypertensive and Diabetic patient case load) in one month for the Internal Medicine Clinic at DeWitt Army Hospital, Fort Belvoir, Virginia.

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GLOSSARY OF TERMS

1. ADHERES TO LOW SODIUM DIET: If the response, adheres to low sodium diet, was positive, examples had to be provided, i.e., does not use salt shaker, omits salt from cooking and does not eat foods and snacks that are highly salted such as pretzels, potato chips, salted pork, ham, etc.

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

3. BEHAVIORAL CHANGES: The amount of change in the direction of desired behavioral outcomes (i.e. knows drugs and action, takes medication, diets (if indicated) low sodium, etc.) possessed by patients six months after the termination of a method of teaching.

4. COMPLIES WITH LAB/ANCILLARY TESTS: Did patient present him/herself for scheduled lab tests or diagnostic procedures.

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

6. 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.

7. EDUCATIONAL TECHNOLOGY: The application of science-based or science-derived concepts and techniques in a systematic way to the practical task of education.

8. FREQUENCY OF PHYSICAL ACTIVITY: Daily, twice weekly, or weekly.

9. INVESTMENT COSTS: Costs necessary to implement the program. Equipment purchases and the costs of running a workshop to train staff are examples of investment costs.

10. KNOWS DRUGS AND ACTIONS: Must be able to name or identify the name of their medication from a list provided and be able to state the medications side effects.

11. MEDICAL ADVICE: Giving a limited, unstructured explanation or directions using professional knowledge or intuition on some aspect of health care or behavior.

12. NON-PROFESSIONAL PARAMEDIC: A graduate of the 91C20, clinical specialist course, a civilian licensed practical nurse, or a 91B20 who has had prior clinical experience.

13. NORM-REFERENCED MEASURES: Measures used to ascertain an individual's performance in relationship to the performance of other individuals on the same measuring device.

14. NUMBER CUPS OF COFFEE PER DAY: (Actual number) decafinated coffee was not considered.

15. NUMBER OF CIGARETTES PER DAY: (Actual number).

16. OPERATING COSTS: Recurring costs required to operate the program, over time, maintenance of equipment, salaries of personnel, and the cost of supplies are examples.

17. 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.

18. 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.

19. 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.

20. 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.

21. RESEARCH AND DEVELOPMENT COSTS: Resources required to develop the program to the stage where it can be introduced into the system. For example, the time an instructional designer spends validating a learning system, money to hire consultants, and evaluation efforts.

22. 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.

23. 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.

24. TAKES MEDICATION: If medications were prescribed, were they taken in the proper amounts and times.

25. 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.

26. TYPE OF PHYSICAL ACTIVITY: If an exercise program was maintained, what type:

Sedentary: walking slowly (1/2 mile or less), light gardening.

Light: roller skating, walking slowly (more than 1/2 mile).

Moderate: walking moderately fast, heavy gardening, cutting grass, bowling, golfing (with cart).

Vigorous: golfing (without cart), walking fast, dancing, bicycling, sit-ups, push-ups.

Strenuous: swimming, tennis, jogging, football, basketball.

27. 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.

28. WAS TENSION EXPERIENCED: Was tension experienced at home or on the job. If the response was positive, were medications taken to control tension.

LIST OF ABBREVIATIONS, ACRONYMS, AND SYMBOLS

1. AHS: Academy of Health Sciences
2. AMEDD: Army Medical Department
3. ANC: Army Nurse Corps
4. DAH: DeWitt Army Hospital
5. FSHTX: Fort Sam Houston, Texas
6. HCSD: Health Care Studies Division
7. I/E Scale: Rotter's Internal - External Scale
8. LOC: Locus of Control
9. N: Number of patients in a described group
10. PACOMED: Patient and Community Health Education Model: A Developmental and Evaluation Project Study
11. SA group: Systems Approach group or Experimental group
12. T group: Traditional group or Control group
13. USMEDCEN: United States Medical Center
14. USMEDDAC: United States Medical Activity
15. ≤: Equal to or less than
16. ≥: Greater than