A COMPARISON OF THE USE OF SELECTIVE AND NON-SELECTIVE MENUS FOR HOSPITAL PATIENTS ON CERTAIN MODIFIED DIETS

by

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INTRODUCTION

Food plays an important role in the maintenance of health and the treatment of various medical conditions. Hospital dietitians recognize this important fact and exercise care in planning menus that may be used for general diets and easily modified to meet the needs of specific patients.

Hospital routine may cause the patient to think that he is an object with a bed number and prescribed treatments. Frequently, he is discouraged with his diet because the foods he most enjoys may have been restricted as to amount or entirely eliminated. Circumstances may cause dietary departments to experience difficulty in giving personal attention to the likes, dislikes and eating habits of each individual patient. The selective menu that allows the patient to choose foods he prefers is used in many hospitals to help solve these problems.

For a patient on a modified diet the selective menu is useful in showing the patient that a variety of foods is feasible on his diet. The printed menu sent daily on the patient's tray gives him an opportunity to select from two or three choices. This selection draws his attention to different foods and methods of preparation possible on his particular regimen. Dietary instructions and menu cards emphasize the importance of proper food selection and help the patient gain confidence in planning his own meals. By observing food choices, the dietitian has an excellent opportunity to determine the amount of instruction in basic nutrition needed by the patient.

The patient may be too ill to make a food selection or uninterested in doing so. Personal attention from the dietitian may be important to the patient. Menu choices are usually checked one day in advance but the patient's wants and needs may change before the food is served. The dietitian

may plan a more appetizing, adequate diet than the patient would select. When a modified diet is part of prescribed treatment the patient may want dietitians to plan his meals. The patient may refuse to select his food unless he is sure a competent dietitian checks his menu to be sure it includes everything he needs to get well. The patient may choose his food without regard for color, texture and flavor of food combinations; also he may not select an adequate diet. Under these conditions a non-selective menu may be more beneficial for the patient.

This study was made to evaulate the use of non-selective and selective menus for patients on certain modified diets at Stormont-Vail Hospital, a 276 bed general hospital in Topeka, Kansas. Nutritive intake and plate waste of patients using these two types of menus were compared. Nutrients studied were checked with the National Research Council's Recommended Daily Dietary Allowances.

REVIEW OF LITERATURE

Selective and Non-Selective Menus for Regular Diets

Studies reported in the literature relating to the use in hospitals of selective and non-selective menus for regular diets indicated that food intake, plate waste, cost, and patient satisfaction were important considerations. Rapport between dietitian and patient was mentioned frequently as a contributing factor to the success of either type of menu.

Intake. Wakefield (1956) found that, except for ascorbic acid, patients of both sexes on regular diets who selected their own foods had a lower intake of nutrients in general than those on non-selective menus. Caloric intake means for men and for women patients on selective diets were lower than those on non-selective diets. However, differences were not significant.

Thirty-one per cent of the men and 34 per cent of the women on selective menus had protein intakes below National Research Council's Recommended Allowances compared to 25 per cent of the men and 24 per cent of the women on non-selective menus. Protein intakes were significantly higher for men on non-selective diets than selective. Women had higher protein intakes on selective than on non-selective diets, although the differences were not significant.

In Wakefield's study no significant difference in calcium intake was noted, although men on non-selective menus had slightly higher intakes than those on selective menus. Women had lower calcium intakes on non-selective than on selective menus. All men in the study had calcium intakes that met or exceeded the National Research Council's Recommended Allowances, but 15 per cent of the women did not meet recommended allowances for calcium on the non-selective diet. Twenty-four per cent of the men and 20 per cent of the women on selective menus had mean calcium intakes below recommended allowances.

No significant difference of iron intake was found by Wakefield (1956) with the use of selective or non-selective menus. However, men consumed slightly more iron on non-selective than on selective diets; whereas, women consumed slightly more iron on selective than on non-selective diets. Twenty per cent of the men on both types of diets had iron intakes below recommended allowances. Sixty per cent of the women on selective and 80 per cent on non-selective diets did not consume 100 per cent of recommended allowances for iron.

Type of menu, selective or non-selective, made no significant difference in intake of vitamin A, thiamine, riboflavin, niacin and ascorbic acid (Wakefield, 1956). Thirty-five per cent of men on both selective and non-selective diets did not consume recommended allowances of vitamin A. For

women, 65 per cent on non-selective and 25 per cent on selective diets did not consume recommended allowances of vitamin A. Thiamine allowances were not met by 30 per cent of men on non-selective and 35 per cent on selective diets, nor by 45 per cent of the women on non-selective and 35 per cent on selective diets. Riboflavin intakes were below the recommended allowances for 15 per cent of both men and women on non-selective diets and 25 per cent of men and women on selective diets. Thirty per cent of the men and 45 per cent of the women on non-selective diets and 55 per cent of men and 25 per cent of women on selective diets had ascorbic acid intakes below recommended allowances (Wakefield, 1956).

In a study of selective and non-selective menus by Foss et al. (1962) mean intakes of nutrients studied met the National Research Council's Recommended Daily Allowances except calories, iron, and thiamine for women and calories for men. Protein intake was significantly higher for women on non-selective diets than for women on selective; whereas, the men had slight but not significantly higher protein intake for the selective menu than for the non-selective.

Mean calcium intakes were slightly higher for both men and women on non-selective menus when compared with men and women on selective menus. However, differences were statistically significant for the women on non-selective menus only (Foss et al., 1962). Iron intakes were significantly higher for men on non-selective than on selective diets. Women had higher mean intakes of iron on non-selective than on selective diets but the differences were not statistically significant.

No significant difference in vitamin A and thiamine intakes between selective and non-selective menus were found by Foss et al. (1962). Riboflavin intakes were significantly greater for women on non-selective than selective

diets, but there was no difference in intakes for the men. Differences in niacin and ascorbic acid intakes were not significant between selective and non-selective menus for men and for women.

Plate Waste. Studies by Bannister (1956), Jefferies (1957), Ralli (1957), Pinney (1955), (1957), Swenson (1958a) and Ortolano et al. (1962) compared plate waste of groups of patients on non-selective diets with similar groups of patients receiving selective menus. No studies were found that cited comparisons of plate waste for the same patient on selective and non-selective menus.

Bannister (1956) observed no plate waste differences between patients using selective and those using non-selective menus. Jefferies (1957) found average plate waste was 0.15 pounds per tray for patients on selective menus as compared to 0.25 pounds for patients on non-selective diets. This was a plate waste increase of 40 per cent for patients on non-selective diets. A difference of 373 full servings of food was wasted per 1,000 trays for the non-selective over the selective group in Jefferies'(1957) study. Patients on both types of menus had twice as much plate waste at noon and evening meals as at breakfast. Several patients when interviewed by Jefferies (1957) expressed a feeling of guilt when they wasted food. This was particularly true of young mothers who handled the family food dollars. Plate waste reduction also was noted by Ralli (1957), Pinney (1955), (1957) Swenson (1958a) and Ortolano et al. (1962) when a selective menu was offered.

Ortolano et al. (1962) reported that raw food costs dropped 7.3 cents per meal after one year's use of selective menus as compared with costs the previous year using non-selective menus. A 15 per cent reduction in raw food cost was cited by Alma (1958) who stated that a decreased food cost was

attained by using past records of patients' food selections to facilitate forecasting, calculating, and ordering of foods. However, no difference in food cost for selective and non-selective menus was found by Bannister (1956) when less accepted foods were omitted from the non-selective menu.

Bannister (1956) stated that personnel needs did not change when selective menus were adopted. Pinney (1955) reported that one cook's position was eliminated after selective menus became routine.

Patient Satisfaction. Complaints decreased when patients chose their menus in studies by Swenson (1958a) and Ortolano et al. (1962). Foss et al. (1962) noted that women were more interested in selecting their meals than were men and some patients refused to select their food when given the opportunity. However, private patients of both sexes chose their food more frequently than did ward patients. Flynn (1963) stated that 30 to 35 per cent of patients offered selective menus did not take advantage of the service.

Patient satisfaction increased with use of selective menus for patients on regular diets according to Jefferies (1957). During Jefferies'(1957) interviews 41 patients of 45 expressed an interest in trying selective menus. Three of the 45 patients on the non-selective menu were dissatisfied and 15 were indifferent to the lack of variety of food offered. All 45 patients who chose their foods liked the selective menu and choices offered.

An improvement in the condition of mental patients was noted by Ralli (1957) when they were allowed to choose their own food. Patients felt they were treated more like normal people, their frustrations decreased, and they began to assume responsibilities in other areas. Elman (1963) stated that since patients were given no choice of drugs, treatment, or procedure, a choice of foods helped satisfy a psychological need to feel independent and secure.

Haines (1961) reported a need for selective menus in three Kentucky Hospitals because of differences in food habits of their patients. Local inhabitants preferred food unfamiliar to professional and technical personnel transferred to this area. Hopper (1959) emphasized that some patients liked selective menus because they could choose either noon or evening for their heavy meal. Although a selective menu was preferred in many studies, Bannister (1956) expressed the belief that some patients may not feel capable of selecting a balanced diet.

Selective and Non-Selective Modified Diet Menus

In a report on Project No. 3 of the Diet Therapy Section of the American Dietetic Association, Pearson (1954) stated that dietitians from 30 hospitals responding to questionnaire used selective menus for modified diets. Selective menus eliminated writing of modified diets and frequent visits to patients to discuss likes and dislikes. Time saved from routine desk work allowed the dietitian additional time for patient instruction. In two hospitals preparation of food for modified diets was incorporated with production in the main kitchen thus eliminating need for a diet kitchen. Only one dietitian reported need for more personnel in food preparation areas, but others commented that additional time was required for collecting and tallying menus. Most dietitians thought, however, that administrative details could be handled easily.

Dietitians responding to the questionnaire believed the selective menu was an aid in teaching diet modifications and basic nutrition (Pearson, 1954). Use of selective modified menus required initial instruction when the diet was ordered. Thus available time was allowed for further instruction during the patient's stay in the hospital so that he was accustomed to

choosing his own food when he was discharged. If the patient was too ill to select his own food, his family often selected it for him, thus establishing good rapport between the dietitian and the patient's family.

Reduced plate waste and increased food intake were cited by most dietitians participating in the project when patients selected their own food (Pearson, 1954). Hopper (1961) agreed that patient food intakes increased with wide variety and unlimited quantity on a selective menu.

PROCEDURE

This study was conducted at Stormont-Vail Hospital to compare the effectiveness of non-selective and selective menus for modified diets. A selective menu for regular and soft diets had been in use for two years but had not been extended to other diets. Cooperation was sought and obtained from the departments of administration, nursing, and dietetics. A letter was sent to each physician on the hospital staff explaining the objectives of the study (Form 1, Appendix).

Food intake and plate waste of patients on soft or regular low sodium diets or regular low fat diets were studied during a 28 day period. During Period I, (non-selective menus) meals were planned by the dietitian for patients on these modified diets for 14 days; whereas during Period II (selective menus) patients selected their food for 14 days. Data were collected from all patients for whom low sodium or low fat diets were prescribed. However, only data for the 14 patients who remained on the diet for three or more days during both study periods were used.

Subjects

The 14 subjects included eight females and six males. Five patients were on regular low fat diets, seven on regular low sodium diets, and two on soft low sodium diets. One female on a regular low fat diet was 15 years of age; the remainder of the patients were 51 to 77 years. Diagnoses for low fat patients were: one cirrhosis of the liver, one gastroenteritis, one obesity, one gall stones, and one jaundice with liver damage. Four congestive heart failure patients, two cancer of the lung, one hypertension, one chronic nephritis, and one hypertensive cerebral vascular accident were subjects on low sodium diets.

Menus

For Period I, a non-selective menu was used. Meals were planned by the dietitian as a modification of the regular menu. Consideration was given to beverage preferences and stated dislikes of individual patients. The menu was recorded on a card and placed on the tray (Form 2, Appendix).

For Period II, a selective menu was used. Patients chose their food one day in advance from a printed modified selective menu form that was sent and returned on the breakfast tray (Form 3, Appendix). Basic food items were the same for both periods with additional selections for Period II. Fruit or fruit juice, hot or dry cereal, poached or soft cooked egg, bread or toast, butter, jelly, and seven beverages were offered for breakfast. For lunch and dinner the patient had a choice of two soups, two entrees, three vegetables, three desserts, bread or toast, butter, jelly, and seven beverages. Patients were allowed to choose any or all food items listed on the menu. In both periods of study the menu card was used as a guide for serving the food and as a sample menu for patient teaching.

Patient Conferences

Patients were not informed that they were subjects of a dietary study and patient conferences were limited to reduce the probability that increased attention during this study would bias the results. Preparation of food and basic nutrition were stressed during each conference.

First Conference. The patient was given a printed diet list the day his diet was prescribed. The dietitian carefully explained the regime stressing adequate nutrition within the dietary limitation. Beverage request and personal dislikes were noted as guides in planning the patient's menus.

Second Conference. The cooperating patient was interviewed after he had received nine meals during Period I. Additional food aversions were noted for diet writing. Instructions were given for adapting the modified diet to family and restaurant menus. Foods served during the previous three days were used as examples in patient teaching.

Third Conference. Instructions for using modified selective menus for Period II were given to the patient. If he was on the non-selective menu for three days only, conferences two and three were combined omitting questions about food dislikes.

Fourth Conference. After the patient had received nine self-selected meals he was visited by the dietitian. Use of selective menus was clarified when needed or requested. Instructions were given for adapting the modified diet to family and restaurant menus.

Fifth Conference. Further instructions on diet management were given the last day of Study Period II or the day the patient was discharged from the hospital. If he was on the selective menu for three days only, conferences four and five were combined.

Food Intake and Plate Waste

Each food item was weighed on Hanson gram scales, which were checked for accuracy, and the amount was recorded before the food was sent to the patient (Form 4, Appendix). Uneaten food was weighed and recorded when the tray was returned to the kitchen. Procedure for weighing foods was: meat, both raw and cooked; vegetables, cooked and drained or raw edible portion; fruit, cooked drained weight plus two tablespoons of juice or raw edible portion; bread, per slice; butter, per pat; milk, one half pint; fruit juice, canned undiluted or frozen diluted; and mixed foods, such as casseroles or fruit gelatin, weight of each ingredient and weight of finished product.

Food intake of each patient was determined by subtracting weight of plate waste from weight of food served. Intake of calories, protein, phosphorus, iron, sodium, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid was calculated for each patient. Nutrients were calculated according to United States Department of Agriculture Handbook No. 8 and National Research Council's Sodium Restricted Diets (1954).

Analysis of Data

Recommended Daily Dietary Allowances for each individual patient were calculated according to weight, age and sex (Table 1). Basic caloric intake needs were set at 25 calories per kilogram of body weight as suggested by Krause (1961). National Research Council's recommendations were used for other nutrients studied. Protein recommendation was 1 gram per kilogram of body weight. Vitamin allowances were adjusted according to age and sex. Calcium, phosphorus, and iron were determined by age and sex, and sodium by

Table 1. Recommended Daily Dietary Allowances, height, age, sex, and weight of each patient.

Patient	Height in.	Age yrs.	Sex	Weight Kg	Weight Lbs.	Calories	Protein g	CA mg	P mg	FE mg	Na mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg
1	65	65	F	61	135	1534	61	800	1200	12	500	5000	1.00	1.50	17	70
2	72	61	M	84	185	2102	84	800	1200	10	500	5000	1.30	1.80	18	75
3	67	75	M	52	115	1307	52	800	1200	10	500	5000	1.30	1.80	18	75
4	63	63	F	55	121	1364	55	800	1200	12	1000	5000	1.00	1.50	17	70
7	71	65	M	61	134	1534	61	800	1200	10	1000	5000	1.30	1.80	18	75
14	62	77	F	52	115	1307	52	800	1200	12	500	5000	1.00	1.50	17	70
15	66	51	F	73	160	1818	73	800	1200	12		5000	1.00	1.50	17	70
16	74	56	M	70	155	1761	70	800	1200	10		5000	1.30	1.80	18	75
17	64	57	F	59	130	1477	59	800	1200	12		5000	1.00	1.50	17	70
19	71	69	M	82	180	2046	82	800	1200	10	1000	5000	1.30	1.80	18	75
20	69	64	M	66	145	1648	66	800	1200	10	500	5000	1.30	1.80	18	75
21	65	15	F	82	180	2046	82	1300	1950	15		5000	1.30	2.00	17	80
22	64	56	F	57	125	1421	57	800	1200	12		5000	1.00	1.50	17	70
23	67	59	F	66	145	1648	66	800	1200	10	500	5000	1.00	1.50	17	70

diet prescription. Daily nutrient and calorie intakes were converted to percentages of recommended allowances for individual patients. Actual intakes of nutrients and calories may be found in Table 1, Appendix.

Data were analyzed by the Kansas State University Statistical Laboratory. Mean intake in per cent of the recommended allowances for each patient for Period I was compared with his mean intake for Period II. The paired comparison t-test of differences was calculated for intakes of nutrients studied. Plate waste of four selected menu items, and total plate waste, were analyzed.

RESULTS AND DISCUSSION

Food Intake

Calories. Intake of calories during Period II was greater at the near 10 per cent level of significance than during Period I (Table 2). Mean caloric intakes ranged from 64 to 122 per cent of recommended allowances for Period I and from 68 to 134 per cent of recommended allowances for Period II. Ten of the 14 patients had mean caloric intakes below recommended allowances for Period I and nine patients had mean caloric intakes below recommended allowances for Period II. Four of the 14 patients had a lower caloric mean intake for Period I than for Period II. Patient No. 23 had the greatest decrease in calories with a mean intake of 105 per cent of recommended allowance for Period I and a mean intake of 78 per cent of recommended allowance for Period II. Three patients, No. 3, 7, and 20, had a decrease from one to five per cent of their caloric intake when changed from a non-selective to selective menu.

Table 2. Caloric intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	85	64-110	14	86	58-130	1
2	14	82	72-117	14	90	69-130	8
3	14	110	74-147	3	105	92-115	-5
4	14	122	103-143	3	134	116-150	12
7	14	101	60-125	6	99	70-128	-2
14	6	97	72-125	3	118	113-126	21
15	4	70	57- 81	3	80	76- 83	10
16	7	72	59- 84	8	81	38-120	9
17	6	66	23-103	11	100	76-119	34
19	4	64	22- 95	3	71	66- 78	7
20	4	69	47- 83	12	68	49-160	-1
21	3	68	67- 70	3	77	67- 85	9
22	3	79	57- 99	4	119	103-135	40
23	3	105	99-112	10	78	57- 96	-27

t-test 1.888

Probability. 10-.05

The range of daily caloric intake for Period I was 22 to 147 per cent of recommended allowances (Table 2). Six patients never consumed 100 per cent of recommended caloric allowances and their lower range limits were: 22, 47, 57, 57, 59, and 67 per cent. Caloric intake for patient No. 4 ranged from 103 to 143 per cent of recommended allowance, thus he was the only patient who consistently consumed over 100 per cent of the recommended allowance for calories during Period I. In Period II daily caloric intake ranged from 38 to 160 per cent of recommended allowances. Caloric intake for patients No. 15, 19, and 21 was consistently under 100 per cent of recommended caloric allowance; whereas, caloric intake for patients No. 4, 14, and 22 was always over 100 per cent of recommended caloric allowance.

Krause (1961) suggested 25 calories per kilogram of ideal body weight for basal metabolism. Twenty-five calories per kilogram of actual weight was used as the recommended allowance for this study as ideal body weight was not known and the subjects were hospital patients who spent most of their time in bed. Only two patients, No. 3 and 7, appeared to be underweight when compared with desirable weight and height tables (Table 2, Appendix). Patient No. 3 decreased his caloric intake from 110 per cent of the recommended calories for Period I to 105 per cent of the recommended calories for Period II (Table, 2). Patient No. 7 decreased his caloric intake from 101 per cent of recommended calories for Period I to 99 per cent of recommended calories for Period II. Patient No. 16, who had a mean intake of 72 per cent of recommended calories for Period I and 81 per cent for Period II, was at the lower limits of ideal body weight for a small frame and height. Patient No. 21, who was 38 pounds overweight, had mean caloric intakes of 68 per cent of recommended allowances for Period I and 77 per cent

of recommended allowances for Period II. Patient No. 15, who was 14 pounds overweight, had mean caloric intakes of 70 per cent of recommended calories for Period I and 80 per cent of recommended calories for Period II. Nine patients had ideal body weights for their height and for a small, medium, or large frame. The two underweight patients had higher intakes during the non-selective period than the selective period, whereas, the reverse was true for the two patients who were overweight. When non-selective menus are used it is the responsibility of the dietitian to know the nutritive needs of the patients. Low calorie foods can be stressed for the obese patient and high calorie foods for the underweight. When only two choices in each food group are given the patient may not select the food that would best meet his caloric needs. Therefore, if caloric intake is a problem for individual patients, the non-selective menu may be desirable.

The findings of this study of patients on modified diets differs from the results of a study by Foss et al. (1962) of patients on regular diets. In their study the group caloric means for men and for women patients was lower on selective diets than on non-selective diets. However, the differences were not statistically significant. On both types of menus caloric intakes for both men and women was below recommended allowances based on height, weight, sex, age, and moderate activity (Foss et al. 1962).

Protein. Patients had a greater intake of protein during Period II than Period I which was significant near the ten per cent level (Table 3). Mean protein intakes ranged from 61 to 125 per cent of recommended allowances for Period I and from 59 to 159 per cent of recommended allowances for Period II. Patients No. 3, 20, and 23 had lower protein intakes during Period I than Period II. Eleven of the 14 patients had higher intakes during Period II than Period I.

Table 3. Protein intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowance.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	66	36- 89	14	86	54-130	20
2	14	74	52- 90	14	97	65-177	22
3	14	108	35-154	3	101	75-138	-1
4	14	125	95-158	3	137	126-147	12
7	14	103	54-131	6	94	72-136	9
14	6	104	81-133	3	131	106-156	27
15	4	76	55-100	3	78	73- 81	2
16	7	85	46-119	8	95	44-144	10
17	6	70	22-107	11	99	83-119	29
19	4	61	29- 83	3	72	62- 78	11
20	4	64	36- 77	12	59	36- 98	-5
21	3	81	73- 93	3	86	83- 91	5
22	3	98	86-112	4	159	135-146	41
23	3	119	106-138	10	88	47-115	-31

t-test. 1.947

Probability 10-.05

Daily protein intake ranges for Period I (22 to 158 per cent of recommended allowances) were lower than for Period II (36 to 177 per cent of recommended allowances). During Period I, the range for patient No. 23 was 106 to 138 per cent of recommended allowances for protein. All other patients did not meet recommended allowances for protein at least one day during Period I, and intakes of five patients did not meet recommended allowances for protein during the entire study Period I. Lowest daily intakes during Period II for patients No. 4, 14, and 22 were 126, 106, and 135 per cent of recommended protein allowances, respectively. Only four patients, No. 15, 19, 20, and 21 never met recommended allowances during Period II. When protein is a critical dietary nutrient, the findings of this study indicated that selective menus might help increase protein intakes.

Nine patients (64 per cent) had mean protein intakes below recommended allowances for Period I and ten patients (71 per cent) for Period II. This was higher than percentages in the study by Foss et al. (1962). They reported 31 per cent of the men and 34 per cent of the women had protein intakes below recommended allowances on regular selective menus compared to 25 per cent of the men and 24 per cent of the women on regular non-selective menus with protein intakes below recommended allowances. No foods were restricted or limited on regular diets and meat portions may have been larger in the study by Foss et al. (1962) than was allowed on modified diets in the present study. Dietary limitations may affect protein intake of patients on low sodium and low fat diets. The 500 mg. sodium diet limits meat to five ounces, milk to two cups, and eggs to one daily. Milk on low fat diets is restricted to skim milk which many patients refuse to drink.

Wakefield (1956) cited significantly higher protein intake for women on regular non-selective diets than for women on regular selective diets; whereas, the men had slight but not significantly higher intake of protein for the regular selective menu than for regular non-selective menu. Foss et al. (1962) reported significantly higher protein intakes for men on regular non-selective diets than for men on regular selective diets; whereas, women had higher protein intakes on regular selective diets than on regular non-selective diets. However, the differences for women were not significant.

Calcium. Significant differences in calcium intakes were not found between Periods I and II (Table 4). Mean calcium intakes ranged from 30 to 149 per cent of recommended allowances for Period I and from 29 to 140 per cent of recommended allowances for Period II. Four of the 14 patients had greater mean intakes during Period I than Period II. Eleven of the 14 patients had mean intakes of calcium below recommended allowances for Period I and 10 patients had mean calcium intakes below recommended allowances for Period II. Mean calcium intakes of only two patients, No. 7 and 22, exceeded recommended allowances for both periods of study.

Daily calcium intakes ranged from 6 to 180 per cent of the recommended allowances for Period I and from 21 to 244 per cent of recommended allowances for Period II. Patient No. 23 was the only patient who exceeded 100 per cent of recommended allowances for calcium in Period I. Patients No. 4, 7, and 22 consumed over 100 per cent of recommended allowances for calcium one or more days during Period I. Ten patients never consumed 100 per cent of recommended calcium allowances during Period I. Patients No. 4 and 22 always exceeded 100 per cent of recommended calcium allowances during Period II, whereas, six patients never consumed 100 per cent of recommended allowances for calcium during Period II. Apparently both types of menus supplied calcium equally well under the conditions of this study.

Table 4. Calcium intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	55	15- 85	14	63	27-139	8
2	14	48	28- 76	14	63	39-129	13
3	14	38	20- 80	3	29	21- 42	-9
4	14	93	31-129	3	113	110-115	20
7	14	137	71-180	6	140	88-244	3
14	6	70	50- 93	3	79	58-108	9
15	4	44	34- 58	3	47	40- 57	3
16	7	58	33- 85	8	117	52-202	59
17	6	30	10- 53	11	46	32- 85	16
19	4	47	6- 76	3	34	30- 41	-13
20	4	44	30- 70	12	42	21- 85	-2
21	3	35	27- 40	3	56	45- 68	21
22	3	110	88-130	4	112	104-116	2
23	3	149	127-180	10	92	40-135	-57

t-test. 783

Probability 50-.40

Results of this study agreed with findings of both Wakefield (1956) and Foss, et al. (1962) for patients on regular diets. Wakefield (1956) found mean calcium intakes were slightly higher for groups of men and women on non-selective menus when compared with groups of men and women on selective menus. The differences were statistically significant for women on non-selective menus only. Foss et al. (1962) reported that type of menu (selective or non-selective) made no significant difference in the intake of calcium. However, men on non-selective menus had slightly higher calcium intakes than men on selective menus; whereas, women on non-selective menus had lower calcium intakes than women on selective menus.

In Period I, 11 patients or 85 per cent had mean intakes of calcium below recommended allowances and in Period II, 10 patients or 71 per cent had mean intakes of calcium below recommended allowances. Foss et al. (1962) reported that all men had higher calcium intakes than recommended allowances on non-selective regular diets; whereas, 15 per cent of the women did not meet the recommended calcium allowances on the non-selective diet. Twenty-four per cent of men and 20 per cent of women on selective menus had mean intakes below recommended allowances.

Phosphorus. Phosphorous intakes showed no significant difference between Periods I and II (Table 5). Means for phosphorus intakes ranged from 45 to 116 per cent of recommended allowances for Period I and from 50 to 110 per cent of recommended allowances for Period II. Twelve of 14 patients in Period I and 11 of 14 patients in Period II had mean phosphorus intakes below recommended allowances. Four patients, No. 3, 7, 20, and 23, had greater phosphorus intakes during Period I than Period II. All other patients had greater mean intakes for Period II.

Table 5. Phosphorus intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	62	43- 81	14	70	45-102	8
2	14	78	61-122	14	97	60-178	19
3	14	66	39- 90	3	59	43- 66	-7
4	14	97	60-129	3	107	103-110	10
7	14	104	57-131	6	98	69-154	-6
14	6	73	62- 86	3	89	77-106	16
15	4	61	43- 82	3	68	62- 71	7
16	7	73	55- 98	8	100	43-163	27
17	6	47	15- 77	11	70	61- 81	23
19	4	57	18- 79	3	64	50- 81	7
20	4	54	27- 70	12	50	28- 71	-4
21	3	45	41- 50	3	57	49- 63	12
22	3	86	73-104	4	110	100-117	24
23	3	116	111-120	10	81	40-100	-35

t-test 1.654

Probability. 20-.10

Daily phosphorus intakes ranged from 27 to 131 per cent of recommended allowances for Period I and from 28 to 178 per cent of recommended allowances for Period II. Patient No. 23 consistently consumed over 100 per cent of recommended allowances for phosphorus during Period I and patients No. 4 and 22 consumed over 100 per cent of recommended allowances for phosphorus during Period II. Eight out of 14 patients in Period I and six out of 14 patients in Period II never consumed 100 per cent of the recommended allowances. Both types of menus, selective and non-selective, supplied phosphorus equally well under the conditions of this study.

Iron. No significant difference in iron intake was found for the two periods (Table 6). Mean ranges of iron were 75 to 136 per cent of recommended allowances for Period I and 77 to 176 per cent of recommended allowances for Period II. Seven of the 14 patients had mean intakes of iron below recommended allowances for Period I and six of 14 patients had mean iron intakes below recommended allowances for Period II. Four patients had greater mean intakes of iron during Period I than Period II.

Daily iron intakes ranged from 30 to 190 per cent of recommended allowances for Period I and from 40 to 370 per cent of recommended allowances for Period II. Ranges exceeded 100 per cent of the recommended allowances daily for two patients, No. 2 and 23, in Period I and three patients, No. 2, 4, and 19, in Period II. Patient No. 14 never met recommended allowances for iron during Period I. The other 13 patients' ranges included recommended allowances of iron in both Periods I and II. This indicated that iron was suppled iron equally well by either non-selective or selective menus.

Foss et al. (1962) found no significant difference of iron intake with selective and non-selective regular menus. They reported that men on non-selective regular diets consumed slightly more iron than men on selective

Table 6. Iron intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	81	50-142	14	77	50-133	-4
2	14	136	110-180	14	176	130-370	40
3	14	127	90-180	3	113	80-130	-14
4	14	104	75-133	3	111	108-117	7
7	14	95	60-140	6	95	70-120	0
14	6	75	58- 92	3	97	83-108	22
15	4	102	83-117	3	108	92-125	6
16	7	119	90-150	8	110	70-160	-9
17	6	83	33-150	11	123	83-158	40
19	4	112	30-190	3	147	120-170	35
20	4	80	50-100	12	81	40-130	1
21	3	85	67-100	3	98	87-113	13
22	3	88	67-117	4	100	92-108	12
23	3	120	110-130	10	92	50-130	-28

t-test 1.594

Probability. 20-.10

regular diets; whereas, women on selective regular diets consumed slightly more iron than women on non-selective regular diets. Wakefield (1956) cited a significantly higher intake of iron for men on non-selective regular diets than men on selective regular diets. However, women on non-selective regular diets had higher mean intakes of iron than women on selective regular diets; but the difference was not statistically significant.

Seven patients (50 per cent) had mean intakes below recommended allowances for iron in Period I and six patients (42 per cent) had mean intakes below recommended allowances of iron in Period II. Foss et al. (1962) reported that 20 per cent of the men on both selective and non-selective regular diets had iron intakes below recommended allowances. Sixty per cent of the women on selective and 80 per cent of women on non-selective regular diets did not consume 100 per cent of recommended allowances for iron. Mean intakes above recommended allowances of iron for both men and women on selective and non-selective regular menus were observed by Wakefield (1956) who did not include data to show the number that did not meet recommended allowances.

Sodium. Differences in sodium intake for the two periods were not significant (Table 7). Mean sodium intakes ranged from 40 to 94 per cent of recommended allowances for Period I and 37 to 83 per cent of recommended allowances for Period II. Five patients had greater sodium intakes during Period I and four patients had greater sodium intakes during Period II.

Daily sodium intakes ranged from 15 to 150 per cent of recommended allowances for Period I and from 19 to 139 per cent of recommended allowances for Period II (Table 7). Sodium intakes of five patients in both periods never met recommended allowances. Since sodium was the nutrient that was

Table 7. Sodium intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	47	26- 95	14	50	29-108	3
2	14	56	30-150	14	57	43- 97	1
3	14	51	33-108	3	68	22-139	17
4	14	75	61- 90	3	64	46- 90	-11
7	14	66	43- 93	6	63	44- 88	-3
14	6	40	33- 50	3	63	55- 68	23
19	4	56	15-123	3	83	51-104	27
20	4	58	19- 45	12	37	19- 66	-1
23	3	94	80-112	10	71	40-107	-23

t-test. 680

Probability 60-.50

restricted in the diet there was concern that the patient would not stay within the limits ordered by the physician if allowed to select his food. However, in this study mean intakes for all patients stayed within limits specified. Eight out of nine patients had been on a low sodium diet during previous admissions to this hospital using non-selective menus and were familiar with the diet. Patient No. 20 had not been on a low sodium diet previously. However, his wife had been on a low sodium diet for four years and he was familiar with the diet as a result of helping care for her. Since all of the patients had some previous knowledge of what foods were permissible on the diet, this experiment may not be a true measure of a patient's ability to select a low sodium diet. Also, the selective menu for a modified diet is carefully constructed to avoid any major excesses by patient. From these data it would seem that either the non-selective or selective menu could be used with the proper choices offered on the selective menu. However, the selected menu should be checked to be sure that the patient does not exceed his milk and meat allowances.

Vitamin A. The difference in vitamin A intake for the two periods was not significant (Table 8). Mean intakes of vitamin A ranged from 72 to 313 per cent of recommended allowances for Period I and 54 to 208 per cent of recommended allowances for Period II. Patients No. 14, 15, and 19 received 90, 72, and 76 per cent, respectively, of their recommended vitamin A allowances for Period I. Patients No. 3, 20, and 23 had vitamin A intakes of 69, 54, and 92 per cent, respectively, for Period II. All other intakes met or exceeded recommended allowances.

Ranges of vitamin A intake for Period I was 10 to 1,196 per cent of recommended allowances. For Period II ranges were 21 to 516 per cent.

Table 8. Vitamin A intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	156	49- 565	14	111	58-446	-42
2	14	166	93- 348	14	177	83-516	11
3	14	100	47- 264	3	69	62- 76	-31
4	14	146	68- 297	3	208	135-291	62
7	14	148	60- 288	6	130	85-225	-18
14	6	90	41- 268	3	151	76-221	41
15	4	72	49- 115	3	121	53-244	49
16	7	277	45-1196	8	185	71-399	-92
17	6	107	15- 358	11	162	53-394	55
19	4	76	10- 113	3	159	70-278	83
20	4	252	225- 238	12	54	21- 98	-178
21	3	313	153- 588	3	157	133-227	-156
22	3	132	102- 185	4	112	87-128	-20
23	3	110	81- 145	10	92	44-148	-18

t-test. . . . . -.856

Probability 50-.40

Ranges included 100 per cent of the recommended allowance for all patients for Period I and for 12 of 14 patients for Period II. Three patients during Period I and two patients during Period II consistently consumed over 100 per cent of recommended allowances. Therefore, both types of menus supplied vitamin A equally well under conditions of this study.

Three (21 per cent) of the patients did not consume recommended allowances of vitamin A during Periods I and II. Foss et al. (1962) reported that 35 per cent of men on both selective and non-selective regular diets did not consume recommended vitamin A allowances; and for women, 65 per cent on non-selective regular diets and 25 per cent on selective regular diets did not consume recommended vitamin A allowances. Wakefield (1956) and Foss et al. (1962) found no significant difference of vitamin A intakes between selective and non-selective regular diets.

Thiamine. No significant differences were evident for thiamine intake between Periods I and II (Table 9). Mean thiamine intakes ranged from 49 to 133 per cent of recommended allowances for Period I and from 50 to 131 per cent of recommended allowances for Period II. Twelve of 14 patients in Period I and 11 of 14 patients in Period II had mean thiamine intakes below recommended allowances. Four of 14 patients had higher thiamine intakes during Period I than Period II.

Daily ranges for thiamine intake were 18 to 239 per cent for Period I and 35 to 333 per cent for Period II. All patients during both periods received less than recommended allowances for thiamine for one or more days. Six patients during Period I and nine patients in Period II consumed more than 100 per cent of the recommended allowances for one or more days. Both types of menus supplied thiamine equally well under the conditions of this study.

Table 9. Thiamine intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	86	53-100	14	131	69-333	45
2	14	88	61-132	14	101	75-177	13
3	14	70	38-163	3	70	49- 84	0
4	14	101	74-129	3	95	75-105	-6
7	14	66	28-131	6	50	35- 63	-16
14	6	72	43- 87	3	95	83-115	25
15	4	72	60- 87	3	95	64-113	13
16	7	76	58- 95	8	86	36-123	10
17	6	53	19- 83	11	95	54-127	42
19	4	55	18- 91	3	76	50-105	21
20	4	49	25- 63	12	50	38- 73	1
21	3	65	59- 72	3	75	70- 82	10
22	3	133	46-239	4	101	78-138	-32
23	3	75	70- 79	10	60	35- 79	-15

t-test 1.357

Probability. 20-.10

Twelve patients (85 per cent) in Period I and 11 patients (78 per cent) in Period II had mean thiamine intakes below recommended allowances. Foss et al. (1962) reported that 30 per cent of men on non-selective regular diets and 35 per cent of men on selective regular diets consumed less than recommended allowances but 45 per cent women on non-selective regular diets and 35 per cent of women on selective regular diets consumed less than recommended allowances. Both Wakefield (1956) and Foss et al. (1962) found no significant difference in thiamine intakes with selective and non-selective regular diets.

Riboflavin. Differences in riboflavin intake were not significant for the two periods (Table 10). Mean riboflavin intakes ranged from 35 to 122 per cent for Period I and from 41 to 129 per cent for Period II. Ten of 14 patients in Period I and 11 of 14 patients in Period II had mean riboflavin intakes below recommended allowances. Seven of 14 patients had greater riboflavin intakes during Period I than Period II.

Daily intake of riboflavin ranged from 12 to 285 per cent for Period I and 28 to 219 per cent for Period II. Eight patients in Period I and 10 patients in Period II consumed daily intakes up to 100 per cent or more of the recommended allowances. Therefore, both types of menus supplied riboflavin equally well under conditions of this experiment.

Ten patients (71 per cent) had mean riboflavin intakes below recommended allowances for Period I and 11 patients (78 per cent) had mean riboflavin intakes below recommended allowances for Period II. Foss et al. (1962) reported that 15 per cent of men and women on non-selective regular diets had riboflavin intakes below recommended allowances and 25 per cent of men and women on selective regular diets had riboflavin intakes below recommended allowances. No significant difference was found in riboflavin intakes with

Table 10. Riboflavin intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	85	36-202	14	82	44-219	-1
2	14	74	44-214	14	76	53-133	2
3	14	53	18- 89	3	47	37- 57	-6
4	14	122	76-285	3	120	115-126	-2
7	14	106	47-146	6	105	69-168	-1
14	6	79	63- 99	3	86	46-125	7
15	4	63	52- 77	3	67	61- 72	4
16	7	79	41-162	8	83	47-129	4
17	6	52	17- 87	11	72	52-110	20
19	4	58	12-104	3	54	42- 68	-4
20	4	42	28- 54	12	41	28- 62	-1
21	3	35	40- 66	3	87	74-102	34
22	3	108	89-119	4	129	115-141	21
23	3	105	99-114	10	79	41-107	-26

t-test 958

Probability. 40-.30

selective or non-selective menus (Foss et al. 1962). However, Wakefield (1956) noted a significantly greater riboflavin intake for women on non-selective regular diets than for women on selective regular diets.

Niacin. Neither selective nor non-selective menus affected niacin intake significantly (Table 11). Mean intakes ranged from 45 to 91 per cent for Period I and 34 to 103 per cent of recommended allowances for Period II. All patients during Period I and 13 of 14 for Period II had mean niacin intakes below recommended allowances. Five of 14 patients had greater niacin intakes during Period I than Period II.

Daily niacin intakes ranged from 8 to 124 per cent for Period I and 16 to 173 per cent for Period II. Five in Period I and four in Period II consumed 100 per cent or more of their recommended allowances for one or more days. This study indicated that both types of menus supplied niacin equally well. Studies by Wakefield (1956) and Foss et al. (1962) agreed with this finding.

Ascorbic Acid. Type of menu, selective or non-selective, made no significant difference in ascorbic acid intake (Table 12). Mean intakes for ascorbic acid ranged from 41 to 206 per cent of recommended allowances for Period I and 59 to 265 per cent of recommended allowances for Period II. Six of 14 patients in Period I and four of 14 patients in Period II had mean ascorbic acid intakes below recommended allowances. Five of 14 patients had greater ascorbic acid intakes during Period I than Period II.

Daily intakes of ascorbic acid ranged from zero to 284 per cent for Period I and from 20 to 306 for Period II. None of the patients received daily intakes of 100 per cent of the recommended allowances during Period I. Four patients in Period II received 100 per cent of the recommended allowances daily. Therefore, both types of menus supplied ascorbic acid equally well

Table 11. Niacin intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	60	38-104	14	68	42-150	9
2	14	90	66-124	14	103	64-173	15
3	14	69	47- 99	3	70	60- 81	1
4	14	80	56-116	3	99	88-121	19
7	14	45	26- 67	6	34	25- 42	-12
14	6	68	57- 75	3	86	78- 90	18
15	4	79	68- 99	3	73	65- 79	-6
16	7	83	63-100	8	79	41-152	64
17	6	46	8- 79	11	85	69- 93	39
19	4	51	28- 79	3	76	63- 85	25
20	4	52	29- 70	12	48	16- 64	-4
21	3	91	71-106	3	85	79- 98	-6
22	3	50	14- 70	4	82	76- 91	32
23	3	79	69- 87	10	56	31- 97	-23

t-test 1.537

Probability. 20-.10

Table 12. Ascorbic acid intake for each patient during Periods I and II; number of days participating, mean, range, and mean differences in per cent of recommended allowances.

	Non-Selective, Period I			Selective, Period II.			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	119	40-187	14	146	82-182	27
2	14	206	59-274	14	265	172-315	59
3	14	75	43-127	3	91	40-144	16
4	14	172	10-284	3	134	73-169	-38
7	14	73	24-126	6	59	30-121	-16
14	6	111	45-192	3	98	77-116	-13
15	4	122	48-223	3	111	79-153	-11
16	7	169	87-223	8	178	106-293	9
17	6	41	0-100	11	186	24-306	143
19	4	102	78-133	3	88	38-114	-14
20	4	96	24-200	12	164	100-223	68
21	3	113	88-144	3	123	70-184	10
22	3	90	53-114	4	141	130-159	51
23	3	93	90- 98	10	103	20-220	10

t-test 1.726

Probability. 20-.10

Six patients (42 per cent) in Period I and four patients (28 per cent) in Period II had mean ascorbic acid intakes below recommended allowances. Findings of Wakefield (1956) and Foss et al. (1962) agreed with those of this study. Foss et al. (1962) reported 30 per cent of men and 45 per cent of women on non-selective menus had mean intakes below recommended allowances and 55 per cent of men and 25 per cent of women on selective regular menus had intakes below recommended allowances.

Plate Waste

Total Waste. No significant difference in total plate waste was found between Periods I and II (Table 13). Mean plate waste in grams for each patient for Period I was compared with that of Period II which offered an opportunity to study individual rather than group plate waste. Mean plate waste for Period I ranged from 17.33 to 577.50 grams; whereas, means for Period II ranged from 2.00 to 594.67 grams. Patient No. 15's mean plate waste was 281.75 for Period I and 2.00 for Period II. Food left on the tray during Period II was only one sugar packet.

Daily plate waste ranged from zero to 1,029 grams for Period I and from zero to 765 grams for Period II. Two patients in Period I and five patients in Period II consumed all food on their tray for one or more days. Patient No. 7 had a plate waste of 1,029 grams for one day during Period I and a plate waste range of 412 to 745 grams in Period II. Plate waste was greater for seven patients in Period I and seven patients in Period II. Therefore, type of menu selective or non-selective did not appear to affect the total plate waste in this study.

These findings differ from results of a study by Jefferies (1957). He noted a 40 per cent difference in plate waste for patients on non-selective

Table 13. Total plate waste for each patient during Periods I and II; number of days participating, mean, range, and mean differences.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	439.64	341- 720	14	351.07	135-530	-138.57
2	14	40.43	0- 109	14	102.29	6-486	61.86
3	14	296.07	98- 445	3	190.67	101-336	-105.40
4	14	180.64	62- 293	3	34.67	12- 70	-145.97
7	14	437.64	90-1029	6	594.67	412-745	157.03
14	6	347.33	220- 501	3	180.00	66-406	-167.33
15	4	281.75	129- 401	3	2.00	0- 6	-279.75
16	7	108.86	43- 220	8	140.38	0-418	31.52
17	6	137.67	59- 324	11	203.64	13-765	65.97
19	4	422.50	35- 797	3	107.67	0-223	-314.83
20	4	92.67	41- 159	12	201.33	0-528	108.66
21	3	49.00	8- 123	3	233.33	141-346	184.33
22	3	577.50	281- 871	4	59.00	16- 85	-518.50
23	3	17.33	0- 26	10	288.60	0-605	271.27

t-test 955

Probability 40-.30

regular diets as compared with that of patients on selective regular diets. However, statistical calculations in Jefferies'(1957) study were on differences of group means rather than on differences of individual means.

Bread. Plate waste for all bread served during the day did not differ significantly between Periods I and II (Table 14). Patient No. 14 did not select bread for one meal each day during the entire time she received a selective menu. No bread was ordered except for breakfast by patient No. 20 for six out of 12 days on a selective menu. Both patients refused bread frequently while on non-selective menus, and patient No. 20 did not always eat the bread he ordered during the selective period.

Mean waste for bread ranged from zero to 62.50 grams for Period I and from zero to 50.67 grams for Period II. Daily bread waste ranged from zero to 100 grams for Period I and zero to 67 grams for Period II. Bread waste for patient No. 7 ranged from 12 to 55 grams for Period I and 45 to 67 grams for Period II. Patient No. 4 wasted at least 10 grams daily and patient No. 22 wasted 12 grams or more daily for Period I. No bread was wasted for one or more days by all other patients during both Periods. Patients No. 21 and 23 wasted no bread during Period I. Mean differences showed that eight patients out of 14 wasted more bread during Period I than Period II, however, this did not prove to be significant statistically. Therefore, type of menu, whether selective or non-selective, made no difference in the amount of bread wasted.

Breakfast Fruit. Breakfast fruit plate waste showed no significant difference for Periods I and II (Table 15). Patient No. 17 consumed all breakfast fruit sent daily during the non-selective period, yet selected fruit at breakfast only three out of ten days during Period II. Patient No. 21 selected and ate both fruit and juice every day during Period II.

Table 14. Bread plate waste for each of 14 patients during Period I and II; number of days participating, per cent mean, range, and mean difference.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	11.93	0- 37	14	6.86	0-37	-5.07
2	14	1.21	0- 12	14	0	0- 0	-1.21
3	14	31.36	0- 45	3	0	0- 0	-31.36
4	14	20.93	10- 25	3	4.00	0-12	-16.93
7	14	38.86	12- 55	6	50.67	45-67	11.81
14	6	35.67	0- 58	3	16.33	0-37	-19.34
15	4	19.00	0- 35	3	0	0- 0	-19.00
16	7	6.86	0- 25	8	20.00	0-59	13.14
17	6	10.50	0- 20	11	17.82	0-35	7.32
19	4	62.50	0-100	3	0	0- 0	-62.50
20	4	8.33	0- 25	12	14.08	0-30	5.76
21	3	0	0- 0	3	0	0- 0	0.00
22	3	37.25	12- 62	4	0	0- 0	-37.25
23	3	0	0- 0	10	3.30	0-50	13.30

t-test. 1.693

Probability 20-.10

Table 15. Breakfast fruit plate waste for each of 14 patients during Periods I and II; number of days participating, per cent mean, range, and mean difference.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	32.86	0-100	14	10.71	0- 80	-22.15
2	14	2.14	0- 30	14	29.29	0-175	-27.15
3	14	6.43	0- 30	3	58.33	0-175	51.90
4	14	8.93	0- 40	3	0	0- 0	-8.93
7	14	.71	0- 10	6	85.00	0-275	84.29
14	6	12.83	0- 65	3	0	0- 0	-12.83
15	4	8.00	0- 22	3	0	0- 0	-8.00
16	7	1.00	0- 7	8	0	0- 0	-1.00
17	6	0	0- 0	11	0	0- 0	0.00
19	4	7.50	0- 20	3	0	0- 0	-7.50
20	4	7.33	0- 22	12	0	0- 0	-7.33
21	3	7.33	0- 22	3	55.00	0-165	47.67
22	3	0	0- 0	4	0	0- 0	0.00
23	3	0	0- 0	10	14.29	0-100	14.29

t-test 1.377

Probability 20-.10

Mean waste of breakfast fruit ranged from zero to 32.86 grams for Period I and zero to 85 grams for Period II. No breakfast fruit was wasted by three patients during Period I or by eight patients during Period II. All patients consumed all the breakfast fruit one or more days during both periods. Daily ranges were zero to 100 grams wasted for Period I and zero to 275 grams for Period II. Eight patients had greater breakfast fruit waste during Period I than Period II and four patients had greater breakfast fruit waste during Period II than Period I. However, these differences were not statistically significant. Therefore, type of menu made no difference in amount of breakfast fruit wasted.

Cereal. Periods I and II showed no significant difference in breakfast cereal plate waste (Table 16). One patient consistently wasted either the cereal or the egg during Period I and during Period II ordered only one or the other. This seemed to indicate that the patient could not consume all food sent on the breakfast tray during the non-selective period.

Two patients in Period I and seven patients in Period II never wasted cereal. The means ranged from zero to 146.25 grams for Period I and zero to 65.40 grams for Period II. The daily range was zero to 250 grams for Period I and zero to 150 grams for Period II. Every patient consumed all cereal served for one or more days during both study periods. Seven out of 14 patients wasted more cereal during Period I than Period II. Cereal wasted was not affected by type of menu used in this study.

Eggs. Egg plate waste was not significantly different for Periods I and II (Table 17). One patient, No. 16, ate an egg the first day on a non-selective menu and then expressed a dislike for eggs. He neither ate nor selected eggs for the remainder of the study. Patient No. 14 ate one egg the first day and half an egg the second day on a non-selective menu. She

Table 16. Cereal plate waste for each of 14 patients during Periods I and II; number of days participating, per cent mean, range, and mean difference.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	39.79	0-100	14	36.82	0-100	-2.97
2	14	4.28	0- 60	14	13.07	0- 65	8.79
3	14	9.29	0- 70	3	0	0- 0	-9.29
4	14	7.86	0- 55	3	0	0- 0	-7.86
7	14	2.14	0- 15	6	43.00	0-100	40.86
14	6	18.17	0- 60	3	0	0- 0	-18.17
15	4	101.25	0-150	3	0	0- 0	101.25
16	7	5.43	0- 18	8	5.57	0- 18	.14
17	6	0	0- 0	11	0	0- 0	0.00
19	4	146.25	0-250	3	0	0- 0	-146.25
20	4	10.00	0- 30	12	65.40	0-150	55.40
21	3	25.33	0- 76	3	8.00	0- 24	-17.33
22	3	75.00	0-150	4	0	0- 0	-75.00
23	3	0	0- 0	10	39.25	0-150	39.25

t-test 1.119

Probability 30-.20

Table 17. Egg plate waste for each of 14 patients during Periods I and II; number of days participating, per cent mean, range, and difference.

	Non-Selective, Period I			Selective, Period II			
Patient	Days	Mean %	Range %	Days	Mean %	Range %	Mean Differences %
1	14	12.86	0- 50	14	1.07	0- 10	-11.79
2	14	1.07	0- 15	14	.77	0- 5	-.30
3	14	.71	0- 5	3	16.67	0- 50	-15.96
4	14	3.57	0- 50	3	0	0- 0	-3.57
7	14	.36	0- 5	6	4.17	0- 10	3.81
14	6	25.00	5- 50	3	25.00	0- 50	00.00
15	4	0	0- 0	3	0	0- 0	00.00
16	7	0	0- 0	8	0	0- 0	00.00
17	6	0	0- 0	11	0	0- 0	00.00
19	4	18.75	0- 50	3	8.33	0- 25	10.42
20	4	0	0- 0	12	0	0- 0	00.00
21	3	8.33	0- 25	3	0	0- 0	-8.33
22	3	12.50	0- 50	4	0	0- 0	-12.50
23	3	0	0- 0	10	1.57	0- 8	1.57

t-test 924

Probability 40-.30

then expressed a dislike for eggs. For the three days she was on a selective menu, she selected an egg the first and third day but refused to eat it the first day.

Zero to 25 grams was the range of means for egg waste for both periods. Five patients during Period I and eight patients during Period II wasted no eggs. Daily waste ranged from zero to 50 grams for both periods. The average weight of a serving of egg was 50 grams. Six patients wasted more eggs during Period I than Period II. Five patients consumed all eggs sent on trays and three patients wasted more eggs during Period II than Period I. Therefore, type of menu made no difference in amount of egg wasted.

SUMMARY AND CONCLUSIONS

Selective menus are used in many hospitals to give the patient an opportunity to choose his own food. In this study food intake and plate waste of hospital patients on soft or regular low sodium diets or regular low fat diets were investigated during a 28 day period. To determine the effectiveness of selective menus for modified diets menus were planned by the dietitian for patients on these specified diets for 14 days during Period I (non-selective menus). Patients selected their food from modified menu cards for 14 days during Period II (selective menus). Each food item was weighed on Hanson gram scales and the amount recorded before being served to patients. Uneaten food was weighed and recorded when trays were returned to the kitchen. Food intake of each patient was determined by subtracting the weight of the plate waste from the weight of the food served. Intake of calories, protein, phosphorus, calcium, iron, sodium, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid was calculated for each patient.

National Research Council's Recommended Daily Dietary Allowances were adjusted for each individual patient according to weight, age, and sex. Calorie and nutrient intakes were converted to percentages of recommended allowances for the individual patient. Mean intake for each patient for Period I was compared with his mean intake for Period II. The paired comparison t-test of differences was calculated by the Kansas State University Statistical Laboratory for intakes of calories and nutrients studied. Plate waste of four selected menu items, and total plate waste were analyzed.

Patients had a greater intake of calories and protein during Period II than Period I which was significant at near the ten per cent level. Intakes of calcium, phosphorus, iron, sodium, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid were not significantly different between Period I and Period II. No significant difference between Period I and II was found for total plate waste, or plate waste for bread, breakfast fruit, cereal and eggs.

The findings of this study indicated that: (1) If caloric intake is a problem for individual patients, the non-selective menu may be desirable. (2) When protein is a critical dietary nutrient, selective menus might help increase protein intakes. (3) Factors other than food intake and plate waste should determine the type of menu to use for modified diets in each individual hospital.

LITERATURE CITED

Alma, Sister M. 1958. Double selection double patient satisfaction. Hospitals 32, 75.

Bannister, A. C. 1956. How selective menus improved our food service. Hospitals 30, 70.

Elman, K. 1963. Are selective menus worthwhile? Yes. Modern Hospital. 100, 100.

Flynn, H. W. 1963. Are selective menus worthwhile? No. Modern Hospital. 100, 100.

Foss, J. A., and M. A. Olsen. 1962. Of what worth is the selective menu? J. Amer. Dietet. Assoc. 41, 29.

Fraser, E. 1958. Can the patient's menu selection be forecast? J. Amer. Dietet. Assoc. 41, 29.

Hains, A. 1961. Selective cycle menus for a hospital chain. J. Amer. Dietet. Assoc. 38, 362.

Hopper, A. E. 1959. Patients thrive on epicurean food service. Hospitals, 93, 110.

Hopper, A. E. 1961. Hospital meals ala cart. Hospitals, 35, 64.

National Research Council. 1954. Sodium-restricted diets. Publication 325.

National Research Council. 1958. Recommended dietary allowances. Publication 589.

Jefferies, J. R. 1957. A study to determine which menu selective or non-selective provides the greatest satisfaction to patients on a regular diet at the Stormont-Vail Hospital, Topeka, Kansas. Unpublished Master's Thesis, University of Minnesota, Minneapolis, Minnesota.

Krause, M. V. 1961. Food, nutrition and diet therapy. 3rd ed. Philadelphia: W. B. Saunders.

Molleson, A. L. 1956. What's new in modified diets. Hospitals, 30, 68.

Ortolano, M. and J. T. Rainey. 1962. Implementing a selective cycle menu system. Hospitals, 36, 84.

Pearson, E. 1954. Selective menus for therapeutic diets. J. Amer. Dietet. Assoc. 30, 1262.

Pinney, E. V. 1955. Cycle menus, tempered with flexibility, have advantages. J. Amer. Dietet. Assoc. 31, 901.

Pinney, E. V. 1957. There's no magic to preparing cycle menus. Hospitals 31, 64.

Ralli, F. M. 1957. Selective menus in a psychiatric hospital. J. Amer. Dietet. Assoc. 33, 1172.

Swenson, G. B. 1958a. Selective menus needn't mean extra work. Modern Hospital. 90, 102.

Swenson, G. B. 1958b. Cycle menu plan adapted for selective menus. J. Amer, Dietet. Assoc. 34, 1308.

U.S. Department of Agriculture. 1950. Composition of foods. Agri. Handbook No. 8.

Wakefield, L. 1956. A study of the relative adequacy of the self-selected and non-self-selected regular diets of ambulatory patients at the Auburn (N.Y.) Memorial Hospital. Master's Thesis. University of Connecticut, Storrs.

APPENDIX

Form 1

July 27, 1959

Dear Doctor:

A research study will be done on low sodium and low fat selective and non-selective modified diets at Stormont-Vail Hospital for my Master's Thesis, Kansas State University. These diets will be studied from the standpoint of teaching techniques, patient satisfaction and total food intake.

The study will begin July 29th with all the patients on the above prescribed diets participating. For Part I of the study (July 29 through August 12) the patients will receive a diet written by the dietitian observing the patients' likes and dislikes. The patient will select his own food from a selective modified menu for Part II of this study (August 13 through August 25). A questionnaire will be given regarding patient satisfaction and the dietitian will give dietary instructions.

The food sent and returned on each tray will be weighed and the food intake calculated. Comparison will be made between the food intake of each patient and the National Research Council's recommended daily dietary allowances.

Any comments, questions or suggestions you may have regarding this study will be appreciated. I can be reached at Stormont-Vail, phone CE 5-2361, extension 204.

Sincerely,

Charlene Langford

Charlene Langford

Form 2

STORMONT-VAIL HOSPITAL

MODIFIED DIET MENU

DATE _____

WRITTEN BY _____ CHECKED BY _____

NAME _____

BED NO. _____

DIET _____

CONDIMENTS Y _____

BREAKFAST

FRUIT _____

JUICE _____

_____

CEREAL _____

_____

EGG _____

_____

BACON _____

_____

_____

TOAST _____

BUTTER _____

_____

MILK JELLY TEA

COCOA CREAM COFFEE

SANKA

NAME _____

BED NO. _____

DIET _____

CONDIMENTS _____

LUNCH

BROTH OR SOUP _____

ENTREE _____

_____

POTATO OR SUBS. _____

VEGETABLE _____

_____

SALAD _____

DESSERT _____

JUICE _____

_____

BREAD _____

BUTTER _____

_____

MILK JELLY TEA

COCOA CREAM COFFEE

SANKA

NAME _____

BED NO. _____

DIET _____

CONDIMENTS _____

DINNER

BROTH OR SOUP _____

ENTREE _____

_____

POTATO OR SUBS. _____

VEGETABLE _____

_____

SALAD _____

DESSERT _____

JUICE _____

_____

BREAD _____

BUTTER _____

_____

MILK JELLY TEA

COCOA CREAM COFFEE

SANKA

Form No. S-105 (Rev. 10-17-58)

Form 3

STORMONT-VAIL HOSPITAL
SELECTIVE MODIFIED MENU

HEAVILY CIRCLE YOUR SELECTION RETURN ON BREAKFAST TRAY

BED NO._____NAME_____MONDAY I (SU)

DIET_____CONDIMENTS_____

BREAKFAST

ORANGE JUICE PETTIJOHNS

APPLESAUCE RICE KRISPIES

SOFT BOILED EGG POACHED EGG PUFFED RICE

TOAST BREAD POSTUM BUTTER JELLY

COFFEE TEA SANKA INSTANT COFFEE COCOA MILK

BED NO._____NAME_____MONDAY I (SU)

DIET_____CONDIMENTS_____

LUNCH

BROTH MILK SOUP CRACKERS

CHICKEN ASPARAGUS

BEEF TIMBALE GREEN BEANS

LETTUCE SALAD

CHERRIES FLAVORED GELATIN FRUIT TAPIOCA

BREAD TOAST INSTANT COFFEE BUTTER JELLY

COFFEE TEA POSTUM ICED TEA SANKA MILK

BED NO._____NAME_____MONDAY I (SU)

DIET_____CONDIMENTS_____

DINNER

BROTH MILK SOUP CRACKERS

ROAST VEAL STEWED TOMATOES

BEEF STEW PAPRIKA POTATO BABY LIMA BEANS

COMBINATION FRUIT SALAD

PEACHES FLAVORED GELATIN PLUMS

BREAD TOAST INSTANT COFFEE BUTTER JELLY

COFFEE TEA POSTUM ICED TEA SANKA MILK

Form 4

FOOD INTAKE

NAME_____ DIET_____ ROOM NO._____ CONDITION_____ MEAL_____ DATE_____

FOOD	AMOUNT SERVED		AMOUNT RETURNED	AMOUNT EATEN	ENERGY	CHO	FAT	MINERALS				VITAMINS					TRYPTO-PHAN
	HOUSE-HOLD MEASURE	GM	GM	GM	CALORIES	GM	GM	CA MG	P MG	FE MG	NA MG	A IU	THIA-'MINE MG	RIBO-FLAVIN MG	NIA-CIN MG	ASCOR-BIC ACID MG	
TOTAL																	
NRC ALLOWANCES																	

Table 1. Daily calorie, nutrient intake, and plate waste for Patient No. 1 on a Regular 500 mg Low Sodium Diet.

Period	Day No.	Calories	Protein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	Plate waste g
I	1	987	37	518	641	6	252	2971	.65	1.54	7.09	56.30	367
	2	1055	36	435	606	7	474	3911	.53	.87	7.91	27.95	720
	3	1239	46	581	688	17	143	7793	1.80	1.17	9.71	60.33	367
	4	1680	41	511	662	11	184	4173	.72	.87	9.15	75.20	714
	5	1387	22	505	977	12	287	3682	1.00	1.24	10.40	101.55	449
	6	899	31	121	517	7	128	1757	.58	.54	8.40	51.05	667
	7	1471	54	369	890	12	231	26213	.88	.98	6.47	115.05	380
	8	1295	38	467	772	13	312	28243	.86	3.03	15.49	130.70	208
	9	1231	47	384	771	9	239	9219	.78	1.11	10.41	126.14	492
	10	1561	51	415	894	10	240	4920	.88	1.09	17.64	73.69	351
	11	1527	37	386	677	9	150	2439	.81	.79	8.61	53.05	574
	12	1506	47	681	863	8	270	3344	.75	1.03	9.18	125.95	341
	13	989	38	325	628	7	195	2555	.62	1.98	10.34	51.04	544
	14	1357	37	445	834	8	180	5809	1.21	1.24	9.24	119.61	465
II	15	1157	55	369	719	8	210	5074	1.22	.76	8.65	126.88	440
	16	1281	47	324	766	9	207	3117	.76	.73	11.41	99.51	510
	17	1157	38	401	619	6	190	3591	2.22	.87	7.09	104.67	455
	18	891	44	393	716	8	188	4930	2.74	.90	10.70	104.97	380
	19	1330	48	551	1200	10	262	2850	.86	1.13	13.24	57.35	302
	20	1077	46	447	607	7	249	5824	.68	.95	7.92	98.36	397
	21	1990	52	500	923	9	273	2946	.79	.99	9.45	85.75	289
	22	927	33	390	713	9	252	22301	.69	2.14	10.77	116.59	328
	23	1381	58	445	812	9	218	9474	.96	.88	10.39	120.00	192
	24	1553	74	1110	897	9	284	3958	3.33	3.29	14.32	105.50	256
	25	1061	39	213	541	9	147	1922	.75	.66	8.89	111.69	173
	26	1875	66	799	1113	16	542	2976	1.32	1.48	14.96	127.59	135
	27	1778	79	595	1228	13	218	2519	1.26	1.37	25.47	98.65	291
	28	1092	53	505	871	8	283	6222	.74	1.14	8.47	74.15	567

Table 1. (Continued) Patient No. 2 on a Regular 500 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day No.	Calories	Protein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	Plate waste g
I	1	1720	61	369	786	11	750	5525	1.34	1.08	14.94	205.51	22
	2	1590	44	298	730	12	220	6513	.79	1.12	13.85	44.00	45
	3	2456	69	379	907	13	263	11626	.93	1.21	15.52	77.55	12
	4	1598	55	604	831	12	151	10561	1.00	.95	11.94	177.85	39
	5	1516	67	303	953	13	198	5125	1.31	1.04	18.82	196.25	22
	6	1640	66	308	797	12	124	5509	.91	.98	13.37	127.46	33
	7	1765	59	333	960	13	243	15293	1.20	1.02	16.36	188.15	10
	8	1627	60	228	1051	18	302	4650	1.71	3.86	22.35	156.85	109
	9	1730	69	553	1469	15	322	6131	1.23	1.61	16.44	189.25	32
	10	1747	66	226	921	13	243	6227	1.13	1.17	19.82	145.70	0
	11	1847	59	403	829	16	255	7997	1.21	1.28	15.24	154.35	5
	12	1565	62	584	1014	13	227	6248	1.13	.80	15.88	191.22	95
	13	1555	56	349	788	14	229	7438	.95	1.05	17.90	147.15	91
	14	1728	76	490	1096	15	280	17401	1.11	1.44	14.06	160.50	51
II	15	1447	69	338	980	15	249	8189	1.36	1.14	17.40	189.51	15
	16	1767	59	337	953	13	214	8092	1.03	1.05	18.01	194.73	36
	17	1661	64	366	891	14	246	14648	.98	1.09	15.96	189.75	97
	18	1727	58	326	866	16	249	6332	.98	1.06	16.49	149.40	227
	19	1934	97	312	1130	18	226	8389	1.26	1.24	26.72	218.82	96
	20	2102	71	396	942	13	241	4382	1.08	1.09	13.68	130.40	90
	21	1830	74	535	1151	15	324	15800	1.16	1.34	14.94	211.25	150
	22	2191	78	477	1145	15	227	13499	1.22	1.33	21.82	201.32	6
	23	2142	101	708	1312	17	338	7205	1.45	1.75	19.65	236.23	42
	24	1829	76	583	1094	15	254	4077	1.14	1.40	14.13	195.75	41
	25	1638	55	721	712	13	244	4467	.86	.95	11.55	141.95	12
	26	1981	149	1035	2132	25	483	6710	1.85	2.39	31.33	229.43	486
	27	2726	107	533	1783	20	360	8295	1.69	1.51	26.70	310.30	87
	28	1526	94	663	1254	37	333	13655	2.30	1.70	17.20	180.70	47

Table 1. (Continued) Patient No. 3 on a Regular 500 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day No.	Calor-ies	Pro-tein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	1	962	41	168	598	10	540	3995	.86	.64	11.80	95.50	410
	2	1322	18	157	463	9	169	2360	.50	1.60	8.87	32.10	263
	3	1448	55	340	809	11	271	13191	.84	1.07	12.69	42.40	285
	4	1334	44	639	681	11	163	4743	.67	.75	8.54	60.25	340
	5	1296	50	228	661	13	172	4224	.82	.89	12.67	52.60	360
	6	1292	58	218	725	14	189	5127	.97	.97	13.35	86.49	417
	7	1926	50	281	719	9	236	7067	.83	.87	10.36	72.36	435
	8	1355	51	280	780	13	278	5187	.75	.98	9.69	50.30	226
	9	1429	71	217	1015	13	244	3631	.96	1.24	13.62	45.45	130
	10	1666	69	300	999	14	233	3850	.94	1.12	17.48	74.80	445
	11	1480	51	234	650	13	192	3911	.81	.97	10.38	36.50	273
	12	1665	62	507	943	12	257	3437	.81	.94	13.21	55.22	193
	13	1480	85	259	968	18	313	5566	2.12	1.27	17.75	46.25	276
	14	1464	80	420	1077	18	332	3451	.89	.32	13.72	32.64	98
II	15	1400	56	795	795	13	212	3805	1.09	1.02	12.35	107.65	101
	16	1198	39	165	515	8	112	3109	.64	.66	10.79	30.30	336
	17	1509	72	775	775	13	695	3421	1.00	.86	14.57	66.95	135

Table 1. (Continued) Patient No. 4 on a Regular 1000 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day No.	Calor-ies	Pro-tein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	1	1540	62	285	737	12	675	5849	1.29	1.24	14.08	198.65	237
	2	1713	60	251	716	13	768	5247	.74	1.18	14.28	41.65	113
	3	1703	82	312	922	13	795	14871	1.33	1.90	14.95	164.30	116
	4	1545	67	1034	1287	11	736	4814	.80	1.58	11.84	93.75	275
	5	1615	59	844	1261	14	622	5636	1.20	1.66	15.83	172.05	125
	6	1814	69	853	1131	14	789	10733	.97	1.74	12.50	144.40	139
	7	1948	66	853	1548	11	767	11998	1.08	1.66	13.06	163.24	86
	8	1665	70	819	1368	16	903	10064	.88	4.28	19.72	134.25	187
	9	1662	83	945	1373	11	835	5541	1.14	2.23	11.10	95.45	139
	10	1783	76	827	1328	12	757	5509	.88	1.76	17.35	113.90	236
	11	1700	68	735	1090	12	751	6497	1.08	1.61	10.26	7.25	249
	12	1401	52	828	984	9	611	3415	.85	1.14	9.48	139.80	275
	13	1584	63	816	1080	12	689	7773	.95	1.69	13.50	135.00	293
	14	1620	87	988	1410	14	838	4004	1.00	2.04	13.36	78.30	62
II	15	1588	74	919	1325	14	556	9867	1.05	1.89	20.65	118.15	70
	16	2042	71	879	1235	13	905	6737	.75	1.70	14.88	51.20	22
	17	1856	81	909	1306	13	455	14564	1.05	1.82	15.12	112.79	112

Table 1. (Continued) Patient No. 7 on a Regular 1000 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day No.	Calories	Protein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	Plate waste g
I	1	1448	54	812	982	9	432	8113	.83	1.57	8.32	67.25	330
	2	1870	62	811	1164	11	931	7979	.83	1.60	12.14	46.00	90
	3	1477	53	880	1007	10	569	8371	.90	1.66	8.61	89.45	331
	4	927	33	571	615	7	459	2981	.36	.88	4.68	18.10	1029
	5	1410	69	997	1197	10	843	6095	.59	2.17	11.01	48.37	380
	6	1348	80	830	1192	9	642	8829	.78	1.62	8.73	63.00	206
	7	1484	59	1059	1166	7	692	6232	1.57	.84	6.60	94.30	350
	8	1378	55	1293	1303	6	732	14401	1.36	2.62	6.28	27.95	751
	9	1523	71	1442	1463	7	858	6284	.78	2.48	5.98	76.85	456
	10	1609	60	1112	1383	8	545	6394	.76	1.98	8.68	55.20	512
	11	1877	72	1384	1479	14	664	7616	1.40	2.35	8.88	46.10	352
	12	1703	64	1415	1424	10	583	6014	.76	2.15	7.65	70.13	447
	13	1887	78	1589	1576	13	679	8470	.61	2.53	11.02	43.50	414
	14	1693	68	1377	1546	12	610	5694	.57	2.36	8.74	43.55	479
II	15	1485	50	970	1013	12	643	6744	.82	1.71	6.59	91.05	412
	16	1691	55	1199	1197	10	587	7253	.80	2.04	4.47	28.25	481
	17	1466	62	1111	1230	9	663	4731	.60	1.86	5.23	22.30	674
	18	1968	83	1949	1849	9	885	11240	.66	3.02	7.58	67.65	728
	19	1077	44	707	832	7	440	4246	.46	1.24	6.79	24.65	528
	20	1429	52	811	984	10	552	4884	.58	1.50	5.78	31.85	745

Table 1. (Continued) Patient No. 14 on a Regular 500 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day No.	Calories	Protein g	Ca mg	P mg	Fe mg	Na mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	Plate waste g
I	9	1340	69	611	903	10	224	2443	.82	1.49	12.50	91.00	261
	10	1155	48	400	839	8	193	3049	.61	1.03	12.56	31.25	501
	11	1628	49	406	791	11	198	4004	.87	1.16	10.44	105.14	406
	12	1195	46	741	926	7	163	2035	.86	1.03	9.76	134.72	314
	13	937	42	442	741	8	164	2223	.43	.95	11.75	39.15	327
	14	1315	69	630	1038	10	251	13378	.71	1.49	12.69	65.00	220
II	15	1500	81	864	1274	13	330	4770	1.15	1.88	15.22	81.15	66
	16	1649	55	566	924	10	276	3779	.85	.69	15.14	70.35	114
	17	1480	68	460	1025	12	341	11069	.85	1.31	13.20	54.00	68

Table 1. (Continued) Patient No. 15 on a Regular Low Fat Diet.

Period	Day No.	Calories	Protein g	Minerals				Vitamins				Plate waste g
				Ca mg	P mg	Fe mg	A IU	Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	
I	11	1471	54	308	624	13	3481	.87	.98	16.77	155.88	344
	12	1239	53	455	800	10	2735	.72	.78	11.52	90.05	253
	13	1038	40	273	517	14	2752	.60	.85	12.16	62.33	401
	14	1372	73	388	981	12	2428	.67	1.16	13.22	33.65	129
II	15	1512	59	458	856	13	2660	1.13	1.04	12.76	107.30	0
	16	1463	53	317	738	11	3277	.64	.91	13.35	55.60	6
	17	1384	59	348	842	15	12202	.78	1.08	11.02	69.95	0

Table 1. (Continued) Patient No. 16 on a Regular Low Fat Diet.

Period	Day No.	Calories	Protein g	Minerals: Ca mg	P mg	Fe mg	A IU	Vitamins: Thiamine mg	Riboflavin mg	Niacin	Ascorbic acid mg	Plate waste g
I	8	1152	61	384	784	15	9067	.83	1.03	13.25	124.07	220
	9	1047	68	682	976	10	4154	.99	1.63	11.35	73.37	108
	10	1127	58	522	847	9	4366	.76	2.91	16.36	64.90	84
	11	1480	61	682	926	15	11968	1.21	1.46	12.68	158.57	69
	12	1327	53	315	745	10	2242	1.03	.74	15.54	162.65	43
	13	1386	32	261	664	12	5371	.96	.96	16.94	137.80	92
	14	1413	83	398	1181	12	59786	1.10	1.22	17.98	166.99	146
II	15	1739	63	808	1141	16	6120	1.40	1.73	15.55	120.85	102
	16	1677	79	1064	1344	12	7248	1.31	.87	18.53	176.53	72
	17	1386	79	1142	1358	14	19947	.95	1.37	12.71	129.64	123
	18	673	31	418	512	7	13289	.47	.85	7.44	86.70	0
	19	1465	60	600	932	10	3559	.80	1.13	16.19	147.85	142
	20	1357	62	800	1269	10	6836	1.16	1.95	8.30	219.87	418
	21	950	56	1026	1059	9	10703	1.63	1.76	7.81	106.70	207
	22	2106	101	1618	1954	10	6347	1.24	2.32	27.27	79.25	59

Table 1. (Continued) Patient No. 17 on a Regular Low Fat Diet.

Period	Day No.	Calories	Protein g	Minerals: Fat gm	Ca mg	P mg	Fe mg	A IU	Vitamins: Thiamine mg	Riboflavin mg	Niacin mg	Ascorbic acid mg	Plate waste g
I	9	1499	63	31	415	924	17	1846	.83	1.29	10.71	28.40	324
	10	344	13	11	78	175	2	735	.23	.26	1.35	0	75
	11	1524	55	48	340	721	18	9980	.91	1.07	11.74	69.90	145
	12	743	36	25	131	484	6	908	.39	.49	6.71	4.30	103
	13	473	22	16	79	207	4	807	.19	.26	4.80	16.90	120
	14	1335	59	47	425	885	13	17921	.64	1.30	12.03	51.70	59
II	15	1414	62	41	332	933	15	2659	1.27	1.10	16.22	214.50	179
	16	1562	57	37	342	802	12	5043	.73	.93	14.21	149.35	126
	17	1642	66	39	321	847	16	13785	1.18	.84	15.75	172.03	125
	18	1438	55	45	344	737	13	5003	.88	.78	12.18	168.95	57
	19	1465	49	38	441	906	15	11499	.96	1.18	14.22	170.99	206
	20	1705	59	45	331	785	15	5005	.77	.98	11.80	92.60	13
	21	1758	65	48	678	856	19	19697	1.11	1.65	12.91	179.70	74
	22	1245	51	53	258	764	10	3094	.54	.98	16.77	17.03	765
	23	1498	70	36	449	973	16	12126	1.13	1.39	14.10	98.45	138
	24	1127	51	31	253	843	15	3050	.76	.92	16.07	94.05	196
	25	1421	61	57	313	798	17	8238	1.07	1.07	14.11	73.88	202

Table 1. (Continued) Patient No. 19 on a Regular Low Fat Diet.

				Minerals				Vitamins				
Period	Day	Calor-ies	Pro-tein gm	Ca mg	P mg	Fe mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	11	1947	68	608	940	19	5667	1.18	1.87	12.62	99.80	35
	12	452	24	45	220	3	475	.23	.22	5.05	58.15	388
	13	1447	48	231	623	14	5594	.77	.79	14.19	83.10	797
	14	1347	59	605	951	9	3385	.66	1.29	4.95	62.65	570
II	15	1598	64	329	970	12	3493	.95	1.22	11.42	28.42	223
	16	1350	51	244	599	15	6385	.65	.76	15.27	85.85	100
	17	1401	62	254	714	17	13908	1.36	.91	14.19	84.65	0

Table 1. (Continued) Patient No. 20 on a Soft 500 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day	Calor-ies	Pro-tein gm	Ca mg	P mg	Fe mg	Na mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	11	779	24	243	325	5	96	11229	.32	.50	5.27	17.75	0
	12	1366	50	563	836	9	218	11413	.79	.86	10.39	89.14	41
	13	1198	43	247	630	8	211	11888	.80	.69	12.61	149.85	78
	14	1210	51	355	780	10	223	11875	.62	.97	9.47	29.11	159
II	15	1091	42	175	490	9	186	2911	.60	.63	9.21	98.10	150
	16	967	42	165	582	8	137	2600	.65	.56	10.45	141.75	95
	17	1273	47	346	603	7	139	2944	.54	.76	11.58	136.55	3
	18	1329	45	495	687	9	143	3643	.62	.68	9.49	160.10	179
	19	1437	50	310	768	13	266	1059	.95	.94	13.59	147.90	138
	20	1653	65	366	856	13	268	4897	.87	1.04	11.19	167.35	20
	21	1046	33	253	432	7	95	2038	.64	.56	7.41	90.50	0
	22	1035	24	355	538	6	167	1590	.47	.77	7.80	74.77	450
	23	804	28	177	338	7	155	1633	.59	.50	5.73	82.75	130
	24	852	36	187	583	8	146	1546	.63	.51	9.11	149.99	287
	25	1021	27	488	618	6	170	4613	.72	.81	5.03	149.35	528
	26	851	30	679	709	4	331	2725	.49	1.12	2.91	74.70	436

Table 1. (Continued) Patient No. 21 on a Regular Low Fat Diet.

					Minerals				Vitamins				
Period	Day	Calor-ies	Pro-tein gm	Fat gm	Ca mg	P mg	Fe mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	12	1387	76	27	523	851	10	10841	.77	.81	12.10	86.72	16
	13	1365	60	54	347	805	13	6640	.94	1.08	11.04	70.45	8
	14	1437	64	54	482	969	15	29377	.85	1.33	16.23	115.20	123
II	15	1379	68	53	724	1130	14	6497	.91	2.04	13.45	55.69	213
	16	1749	70	54	881	1237	13	5646	.95	1.70	15.03	90.80	141
	17	1617	75	46	586	963	17	11347	1.07	1.49	14.84	147.45	346

Table 1. (Contined) Patient No. 22 on a Regular Low Fat Diet.

Period	Day	Calor-ies	Pro-tein gm	Fat gm	Minerals				Vitamins				Plate waste g
					Ca mg	P mg	Fe mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	
I	11	1311	49	39	811	881	8	5408	1.60	1.33	7.08	61.65	651
	12	976	64	37	708	1042	10	9247	2.39	1.60	12.32	73.57	507
	13	804	58	18	1039	988	14	6733	.46	1.78	2.45	36.92	871
	14	1408	53	43	959	1242	10	5115	.86	1.79	11.97	80.15	281
II	15	1467	78	52	928	1364	13	6105	1.38	1.95	15.40	111.42	76
	16	1714	83	46	922	1404	12	6388	.98	2.11	12.90	94.67	16
	17	1884	77	56	835	1206	11	4358	.88	1.73	13.67	90.65	85

Table 1. (Continued) Patient No. 23 on a Regular 500 mg Low Sodium Diet.

				Minerals					Vitamins				
Period	Day	Calor-ies	Pro-tein gm	Ca mg	P mg	Fe mg	Na mg	A IU	Thia-mine mg	Ribo-flavin mg	Nia-cin mg	Ascor-bic acid mg	Plate waste g
I	12	1638	75	1126	1421	11	455	5150	.97	1.78	12.44	67.65	26
	13	1700	70	1436	1311	12	562	7252	.91	1.81	15.65	67.85	26
	14	1853	91	1016	1442	13	400	4040	1.03	2.05	14.36	73.70	0
II	15	1200	58	969	852	11	373	7421	.86	1.38	11.32	78.70	544
	16	1300	56	764	963	8	384	5328	.83	1.58	8.04	30.38	560
	17	1440	76	1082	1283	7	533	4814	.73	1.42	8.44	15.03	219
	18	940	48	686	804	7	329	4707	.59	1.42	6.42	29.89	70
	19	1413	75	768	1146	13	343	5149	1.03	1.93	15.28	100.41	340
	20	1555	76	728	1223	13	360	3791	.92	1.60	11.07	164.78	479
	21	1577	50	806	1209	10	399	3197	.94	1.76	9.74	134.95	605
	22	1236	49	849	859	6	354	4566	.57	1.29	7.22	81.40	471
	23	752	31	423	474	5	200	2205	.45	..74	5.53	28.22	22
	24	1465	63	835	825	12	246	4794	.87	1.08	17.39	106.15	0

Table 2

Desirable Weights for Men
(Ages 25 and Over)

HEIGHT (WITH SHOES, 1-INCH HEELS)		WEIGHT IN POUNDS ACCORDING TO FRAME (IN INDOOR CLOTHING)		
Feet	Inches	Small Frame	Medium Frame	Large Frame
5	2	112-120	119-219	126-141
5	3	115-123	121-133	129-144
5	4	118-126	124-136	132-148
5	5	121-129	127-139	135-152
5	6	124-133	138-143	138-156
5	7	128-137	134-147	142-161
5	8	134-141	138-152	147-166
5	9	136-145	142-156	151-170
5	10	140-150	146-160	155-174
5	11	144-154	150-165	159-179
6	0	148-158	154-170	164-184
6	1	152-162	158-175	168-189
6	2	156-167	162-180	173-194
6	3	160-171	167-185	178-199
6	4	164-175	172-190	182-204

Desirable Weights for Women
(Ages 25 and Over)

HEIGHT (WITH SHOES, 2-INCH HEELS)		WEIGHT IN POUNDS ACCORDING TO FRAME (IN INDOOR CLOTHING)		
Feet	Inches	Small Frame	Medium Frame	Large Frame
4	10	92- 98	96-107	104=119
4	11	94-101	98-110	106-122
5	0	96-104	101-113	109-125
5	1	99-107	104-116	112-128
5	2	102-110	107-119	115-131
5	3	105-113	110-122	118-134
5	4	108-116	113-126	121-138
5	5	111-119	116-130	125-142
5	6	114-123	120-135	129-146
5	7	118-127	124-139	133-150
5	8	122-131	128-143	137-154
5	9	126-135	132-147	141-158
5	10	130-140	136-151	145-163
5	11	134-144	140-155	149-168
6	0	138-148	144-159	153-173

Abstracted from Krause, (1961)

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A COMPARISON OF THE USE OF SELECTIVE AND NON-SELECTIVE MENUS FOR HOSPITAL PATIENTS ON CERTAIN MODIFIED DIETS

by

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ABSTRACT

Selective menus are used in many hospitals to give the patient an opportunity to choose his own food. In this study food intake and plate waste of hospital patients on soft or regular low sodium diets or regular low fat diets were investigated during a 28 day period. To determine the effectiveness of selective menus for modified diets menus were planned by the dietitian for patients on these specified diets for 14 days during Period I (non-selective menus). Patients selected their food from modified menu cards for 14 days during Period II (selective menus). Each food item was weighed on Hanson gram scales and the amount recorded before being served to patients. Uneaten food was weighed and recorded when trays were returned to the kitchen. Food intake of each patient was determined by subtracting the weight of the plate waste from the weight of the food served. Intake of calories, protein, phosphorus, calcium, iron, sodium, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid was calculated for each patient.

National Research Council's Recommended Daily Dietary Allowances were adjusted for each individual patient according to weight, age, and sex. Caloric and nutrient intakes were converted to percentages of recommended allowances for the individual patient. Mean intake for each patient for Period I was compared with his mean intake for Period II. The paired comparison t-test of differences was calculated by the Kansas State University Statistical Laboratory for intakes of calories and nutrients studied. Plate waste of four selected menu items, and total plate waste were analyzed.

Patients had a greater intake of calories and protein during Period II than Period I which was significant at near the ten per cent level. Intakes of calcium, phosphorus, iron, sodium, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid were not significantly different between Period I

and Period II. No significant difference between Period I and II was found for total plate waste, or plate waste for bread, breakfast fruit, cereal and eggs.

The findings of this study indicated that: (1) If caloric intake is a problem for individual patients, the non-selective menu may be desirable. (2) When protein is a critical dietary nutrient, selective menus might help increase protein intakes. (3) Factors other than food intake and plate waste should determine the type of menu to use for modified diets in each individual hospital.