NUTRIENT INTAKE OF HOSPITAL PATIENTS ON SELF-SELECTED DIETS

by

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INTRODUCTION

Confinement in a hospital unfortunately does not guarantee protection against malnourishment (1, 2). It is fallacious for either the public or the medical community to assume that good nutrition is automatically provided to hospitalized patients. Recent surveys of surgical and medical patients in large hospitals in Alabama (1) and Boston (3) revealed a significant number of malnourished individuals. In studies to assess the incidence of nutritional deficiency by laboratory and biochemical methods, findings pointed to a significant frequency of malnutrition in general hospital patients (4, 5).

There is need for a greater awareness of the nutritional health of hospitalized patients; analysis of actual dietary intake is one tool that can be employed to greater advantage. Patients' food preferences, food knowledge, and acceptance of food combinations were studied (6-10), but the reports did not provide data on dietary intakes of patients. The use of selective menus in hospitals does provide a variety of choices; however, patients do not always choose and consume well-balanced diets (11, 12). Personal, socio-cultural, and educational factors all play a role in determining food habits (13); food consumption patterns reflect the influence of society and culture on individual behavior. As emphasized by Pyke (14) people are primarily concerned with eating food and not with ingesting nutrients.

It is well known that malnutrition interferes with wound healing and heightens susceptibility to infection. It is important that the essential role of good nutrition be stressed in hospitals. Attention needs to be directed to basic nutritional principles such as levels of energy and nutrient intakes to meet the recommended allowances for the stress of childbirth, infection, injury, illness, or surgery (1). Nutrient intakes of many sub-groups of the population have been studied extensively (11, 15-21); hospital patients generally have been neglected. Studies of food habits and nutrient intakes of hospitalized patients could provide some base line information for assessment of dietary adequacy, possible changes needed in menu structure, and types of nutrition education which might prove most effective during a hospital stay (1, 12). It is imperative to insure that preventable malnutrition does not contribute to mortality, morbidity, and prolonged bed occupancy rates (1).

Casual observations of menu choices made by patients in a women's hospital raised several questions:

1. Do hospital patients on a selective menu make food choices based on age, education, socio-cultural, or economic background?
2. How many patients select diets which are below recommended levels (22) for age and condition?
3. Are lower educational levels associated with sub-optimal nutrient intakes?

This study was predicated on the above questions.

Objectives

The purposes of this study were:

1. To observe and record the food choices, and calculate the nutrient intake of a group of obstetrical patients in a women's hospital in Washington, D. C., and to compare this with the Recommended Dietary Allowances (RDA) (22).
2. To compare the dietary intake of this group of patients with the results of the Ten-State Nutrition Survey, 1968-1970 (23) and the First Health and Nutrition Examination Survey (HANES) (24).
3. To determine whether age, education, and occupation influence the dietary intake of the patients.

Chapter 2

REVIEW OF LITERATURE

In recent years increased world and national interest has been focused on the nutritional status of groups of individuals and populations (25). To accrue data for evaluation of nutritional status, nutrient intake information, clinical examinations, and biochemical measurements must be considered.

Food Consumption Surveys: General

Food consumption data can be classified into three basic types (26). Food balance sheets estimate the total amount of foodstuffs available per person as an annual average from information on the amounts of food produced, after adjustment for imports and exports, allowance for wastage, and deductions for non-food uses. This method assumes normal distribution of food supplies to all members of the population; it does not provide any measurements of individual nutritional status. Household food consumption surveys give total amounts of food consumed, specified by main food items and food groups and sources. Amounts are estimated from questionnaires, from interviewing, or by weighing all food for several days. Food intake is normally measured in terms of "edible portion" for household food consumption surveys; figures are based on data for raw food. These surveys do not allow for estimates of the distribution of food between household members. Care must be taken to insure that the households are truly representative of the population groups under study and that an estimate of the "habitual level" of food intake in the household is attained by smoothing out day-to-day variations.

Surveys of individual intakes by measuring or weighing food, food diaries, or dietary recall of the food actually consumed provide the most accurate record of average food consumption patterns for individuals with certain characteristics and of the likely individual maximum intake of each food item (26). There is no one generally accepted method of measuring dietary intake of free-living individuals; the method selected must meet the defined objectives of the study. Any study which seeks to compare nutritional data with other measurements on an individual basis must use some method which distinguishes each individual's dietary intake (27). Due to day-to-day variations in intake, records which cover more than one day are generally more reliable (17, 22, 27). Although nutrient intake data per se cannot be used to evaluate nutritional status, it can provide information on nutrients deficient in significant amounts within a specific sector of the population (23).

National Surveys: Dietary Intake

The Department of Agriculture regularly compiles figures on the nutritive value of foods available for consumption (28). In 1965, this Department in a Household Food Consumption Survey collected data on dietary intake of individuals (28, 29). The Department of Health, Education, and Welfare in 1967, studied population groups in ten states to determine the magnitude and location of malnutrition and related health problems in the country (23, 30). The population sample was drawn from census bureau enumeration districts with the lowest average income (some middle and upper income families resided in these low average income districts). Nutrient

intake data were collected as part of the dietary component which included sources of nutrients, food habits, and food preparation methods. The 24-hour recall method was used to collect data for selected groups of individuals. Measured against a standard established for this study (and similar to the 1968 Recommended Dietary Allowance (31)), dietary intakes of pregnant and lactating women for calories, iron, calcium, vitamin A, and protein were below recommended allowances for women of child-bearing age. More than half the pregnant females had less than 11.0 mg of iron per day as compared to the standard of 18.0 mg. This low iron intake was consistent with biochemical data of low serum hemoglobin values as defined by the Interdepartmental Committee on Nutrition for National Defense (ICNND) (32). A large proportion of all women of child-bearing age were found to have low hemoglobin and hematocrit levels as measured against this standard. While mean protein intakes of pregnant and lactating women were slightly above the standards for almost all sub-groups, a large number of pregnant women had intakes below 50 g a day. Approximately 50 percent of the pregnant and lactating women of all ethnic groups had inadequate intakes of calcium compared to the standard for the survey. A relatively large proportion of pregnant and lactating women demonstrated low serum albumin levels suggesting marginal protein nutriture (23, 30).

In 1971-72, the First Health and Nutrition Examination Survey (HANES) was undertaken for the purpose of estimating the nutritional status of the United States population and monitoring the changes in the status over time

(24). This was the first program to collect measures of nutritional status for a scientifically designed sample of the United States civilian, non-institutionalized population in an age range of 1-74 years. Dietary data were collected by trained interviewers using the 24-hour dietary recall method and food portion models in addition to questions about frequency of food intakes covering the preceding three months (33). Females in the child-bearing age group (18-44 years) had mean intakes as follows: 1,674 calories, 68 g protein, 636 mg calcium, 10.5 mg iron, 4,018 IU vitamin A, and 79 mg vitamin C. Judged by the 1968 Recommended Dietary Allowances (31), intakes for protein, vitamin A, and vitamin C were adequate, caloric intake was low, calcium intake was slightly sub-optimal while iron intake was far below the standard of 18 mg per day. The median figures were considerably lower reflecting the existence of some very low values in the sample. The low dietary intakes of iron were related to a relatively high percentage of low hemoglobin and hematocrit values for women in this age group, which included pregnant as well as non-pregnant women.

A survey of nutritional status in Canada indicated protein and/or calorie deficits among a number of women. A substantial number of pregnant women were found to have low serum protein levels, probably due to inadequate protein intakes. A large number of pregnant women were observed to have iron deficiency based on Canadian standards (9 mg/100 ml high risk, 10.5 mg/100 ml low risk) (34).

Dietary Intake of Selected Groups

In addition to national surveys, dietary intake studies were conducted with various sub-groups of the population as subjects. King et al. (18) studied dietary intakes of pregnant teenagers based on three-day food intake records and judged the quality of intake by the standard of the 1968 Recommended Dietary Allowances (31). No nutrient tabulated was adequately supplied to all of the teenagers; the nutrients most poorly supplied by the diets were calcium (average 811 mg), iron (mean of 9.0 mg), vitamin A (3,900 IU average), and energy (mean 1,900 calories). Three-day food records were used to study the dietary intakes of iron by a group of pregnant teenagers (20). Intakes were more than 6-8 mg below recommended levels (31); low intakes were correlated with hemoglobin and hematocrit values below acceptable levels based on Interdepartmental Committee on Nutrition for National Defense standards (32). Median hemoglobin values were 10.4-11.7 g/100 ml during the third trimester of pregnancy and 10.9-12.7 g/100 ml for non-pregnant subjects. From the three-day food intake records of Filipino women (19) on freely selected diets, mean individual daily nutrient intakes were calculated and compared to the standard of the 1974 Recommended Dietary Allowances (22). Calcium, iron, vitamin A, and vitamin C were the nutrients most frequently consumed in inadequate amounts. Mean iron intake was 16.8 mg with a range of 6.8-31.6 mg daily; 61 percent of the subjects had less than 67 percent of the recommended intake of calcium. The nutritive value of the usual diets of 82 men on freely selected diets (16) was calculated

from data collected by the food diary method at frequent intervals over a one-year period. Judged by the 1968 standard (31), the minerals and vitamins studied were supplied to most of the group in adequate amounts with the exception of calcium.

In a longitudinal study covering 20 years (35), the dietary intake of pregnant women was recorded using nutritional histories and questions on food frequency usage in combination with 24-hour recorded intakes. Mean preconceptional levels of calories, protein, and calcium met the recommended standard (31) in 75 percent or more of the subjects. Although group percentiles of some nutrients changed little during pregnancy from preconceptional levels, there were marked individual changes. High preconceptional intakes of calcium and protein tended to decrease and low intakes to increase. Mean calcium intake was inadequate during pregnancy; protein intake was adequate. Though the mean preconceptional daily intake of 1,900 calories approximated the recommended allowance (31), it represented a range of 725-3,025 calories.

Dietary intakes of American Indian women on a reservation (15) were below the recommended levels (31) in iron, calcium, and riboflavin for women of child-bearing age. Seven-day dietary records of 26 Australian women during pregnancy, lactation, and after the cessation of lactation (36) were inadequate in iron at all three stages judged by the 1968 Recommended Dietary Allowances (31). Nutrient intake studies were made on individuals from such diverse sub-groups of the population as pre-school children (17) to non-hospitalized patients with multiple sclerosis (21). All of the studies

appear to be in fairly common agreement that dietary intakes of iron, calcium, protein, vitamin A, and vitamin C as well as calories are most frequently inadequate as compared to selected standards.

Dietary Intake: Hospital Studies

One sub-group for which very little nutrient intake data is available is for hospital patients. Surveys conducted in several hospitals (1-5) to study the incidence of iatrogenic malnutrition were based on laboratory and biochemical measurements; dietary intake information was related primarily to patients' refusal to eat because of appetite loss. In 1963, the nutritional value of food served to hospitalized patients in England was investigated (37). The actual 24-hour food consumption of 152 randomly selected patients on typical house diets was chemically analyzed. Judged by the standard of the 1968 Recommended Dietary Allowances (31), diets for women were found to be adequate in calories, protein, riboflavin, and calcium; vitamin C (range of 12-38 mg per day) and iron (range of 6.5-12.0 mg per day) intakes were inadequate. There was an inverse ratio between the size of the hospital and the standard of feeding (including the nutritional value of the food). The nutritive value of selective menus chosen by a group of 62 ambulatory patients in a New York hospital was compared to that of an equal number of patients on a non-selected menu (12). Intake levels of all nutrients was slightly lower in the self-selected menus with the exception of ascorbic acid. Compared to the 1968 standard (31) mean intakes of all nutrients for women on the self-selected menu were adequate for the age group of 45 years and over, with

the exception of iron (13.5 mg), calcium (708 mg), and niacin (10.6 mg); intakes of riboflavin (1.48 mg) and thiamin (1.04 mg) were marginal. A hospital in Hawaii (38) analyzed the food on one day's house diet. Energy value was 1,739 calories with 213 g carbohydrate, 65 g protein, and 70 g fat. No attempt was made to relate analyzed values to actual consumption.

Food Habits

Food cannot be calculated as nutrient intake until it is consumed. Patients' food habits influence food choices and determine nutrient intake (39); they are the result of an individual's present environment and past history (40). Food habits have been defined as the way in which individuals, in response to social and cultural pressures, select, consume, and utilize portions of the available food supply (41). To a hospitalized patient, his diet--the selective or non-selective menu--represents the available food supply. On a selective menu the choices which are made will be influenced by education level, economic status, socio-cultural background, and age (13, 39).

Food choice is influenced by what is perceived as its effect on one's state of contentment and happiness. Eating can be a highly emotional activity--a source of pleasure and gratification or of anxiety and tension (39). Acceptability of foods and food combinations by hospital patients will also be affected by familiarity with the terminology used in menu descriptions and the meal (lunch, dinner, etc.) at which the food is offered (6-10). The patient's nutritional knowledge will greatly affect the nutritive value of the daily diet selected (10).

Nutrient Intake: Effect of Illness

The physiologic stress of illness, injury, infection, or nervous tension increases the necessity for adequate nutrient intake for a hospital patient. Adequate diet may be associated with a greater degree of drug effectiveness. In pre-existing conditions of stress, faulty diet can act as an additional stressor capable of eliciting the typical manifestations of General Adaptation Syndrome (GAS). Emotional tension is a common human stessor; faulty diet fails to provide protection to organs which may be affected. During the alarm reaction of stress the body loses large quantities of ascorbic acid; deficiency in any of the vital food constituents diminishes the body's resistance to stress (42). Adequate nutrient intake of the hospitalized patient may not always be associated with a more rapid recovery rate, but inadequate intake will certainly delay recovery. A careful look at the food habits and nutrient intakes of hospital patients would provide more detailed information on specific areas of nutrient intake deficiencies, possible menu changes which could help to correct these, and a challenge to design some form of nutrition education (10, 12) which could provide information regarding desirable food choices even to short-stay patients.

Chapter 3

METHODS

The patient population of a women's hospital (154 beds) in Washington, D.C. is a heterogeneous mixture of patients from upper, middle, and low income levels with approximately 25 percent of the patients on Medicaid. Race distribution is almost evenly divided between whites and blacks with a small percentage of other races; nationals from other countries are also represented. Approximately 50 percent of the bed capacity is for obstetrical use with the balance for medical and surgical patients. The average stay for obstetrical patients is 3.8 days. The average number of births per months is 325. All patients on regular and modified diets make food choices from a selective menu. The hospital uses a three-week cyclic menu. Dietary intakes were recorded for a three-day period using the same three days whenever they appeared in each of five cycles (17-20, 27, 43).

Subjects

To rule out bias that would develop due to the inclusion of patients with more than one medical problem, subjects were all normal obstetrical patients on regular diets. All obstetrical patients on regular diets for the three days sampled became subjects. Some patients were discharged before the end of the sampling period and data for these patients were therefore not included. Data were collected for a total of 64 patients. Subject were not advised that their diet selections were being studied as it was felt that this could influence the choices made.

Menu Selection

Nutrient intake data were based on selective menus for Tuesday, Wednesday and Thursday of A-week of the three-week cycle menu (Appendix). Menus were sent to patients with breakfast trays on Monday and each successive day of the sampling period, and collected by the dietary aides after breakfast. On Monday, patients who were admitted later in the day were given a menu for the following day on Monday afternoon or before breakfast on Tuesday morning. Subjects whose marked menus for the following day were not received in the dietary office by 1:30 p.m. were sent another menu, and a dietary aide waited while it was completed. Menu selection data were transferred to journal sheets--one sheet for each meal of the three days. All food served was weighed or measured prior to the service of each meal to insure correct portion sizes. All trays of subjects were checked for leftovers; modifications were made in the journal sheet entries for food items not consumed or only partially consumed. Patients were interviewed to obtain information on foods consumed between meals and at bedtime and this information was added to the journal sheets.

Menu Coding

Menu items on the journal sheets were coded with item numbers from the Department of Agriculture Handbook No. 72, Nutritive Value of Foods (44). Coded menu items with weights in grams were transferred to IBM coding forms; this information was then key-punched onto data cards for subsequent reducation of data by computer. Data cards were checked against

original records, and obvious key-punch errors were corrected. The print-out was checked item by item with the original record. The program used was written for the Department of Human Nutrition and Foods of Virginia Polytechnic Institute and State University in Blacksburg, Virginia; the computer was programmed to convert amounts that were multiples or fractions of the quantities appearing in the table of nutrient values (44). Mean daily intakes of calories, protein, fat, carbohydrate, calcium, iron, Vitamin A, thiamin, riboflavin, niacin, and vitamin C were calculated by the computer, as was the percentage of the Recommended Dietary Allowances (22) for each nutrient supplied by the average daily diet.

Demographic Data

Each subject was interviewed to obtain information on breastfeeding, complications during pregnancy, pre-natal mineral and vitamin supplements taken, and what the subject considered to be the most important source of her nutrition knowledge. Interviews were conducted informally. As a rationale for the interview, questions were included dealing with the patients' opinion on hospital food. Some questions which were included produced information not essential for this study. (Interview Form--Appendix.)

Fifty of the patients supplied information on weight gain during pregnancy; pre-conceptional weights were available for 26 subjects. Information on age, education, occupation, insurance, birthweight of infant, complications during delivery, and hemoglobin and hematocrit values at

the time of admission were available from patients' charts. The information obtained from interviews and charts was transferred to summary sheets.

Chapter 4

RESULTS AND DISCUSSION

Dietary Intake and Comparison to Recommended Dietary Allowances (22)

The use of selective menus in hospital feeding provides for a wider range of choices for patients; the patient becomes more involved with his food and looks forward to meals more enthusiastically. It provides an opportunity to observe the nutritional intakes and food habits of individual patients, and can be utilized as a teaching tool. One study of hospital patients reported that the nutritive value of self-selected diets was lower than for non-selected diets and was marginal in several nutrients (12.)

The three-day dietary intake record is generally accepted as providing fairly reliable figures on the nutrient intake of individuals (17, 27), and provides some allowance for day-to-day fluctuation.

The Recommended Dietary Allowances were intended as a guideline for measuring the nutritional adequacy of diets for institutions, and they facilitate statistical comparison of the nutritional adequacy of dietary intakes of population groups. They are the level of intake of essential nutrients considered to be sufficient to meet the known nutritional needs of practically all healthy persons. The allowances are estimated to exceed actual requirements of most individuals in the population but do not take into account the specific nutritional needs of persons with infections, illness, or injury. Though the Recommended Dietary Allowances were not prepared and intended for the purpose of assessing individual dietary records, it is acceptable

practice to use them as a measure by which to judge the adequacy of dietary intakes. In assessing individual dietary intakes, it is highly unlikely that an intake is inadequate when it meets or exceeds the allowance, but as intake falls, the risk of deficiency increases (22, 31, 45).

Twenty-seven of the 64 subjects were lactating, which increased nutrient needs. Group means were calculated for lactating and non-lactating subjects. The mean daily intake of both groups exceeded 100 percent of the appropriate allowance (22) (Table I) for all nutrients with the exception of iron. For this nutrient, the lactating group had a mean intake equal to 100 percent of the allowance while the mean for the non-lactating group was 94 percent of the allowance.

The group of lactating subjects had a higher mean daily intake of calories and all nutrients, than did non-lactating subjects (Table I). Mean intakes were generally high. It should be pointed out that subjects were not limited to a choice of only one item from each menu section; some patients chose soup and juice, two juices, or two desserts (i.e., ice cream and fruit). Trays were checked, and if all food ordered was not consumed, adjustments were made in the records. Patients on regular diet were routinely sent an apple, plus cheese and crackers, for a bedtime snack; in addition, they were offered fruit juice or punch. Lactating patients were encouraged to have milk at bedtime and could have cereal or a sandwich, in addition. Eighty-seven percent of the subjects ate the bedtime snack. Fifty-nine of the lactating subjects and 13 percent of the non-lactating subjects had milk

Table I. Mean Daily Nutrient Intake and Percentage of the Recommended Dietary Allowances (22) for 64 Obstetrical Patients

	Lactating 27 Subjects		Non-lactating 37 Subjects	
	Mean	Percent RDA	Mean	Percent RDA
Calories	3,035	>100	2,933	>100
Protein (g)	123	>100	111	>100
Calcium (mg)	1,704	>100	1,344	>100
Iron (mg)	18.0	100	17.0	94
Vitamin A (IU)	18,092	>100	15,473	>100
Thiamin (mg)	1.61	>100	1.48	>100
Riboflavin (mg)	3.39	>100	2.80	>100
Niacin (mg)	20.5	>100	20.0	>100
Vitamin C (mg)	197	>100	187	>100

at bedtime, 22 percent of the lactating subjects and eight percent of the non-lactating women had cereal and one lactating subject had a sandwich every evening.

The use of mean intakes for groups can mask the fact that some individuals may have had intakes well below the standard for any nutrient. The mean intake of calories for only three subjects was less than 100 percent of the allowance; mean intake for two lactating subjects was 2,228 and 2,375 calories (89 and 95 percent of the allowance), and for one non-lactating subject was 1,586 calories (79 percent of the allowance). Though the group mean for iron was 18.0 mg daily for the lactating subjects, 15 of the 27 subjects had mean intakes below the allowance and several were below 15 mg. Twenty-seven of the 37 non-lactating subjects had mean daily iron intakes below the standard of 18.0 mg; though most were marginally low, seven were below 15 mg per day, and one was 9.3 mg. Mean calcium intakes were below the allowance for four lactating subjects and three non-lactating subjects. Three of the lactating subjects had lactose intolerance, the mean intake of the fourth subject was only marginally low (1,172 mg). Two non-lactating subjects with low intakes were 16-year old high school students. One non-lactating subject, who had a mean daily intake of only 470 mg, also had low caloric (1,586) and iron (9.3 mg) intakes. She also had a mean intake of thiamin (0.92 mg) and riboflavin (1.07 mg) below the allowance. During the interview, this subject said she ate meat at home only occasionally, ate no eggs or milk, and liked only three or four vegetables. She reported having trouble with anemia during

this pregnancy (her second), and that she took iron supplements routinely. One lactating subject also had a mean intake of thiamin (1.04 mg) and riboflavin (1.40 mg) lower than the allowance. Her caloric intake was also low (2,227) as was her mean intake of calcium (728 mg). She had gained 50 pounds during this pregnancy and had another child under one year of age; she was extremely anxious to reduce her weight. Only one subject, who was a vegetarian, had a mean daily intake of niacin (11.1 mg) below the allowance; she exceeded the allowance for all other nutrients tabulated except iron. The mean daily intake of no subject was below the standard for vitamin A, vitamin C, or protein. The high mean intake of vitamin A was due to the consumption of eggs, cheese, whole milk, chicken pie, green and yellow vegetables, and liver (by 25 subjects). The selection of orange juice by all subjects daily, and of tomatoes frequently, contributed substantially to the high mean intake of vitamin C. Low iron and calcium intakes were in agreement with other studies (12, 15, 16, 18-20, 23, 24, 35, 36).

Comparison of Dietary Intake to Results of National Surveys

A comparison of the mean intakes of the subject group to similar groups in the Ten-State Nutrition Survey (23) and the First Health and Nutrition Examination Survey (HANES) (24) is reported in Table II. Mean intakes of the subject group was higher than the national survey groups for all nutrients with the exception of thiamin. For this nutrient, the Spanish-American group in the Ten-State nutrition Survey had a higher mean daily intake (1.66 mg) than any other group. The higher mean daily nutrient intake for the subject

Table II. Comparison of Mean Nutrient Intake From a Three-day Selective Menu by Obstetrical Patients with Results of the Ten-State Nutrition Survey (23) and the First Health and Nutrition Examination Survey (24).

	Hospital Patients No. of Subjects			Ten-State Survey* No. of Subjects			HANES** No. of Subjects	
	White 26	Black 35	Other 4	White 222	Black 187	Sp.Amer. 62	White 1,758	Black 618
Calories	3,045	2,942	2,736	2,074	1,788	2,166	1,691	1,529
Protein (g)	124	111	109	88	70	84	69	61
Calcium (mg)	1,663	1,390	1,287	1,020	665	745	660	467
Iron (mg)	18.6	17.1	16.0	11.9	9.5	13.1	10.6	9.4
Vitamin A (IU)	18,633	15,345	13,147	4,629	6,379	4,106	3,950	4,477
Thiamin (mg)	1.52	1.48	1.43	1.16	1.10	1.66		
Riboflavin (mg)	3.40	2.83	2.63	1.88	1.63	1.96		
Niacin (mg)	20.8	19.7	19.8	17.4	14.2	16.7		
Vitamin C (mg)	200	189	153	85	94	100	80	71

* These figures represent a weighted average of mean intake of pregnant and lactating females from high income ratio states and low income ratio states (Reference (23) Table I, p. V-235). Dietary intake data was based on 24-hour recall.

** These figures represent the mean intake of examined females aged 18-44 years (Reference (24) Table 37, p. 103). Dietary intake data was based on 24-hour recall and interview.

group was associated with a higher mean caloric intake. The volume of food consumed appeared to be a factor in the high mean nutrient values. In the First Health and Nutrition Examination Survey data, even though all population groups had mean calcium, vitamin A, and vitamin C intakes which were adequate in relation to the standard; substantial numbers of individuals had intakes far below the standard. The percentage of these individuals who had intakes less than the standard were: 12-74 percent for calcium, 37-74 for vitamin A, and 39-72 for vitamin C (24). In the Ten-State Nutrition Survey, protein intakes for pregnant and lactating women were generally above recommended allowances, and yet a relatively large proportion of these women demonstrated low serum albumin levels. It was suggested that this may reflect inadequate standards for this gorup (30). The low serum albumin levels might also reflect the quality of the protein intake.

Distribution of Calories

The distribution of calories in the diets selected by the hospital patients was compared to the average United States dietary pattern (22), and to the results of other studies (Table III). Dietary intake patterns in the United States at the present time provide 46 percent of calories from carbohydrate, 42 percent from fat, and 11-12 percent from protein (22). There are no allowances for carbohydrate and no minimum requirements set. The inclusion of 50-100 gm in the diet per day will offset undesirable metabolic responses associated with high fat diets and fasting.

Table III. Comparison of Distribution of Calories in Diets of 64 Obstetrical Patients With Average United States Dietary Pattern and Findings of Other Studies.

	Percent Calories as CHO	Percent Calories as Fat	Percent Calories as Protein
64 Hospital Patients	46.5	37.8	15.6
HANES (24)			16.2*
Ten-State Survey (23)			16.4**
Bass (15)	50.0	36.0	14.0
Walker (38)	49.0	36.0	15.0
Witschi (21)	46.4	38.8	14.8
Average U.S. Diet (22)	46.0	42.0	11.0-12.0

* This figure represents a weighted average of percent calories from protein for the total number of examined females aged 18-44 years (Reference (24) Table 5, p. 38).

** This figure represents a weighted average of percent calories from protein for pregnant and lactating females from high income ratio and low income ratio states (Reference (23), Table I, p. V-235).

There is no specific requirement for fat as a nutrient; 15-25 g per day will provide the fat necessary for serving as a carrier for fat soluble vitamins and to provide essential fatty acids (22). Beaton (46) stated that there is no valid estimate of the desirable proportion of calories from protein; however, the average protein concentration of the North American diet is 14-16 percent of the total calories. The allowance for calories for the age group 15-20 years is 2,000-2,100 calories daily, and for protein 46-48 g per day (22).

The caloric distribution of this group was compared with the average dietary intake pattern in the United States and the finding of other studies (Table III). The percentage of calories as fat for these subjects was lower (37.8 percent) than the average United States diet; the percentage of calories as protein was higher (15.6 percent). However, the percentage of calories as protein was in agreement with Beaton's figures (46) on the average protein concentration of North American diets, and there was less than four percent difference between the percentage for these subjects and the percentage for the Ten-State Nutrition Survey (23), and the First Health and Nutrition Examination Survey (24).

The percentage of calories as protein for this group was slightly higher than that reported for three other studies with different population groups (15, 21, 38) (Table III), caloric distribution as fat was similar, and slightly fewer calories were from carbohydrate sources. In general, the distribution was in agreement with other reports. A review of the

frequency of selections from various food groups indicated that, with the exception of the vegetarian subject and the three subjects with lactose intolerance, subjects made choices from a wide variety of food groups.

Relationship of Age to Nutrient Intake

The age range of the 64 subjects was 16-42 years. Mean daily nutrient intake was calculated for the age groups delineated in the Recommended Dietary Allowances (22) (Table IV). Fifty of the subjects were 23-42 years of age, nine subjects were 19-22 years of age, and five subjects were in the 15-18 age group. Fifty percent of the oldest age group were lactating compared with only one in each of the other age groups.

In relation to the standard (22), the mean daily intake of the age group 15-18 years for both lactating and non-lactating subjects exceeded the allowance for all nutrients with the exception of iron and, for the non-lactating subjects, calcium (Table V). The mean intake of calcium by these four subjects was 1,146 mg, only two subjects had mean intakes in excess of the allowance while the intake of the other two subjects was 928 mg (66-99 percent of the allowance) and 615 mg (34-65 percent of the allowance). For the age group 19-22 years (lactating and non-lactating), the mean daily intake of all nutrients, with the exception of iron, exceeded the standard.

For the age group 23-50 years, mean daily intakes of calories, calcium, iron, thiamin, and riboflavin were lower than the standard for both lactating and non-lactating groups; niacin intake was less than the

Table IV. Comparison of the Range and the Mean Daily Energy and Nutrient Intake by Age Group for 64 Lactating and Non-lactating Obstetrical Patients on a Three-day Selective Menu.

	15-18 Years		19-22 Years		23-50 Years	
Number of Subjects:	1 L*	4 N**	1 L*	8 N**	25 L*	25 N**
Calories						
Range		2267-3577		2605-3556	2228-3716	1586-3563
Mean	3431	2886	3103	3055	3016	2901
Protein (g)						
Range		86-120		96-139	76-165	66-132
Mean	124	106	120	117	123	123
Calcium (mg)						
Range		614-1710		915-2216	729-2378	471-1869
Mean	1837	1145	1589	1547	1704	1305
Iron (mg)						
Range		15.7-19.7		14.1-20.7	13.6-23.6	9.3-22.9
Mean	14.9	16.8	16.6	16.4	18.2	17.3
Vitamin A (IU)						
Range		12,441-24,412		5,113-29,184	7,612-29,764	4,538-29,179
Mean	6,496	20,416	13,537	11,354	18,738	16,000
Thiamin (mg)						
Range		1.16-1.57		1.20-1.76	1.04-2.03	0.92-1.85
Mean	1.50	1.36	1.64	1.53	1.61	1.48
Riboflavin (mg)						
Range		2.34-4.02		1.71-3.57	1.40-5.17	1.07-4.06
Mean	3.01	2.91	2.76	2.76	3.38	2.79
Niacin (mg)						
Range		19.7-23.0		17.6-23.3	11.1-27.0	15.6-22.9
Mean	20.8	20.9	20.8	19.6	20.5	19.9
Vitamin C (mg)						
Range		168-182		143-220	126-240	144-236
Mean	215	173	201	176	196	193

* L = Lactating ** N = Non-lactating

Table V. Comparison of Energy and Nutrient Intake with 1974 Recommended Dietary Allowances (22) by Age Group for 64 Obstetrical Patients on a Three-day Selective Menu.

Energy & Nutrients	Age Group	No. of Subjects	Percent of RDA		
			≥100	66-99	34-65
			Percent of Subjects		
Energy (K cal):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	94	6	
Protein (g):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	100		
Calcium (mg):	15-18 years	5	60	20	20
	19-22	9	100		
	23-50	50	90	6	4
Iron (mg):	15-18 years	5	20	80	
	19-22	9	22	78	
	23-50	50	36	62	2
Vitamin A (IU):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	100		
Thiamin (mg):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	92	8	
Riboflavin (mg):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	96	4	
Niacin (mg):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	98	2	
Vitamin C (mg):	15-18 years	5	100		
	19-22	9	100		
	23-50	50	100		

allowance for the lactating group. Failure of this group to meet 100 percent of the niacin allowance was due to the inclusion of one vegetarian subject. Wakefield and Potgeiter (12), in 1958, found that for subjects on self-selected hospital diets, women over 45 years of age had intakes of iron (13.5 mg), calcium (708 mg), and niacin (10.6 mg) slightly below recommended standards and marginal intakes of thiamin (1.04 mg) and riboflavin (1.48 mg). Higher mean nutrient intake appeared to be positively associated with the two younger age groups--15-18 years and 19-22 years. Caloric intake of women in the 23-50 age group was lower and the lower nutrient density appears to be the result of this.

Relationship of Education to Nutrient Intake

Some researchers have found a positive correlation between educational attainment and the nutritional value of freely selected diets (13, 23, 47-50). Findings of the Ten-State Nutrition Survey (23) directly related the education level of the wife of the head of household or the female head of household to the nutritional status of children under 17 years of age; there also was a positive relationship among adults between years of school completed by the individual and his or her nutritional status. Other researchers have shown a definite positive relationship between education level of the mother to nutrient intakes (47) and growth patterns of children (49). At all levels of education, Davis (48) found that persons with higher education levels appeared to have better nutrition; others have found that homemakers with higher levels of education tended to use all food groups

(13). A positive correlation has been demonstrated between educational attainment and nutritional knowledge (13); lack of nutritional knowledge resulted in poor choices of food substitutions (10).

Subjects were grouped by education attainment based on:

1) Less than twelfth grade.

2) High School Diploma.

3) Baccalaureate Degree.

4) Education beyond Baccalaureate Degree.

Fourteen subjects had education levels lower than high school diploma, 33 subjects had high school diplomas, 14 had baccalaureate degrees, and three had graduate school education.

The groups of subjects (lactating and non-lactating) with baccalaureate degrees and post-baccalaureate education had nutrient intakes equal to or exceeding 100 percent of the allowance for all nutrients with the exception of iron and, in the case of lactating university graduates, calcium (Table VI). The seven percent receiving 66-99 percent of the calcium allowance for this group represented one subject with mild lactose intolerance whose mean calcium intake was 1,075 mg. The group of lactating subjects with high school diplomas has less than 100 percent of the allowance for calories, calcium, iron, thiamin, riboflavin, and niacin. The niacin deficit was due to the inclusion of the one vegetarian in this group. The non-lactating group with high school diplomas had a mean intake less than 100 percent of the allowance for iron only. Intakes lower than 100 percent of the

Table VI. Comparison of Energy and Nutrient Intake with 1974 Recommended Dietary Allowances (22) by Educational Level for 64 Obstetrical Patients on a Three-day Selective Menu.

Energy & Nutrients	Education Group	No. of Subjects	Percent of RDA		
			≥100	66-99	34-65
			Percent of Subjects		
Energy (K cal):	Below Grade 12	14	93	7	
	H.S.Diploma	33	94	6	
	Baccalaureate	14	100		
	Baccalaureate +	3	100		
Protein (g)	All Groups	64	100		
Calcium (mg):	Below Grade 12	14	72	14	14
	H.S. Diploma	33	94	3	3
	Baccalaureate	14	93	7	
	Baccalaureate +	3	100		
Iron (mg):	Below Grade 12	14	14	79	7
	H.S.Diploma	33	39	61	
	Baccalaureate	14	36	64	
	Baccalaureate +	3	33	67	
Vitamin A (IU):	All Groups	64	100		
Thiamin (mg):	Below Grade 12	14	93	7	
	H.S.Diploma	33	91	9	
	Baccalaureate	14	100		
	Baccalaureate +	3	100		
Riboflavin (mg):	Below Grade 12	14	93	7	
	H.S.Diploma	33	97	3	
	Baccalaureate	14	100		
	Baccalaureate +	3	100		
Niacin (mg):	Below Grade 12	14	100		
	H.S.Diploma	33	97	3	
	Baccalaureate	14	100		
	Baccalaureate +	3	100		
Vitamin C (mg):	All Groups	64	100		

allowance for calories, calcium, iron, and thiamin were observed for both lactating and non-lactating groups of subjects with less than high school education; in addition riboflavin intake was below the allowance for the lactating group. There were subjects in this group only who received less than 66 percent of the allowance for iron and calcium. Though the number of subjects was small, there did appear to be a positive association between educationa level and nutrient intake.

A recent Federal Drug Administration survey (51) on consumer nutrition knowledge concluded that shoppers with university education were more frequently high scorers on questions regarding nutrient content of foods and substitutions of similar nutrient cont4ent. Shoppers with less than high school education responded with substantially more "don't knows."

Relationship of Occupation to Nutrient Intakes

Walter (50) found a positive relationship between occupation and the nutritional value of food choices, but concluded that this occupational difference between day laborers and professionals could be an expression of differences in education levels between occupations.

Subjects in this study were grouped by occupation of the household head or the subject, if single and not living with parents, based on classifications of the Virginia Employment Commission (52). The classifications were:

1) Professional, technical, and managerial - 24 subjects

2) Sales and clerical - 13 subjects

3)	Craftsmen -	3 subjects
4)	Operatives and transportation operatives -	4 subjects
5)	Laborers (not farm labor) -	6 subjects
6)	Farmers, foreman, and farm laborers -	0 subjects
7)	Service -	6 subjects
8)	Private household -	0 subjects
9)	Unemployed -	8 subjects

A comparison of the percentage of the allowance met for the nutrients on the basis of occupational classification is presented in Table VII. Nutrient intake lower than the Recommended Dietary Allowances (22) occurred at all occupation levels. Fifteen of the 24 subjects in the professional, technical, and managerial occupation classification had post-baccalaureate education or a baccalaureate degree; nine subjects had a high school diploma. It was of interest to note that 18 of these 24 subjects were breast feeding (a higher ratio than in any other classification with the exception of craftsmen, in which all three subjects were lactating). The mean daily intake of the lactating subjects was below the standard for calcium (two subjects with lactose intolerance), thiamin (two subjects with mean daily intakes of 1.26 mg and 1.27 mg, as compared to the standard of 1.30 mg), and iron (12 subjects). The mean intake of the 12 subjects with less than the standard for iron (18.0 mg) was 16.85 mg; only one subject had an intake below 15.0 mg daily. The six non-lactating subjects had a mean daily intake below the standard in iron only--the mean intake of the three subjects whose intake was less than the allowance was 16.96 mg and the lowest intake was 15.9 mg.

Table VII. Comparison of Energy and Nutrient Intake with 1974 Recommended Dietary Allowances (22) by Occupational Classification for 64 Obstetrical Patients on a Three-day Selective Menu

	Professional 24 subjects			Sales & Clerical 13 subjects			Craftsmen 3 subjects			Operatives 4 subjects		
	Percent of RDA			Percent of RDA			Percent of RDA			Percent of RDA		
	≥ 100	66-99	34-65	≥100	66-99	34-65	≥100	66-99	34-65	≥100	66-99	34-65
	← Percent of Subjects →											
Energy (K cal)	100			92	8		67	33		100		
Protein (g)	100			100			100			100		
Calcium (mg)	92	8		92		8	100			100		
Iron (mg)	37.5	62.5		31	69		33	67		33	67	
Vitamin A (IU)	100			100			100			100		
Thiamin (mg)	92	8		92	8		100			100		
Riboflavin (mg)	100			92	8		100			100		
Niacin (mg)	100			100			67		33	100		
Vitamin C (mg)	100			100			100			100		

Table VII. (Continued) Comparison of Energy and Nutrient Intake with 1974 Recommended Dietary Allowances (22) by Occupational Classification for 64 Obstetrical Patients on a Three-day Selective Menu

	Laborers 6 subjects			Service 6 subjects			Unemployed 8 subjects	
	Percent of RDA			Percent of RDA			Percent of RDA	
	≥100	66-99	34-65	≥100	66-99	34-65	≥100	66-99	34-65
	← Percent of Subjects →							
Energy (K cal)	100			83	17		100	
Protein (g)	100			100			100	
Calcium (mg)	66.6	16.7	16.7	83		17	88	12
Iron (mg)	17	83		50	33	17	25	75
Vitamin A (IU)	100			100			100	
Thiamin (mg)	100			83	17		100	
Riboflavin (mg)	100			83	17		100	
Niacin (mg)	100			100			100	
Vitamin C (mg)	100			100			100	

Sales and clerical classification included two subjects with a baccalaureate degree and 11 with a high school diploma. One of the two lactating subjects in this group was low in calcium intake (lactose intolerance), calories (due to attempted weight loss), thiamin, and riboflavin. Of the 11 non-lactating subjects in this classification, nine subjects had a mean daily iron intake below the standard; no other nutrients were lower than the allowance.

All three subjects in the craftsmen classification were lactating; all had high school diplomas. Two of this group had a mean intake of iron lower than the allowance; one of the two was a vegetarian--her daily mean intake of iron was only 13.6 mg and her daily mean intake of niacin was also below the standard.

Six subjects were classified as laborers. Five of these had less than twelfth grade education and one had a high school diploma. Mean daily intake was below standard for calcium for two non-lactating subjects (one was 614 mg and the other 927 mg), both of whom were 16 years of age. Mean intake of iron was below standard for four non-lactating and one lactating subject.

Of the six subjects in the service classification, none were lactating. Three subjects had a mean intake below the standard for iron with one subject having an intake of only 9.3 mg daily. This same subject had intakes below the allowance for calories (1,586), calcium (470 mg), thiamin (0.92 mg), and riboflavin (1.07 mg). Four of these subjects had a high school diploma, and two less than twelfth grade education.

Only two of the eight subjects who were unemployed were breast feeding. One of these subjects had a calcium intake below the standard but very marginally. All six non-lactating subjects had iron intake below standard. The education level of six of these subjects was less than twelfth grade; two had high school diplomas.

There did not appear to be a strong, positive association between occupational classifications and nutrient intake. However, the first two groups, which were composed of subjects with higher education levels, showed nutrient intake only marginally below the recommended allowances except for calcium in one subject. For the other groups the difference between the allowance and the nutrient intake actually achieved was of a greater magnitude. A stronger association was observed between nutrient intake and education level which was an achievement of the subject herself. The association with occupation may be less positive as the occupational classification, which was a function of the head of household, did not strictly follow educational levels. In only seven cases (excluding unemployment) was the occupation classification based on the subject herself.

Hemoglobin and Hematocrit Values

Knowledge of the optimum nutritional requirements of mother and fetus during pregnancy or of the lactating mother is far from complete (53, 54). The incidence of iron-deficiency anemia is high among infants and menstruating and pregnant women (39). The average iron loss due to menstruation has been estimated at about 0.5 g per day (spread over a month's time) (55).

Recommended intakes of iron are based on estimates of physiologic losses of iron from the body and increments in growth. During pregnancy, increased iron is required not only to replace usual physiologic losses but to expand the red cell mass to provide for the needs of the fetus and placenta. The total iron requirement for pregnancy ranges between 580 to 1,340 mg with an average of 980 mg (56). If it is assumed that most women consume 1,500 to 2,000 calories per day with approximately 5 to 6 mg of iron per 1,000 calories, it is obvious that they will be consuming borderline amounts of iron (45). The average caloric intake of subjects in this study was 2,974 with a range of 1,586 to 3,716 calories. Average iron intake was 17.6 mg with a range of 9.3 to 23.6 mg.

Hemoglobin and hematocrit values were obtained for 48 subjects in this study at the time of their admission to the hospital. The standards of the Interdepartmental Committee on Nutrition for National Defense (32), for the third trimester of pregnancy, was used as an interpretive guide to acceptable levels. Most subjects took supplemental iron during pregnancy. Though many did not take it regularly, and some started late in the pregnancy, this undoubtedly influenced blood values at the time of delivery.

Though the mean hemoglobin value for all 48 subjects (Table VIII) was above the Interdepartmental Committee on Nutrition for National Defense (32) standard, values for 15 subjects fell below the acceptable mean and two had values below the lower limits of the range. One of thse, with a hemoglobin of only 8.2 g/100 ml said that she had stopped taking supplements after a month because it was "too much bother." Differences in the mean for black

Table VIII. Comparison of Hemoglobin and Hematocrit Values of 48 Obstetrical Patients to the Interdepartmental Committee on Nutrition for National Defense Standard

	No. of Subjects	Hemoglobin g/100 ml		Hematocrit Percent	
		Range	Mean	Range	Mean
ICNND Values for Third Trimester		10.5-12.9	11.7	33-34	33.5
Obstetrical Patients:					
Black	29	8.2-13.7	11.6	26-38	34.63
White	17	10.6-14.3	12.05	30-40	35.06
Total*	48	8.2-14.3	11.9	26-40	34.9

* Includes two subjects of other races.

and white subjects is not great; the inclusion of two low values of 8.2 g/100 ml and 9.8 g/100 ml was influential in the low mean value for black subjects. Hematocrit values of subjects follow a similar pattern. Twelve subjects had a hematocrit value below the acceptable mean. The subject with the lowest hemoglobin value had a hematocrit of only 26 percent. The mean for both patient groups was above the ICNND (32) standard.

These results in general were in agreement with the Ten-State Survey (23). The mean hemoglobin value for 203 pregnant females, 13-44 years of age in that study, was 12.5 g/100 ml for whites and 11.9 g/100 ml for blacks. Sixty-six percent of white subjects and 47 percent of black subjects had hemoglobin values higher than 11.9 g/100 ml.

Filer (57) defined anemia by a hemoglobin value of $\leq$10 g/100 ml; only two of the subjects in this study of 48 patients fell below that value. Standards of hemoglobin levels for defining anemia differ, however, and the hemoglobin value alone is not adequate criteria for the existence of anemia. Evaluation of clinical signs and symptons is also necessary.

Weight Gain of Subjects

There is reasonable agreement concerning the amount of weight that should be gained by a pregnant woman (36, 53, 54, 58, 59). The increased blood volume, breast size and density, and growth of the placenta, together with the weight of the fetus and other morphological results of the pregnancy, could easily add up to 20 pounds. Add to this four pounds as a safety reserve which results in a sound basis for viewing a 24-pount weight gain as permis-

sible and advisable (53, 58). Low birth weight (below 2,500 g) accounts for 65 percent of perinatal deaths and these babies not only have a poorer chance of survival, but the survivors have more medical complications (60, 61).

The preconceptional weight of the mother has been positively correlated with the birth weight of the infant (60, 62), as has the amount of weight gained by the mother (59-62). Niswander (62) found that with increased maternal weight gain there was a decrease in the relative frequency of low ($\leq$ 2,500 g) birth weights in infants. A positive linear association between maternal pre-pregnancy weight and birth weight of the infant was also demonstrated in these subjects. A diminution in the strength of the association of birth weight to maternal weight gain was observed as the pre-pregnancy weight gain to birth weight of infants.

The positive relationship observed in this study (Table IX) between maternal weight gain and birth weight of infant is consistent with findings of other studies (18, 59-62). Data on pre-pregnancy weight was available on only 26 subjects. Four mothers who gained less than 23 pounds had infants weighing more than eight pounds; pre-pregnancy weights of two of these women were 190 and 199 pounds. Two mothers who gained more than 25 pounds had infants weighing less than six pounds; the pre-pregnancy weights of these two women were 122 and 132 pounds. This association between infant birth weight and preconceptional weight of the mother is consistent with the findings of other researchers (60, 62).

Table IX. Relationship of Weight Gain of Mother to Birth Weight of Infant; 48 Obstetrical Patients

Weight Gain of Mother				Birth Weight of Infant	
Prenatal Weight Gain	No. of Subjects	Range	Mean	Range	Mean
(pounds)		(pounds)		(grams)	
< 23	15	14-22	17.3	1701-4253	2780
23-25	11	23-25	24.6	2580-4082	3203
>25	23	26-45	32.9	2381-4706	3742

Sources of Nutrition Knowledge

Subjects were questioned during the interview as to where they had learned about nutrition. Sixty-two percent replied mothers and grandmothers, 15.6 percent of the subjects learned about nutrition at high school or in university science courses, and 14 percent credited mass media for their knowledge of nutrition. Thirty percent of the subjects said that they had learned about nutrition from professionals at the time of their first pregnancy, i.e., pre-natal clinics, expectant parents classes, physicians, and nutritionists. The total of these responses is greater than 100 percent, because subjects in many cases listed two or more sources of nutrition information. Thirty percent of the subjects said that though they had been exposed to nutrition information at home or had classes in nutrition at school, they had not really tried to put the knowledge into practice until their first pregnancy. Other researchers have also concluded that motivation has been essential to put this knowledge to work (64).

The responses in this study differed from the results of a survey of 2,545 households conducted by the Consumer and Food Economics Institute in 1970 (63). In that survey high school was listed as the source of nutrition information by 40 percent of respondents, and mass media by 30 percent, while only 25 percent learned about nutrition from mothers and grandmothers.

Attitudinal factors which have been found to most affect food choices include personal contacts and professional people. Individuals accept food advice best from those they consider friends and/or allies. Professional people

whom the patient accepts have been found to exert influence on patient food habits (65). The positive influence of professionals also was noted in the responses given by subjects in this study.

Subjects were asked if they would like more information on nutrition during their hospital stay. Thirty-five percent responded positively; their interest was in nutrition information not only for the period of hospitalization but for use at home in feeding a family and for lactation. This response was similar in magnitude to that of the Consumer and Food Economics Institute survey (63).

The demand for information on nutrition is not universal; nutritionists are searching for ways to reach people in order to support and intensify basic nutrition knowledge. Mothers' concepts and knowledge about food is particularly important, as they were found to be the major influence on the food habits of the family (11) and, in this study, a major source of nutrition information. There is much concern that the woman with a low education level or in a low-income bracket will make unwise choices in food for herself and her family. In a recently conducted survey (50), education of less than high school level was associated with poor responses to nutrition knowledge questions.

Obviously, opportunities for reaching all segments of the population need to be considered. One target group at which nutrition education programs could be aimed with reasonable assurance of a successful response appeared to be the female at the time of her first pregnancy (66). Many hospital patients

also were interested in receiving nutrition information. Patient motivation is one of the most difficult tasks for the nutritionist or dietitian (66); the dietitian who sees patients making poor food choices on a selective menu knows frustration. However, an understanding of food habits, aversions, and acceptances is helpful in counseling patients. In her professional capacity the dietition can, if accepted by the patient, exert considerable influence on dietary intake by suggesting food changes and substitutions (65).

Conclusions

The food choices made by this group of patients on a selective menu appeared to be influenced by age, education, and occupation; education and occupation affect economic and socio-cultural background (50).

Diets which were adequate for all nutrients tabulated were selected by 31 percent of the patients. Eleven percent of the subjects selected diets which were below the allowance for more than one nutrient, but only five percent selected diets below the standard for more than two nutrients.

A positive association was observed between higher education levels and quality of dietary intake. Eighty percent of the subjects with education below twelfth grade selected diets below the standard for one nutrient; seven percent of the diets selected by these subjects were below the standard for five nutrients.

Recommendations

The selective menu used in this study was associated with diets which largely met the recommended allowance (22) for all nutrients with the exception

of iron. No menu modification appeared to be necessary. However, both the nutrient intake data and the interview indicated some areas in which nutrition education could be helpful. Basic nutrition information such as the four food groups and substitutions within them could be provided to all patients either routinely with trays or as a part of the selective menu cover design. A suitable pamphlet on general nutrition for the family could be supplied to all patients, particularly all obstetrical patients; more information on dietary intake during lactation could also be provided for interested patients.

The subjects in age group 23-50 years were observed to have dietary intake below the recommended allowance (22) more frequently than lower age groups. Lower nutrient density due to reduced caloric intake appeared to be the cause. This was, in some cases, due to attempted weight control. A weight loss program should not be followed during pregnancy (58). Weight control and weight loss become more difficult when the patient has been overweight for a period of time which can readily occur when there is weight gain from two or more pregnancies with no weight loss in between. With the mean age of this representative group of subjects at 26.79 years, it appeared that this was an ever-present problem in this hospital. Information on adequate post-partum nutrient intake concurrent with reduced caloric intake would be helpful to many subjects. Intake of thiamin, riboflavin, and niacin was occasionally low; information on sources of these B-vitamins and alternate foods which would supply them should contribute to more adequate intake. In a recent survey (51) these three vitamins were most often new to shoppers.

Although only one subject in this study was a vegetarian, there are many such patients in the hospital and in clinics. In addition to iron, niacin was the only nutrient studied in which the intake of this subject was below the allowance. Vegetarians could be provided with information on alternate sources of nutrients such as niacin in which they might have intakes below the allowance. Many of the vegetarian subjects are eager for information; a bibliography of readily available materials on the subject could do much to improve their nutrient intake.

Prenatal patients are not usually contacted in the hospital setting. However, currently available pamphlets could be reviewed and assembled, together with a bibliography, for the use of physicians on the hospital staff. This would help in reaching one target group identified in this study.

Chapter 5

SUMMARY

The three-day caloric and nutrient intake of 64 obstetrical patients using selective menus was observed and calculated. Mean daily intake of 37 non-lactating subjects was below the Recommended Dietary Allowances (22) for iron only; mean intake of lactating subjects was equal to or exceeded the allowance for energy and all nutrients. For both lactating and non-lactating subjects, iron was the nutrient most frequently found to be lower than the intake standard; calcium intake was below the standard for six subjects. Intake of thiamin was below the allowance in four cases, riboflavin in two cases, and niacin for one vegetarian subject. Calories were slightly below the allowance for several subjects--in only one subject to any great degree.

Intake of calories and all nutrients was higher for this group than for similar groups in the Ten-State Nutrition Survey (23) and the First Health and Nutrition Examination Survey (24). As the ratio of nutrients to calories appeared to be the same, lower nutrient density was probably the result of lower caloric intake.

A positive association appeared to exist between the lower age groups (15-18 years and 19-22 years) and nutrient intake. Higher education level of the subject was associated with higher quality of nutrient intake. The relationship between occupational classification and nutrient intake was observed to be less positive; however, classifications primarily comprising

graduate school, university and high school graduates were associated with slightly better nutrient intake. This was observed to be more a function of the education of the subject than of the occupation of the household head.

Mothers and grandmothers were listed by the greatest number of subjects as the source of their nutrition knowledge. The next most important source listed was health professionals at the time of the first pregnancy. High school and mass media were not listed as frequently. Approximately one-third of the subjects indicated interest in more nutrition information.

Mean hemoglobin and hematocrit values of 48 subjects at the time of hospital admission were above the Interdepartmental Committee on Nutrition for National Defense standards (32). Mean daily intake of iron was 18.0 mg (lactating subjects) and 17.0 mg (non-lactating subjects); however, the dietary intake was for the immediate post-partum period, and it is impossible to assume that levels ingested in the hospital were equal in all cases to consumption at home. At best it can be considered an indication of usual dietary pattern. Hemoglobin value probably was a reflection of prenatal mineral supplements which were taken by most subjects.

In most cases greater weight gain by the mother was associated with infants who weighed more at birth. Pre-conceptional weight also exerted an influence on birth weight of infants with heavier mothers giving birth to larger babies, even if they gained a relatively small amount of weight. These observations were in agreement with other findings.

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APPENDICES

Morning

ROOM _____ NAME _____

PLEASE CIRCLE CHOICE (LIKE THIS)

Tuesday A

FRUITS AND JUICES
- Orange Juice
- Grapefruit Juice
- Sliced Peaches

CEREALS
- Cornflakes
- Sugar Frosted Flakes
- Farina

BREAKFAST ENTREES
- Scrambled Egg
- Poached Egg
- Sausage Links

BREAKFAST BREAD
- Corn Muffin

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE TOAST WHEAT TOAST RYE TOAST MELBA TOAST

SPECIFY SERVINGS: SMALL REGULAR LARGE

Noon

ROOM _____ NAME _____

THERE WILL BE AN EXTRA CHARGE FOR ALL ITEMS NOT ON THIS MENU

Tuesday A

APPETIZERS
- Cranberry Juice
- Cream of Mushroom Soup

ENTREES
- Veal Parmigiana
- Pork Tenderloin

VEGETABLES
- Baked Potato
- Broccoli Spears
- Early June Peas

SALAD
- Pear Half with Cream Cheese, French Dressing

DESSERTS
- Chocolate Cake
- Vanilla Cream Pudding
- Apricot Halves

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Night

ROOM _____ NAME _____

PLEASE HAVE MENU READY BY 9:30 A.M.

Tuesday A

APPETIZERS
- Lemonade
- Cream of Chicken Soup

ENTREES
- Roast Round of Beef - Gravy
- Cottage Cheese Fruit Plate with Brown Bread

VEGETABLES
- Mashed Potatoes
- Whole Baby Carrots
- Zucchini Squash

SALAD
- Sliced Tomato on Lettuce with Mayonnaise

DESSERTS
- Cherry Pie
- Gelatin Cubes with Whipped Cream
- Cantaloupe

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Morning

ROOM _____ NAME _____

PLEASE CIRCLE CHOICE (LIKE THIS)

Wednesday A

FRUITS AND JUICES
- Orange Juice
- Pineapple Juice
- Stewed Prunes

CEREALS
- Pep Wheat Flakes
- Sugar Pops
- Oatmeal

BREAKFAST ENTREES
- Scrambled Egg
- Soft Cooked Egg

BREAKFAST BREADS
- Danish Pastry

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE TOAST WHEAT TOAST RYE TOAST MELBA TOAST

SPECIFY SERVINGS: SMALL REGULAR LARGE

Noon

ROOM _____ NAME _____

THERE WILL BE AN EXTRA CHARGE FOR ALL ITEMS NOT ON THIS MENU

Wednesday A

APPETIZERS
- Blended Juice
- Beef Noodle Soup

ENTREES
- Baked Chicken
- Broiled Calves Liver with Bacon

VEGETABLES
- Potato Logs
- Wax Beans
- Stewed Tomatoes

SALAD
- Fruited Gelatin Salad - Mayonnaise

DESSERTS
- Apple Pie
- Banana

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Night

ROOM _____ NAME _____

PLEASE HAVE MENU READY BY 9:30 A.M.

Wednesday A

APPETIZERS
- Apricot Nectar
- Cream of Potato Soup

ENTREES
- Shrimp Creole
- Chicken Pie

VEGETABLES
- Rice
- Asparagus Spears
- Italian Green Beans

SALAD
- Head Lettuce - 1000 Island Dressing

DESSERTS
- Sherbert and Cookies
- Grapefruit Sections

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Morning

ROOM_____ NAME_____

PLEASE CIRCLE CHOICE (I LIKE THIS)

Thursday A

FRUITS AND JUICES
- Orange Juice
- Apple Juice
- Stewed Prunes

CEREALS
- Rice Krispies
- 40% Bran Flakes
- Cream of Wheat

BREAKFAST ENTREES
- Scrambled Egg
- Poached Egg
- Crisp Bacon

BREAKFAST BREADS
- Biscuits

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE TOAST WHEAT TOAST RYE TOAST MELBA TOAST

SPECIFY SERVINGS: SMALL REGULAR LARGE

Noon

ROOM_____ NAME_____

THERE WILL BE AN EXTRA CHARGE FOR ALL ITEMS NOT ON THIS MENU

Thursday A

APPETIZERS
- Grape Juice
- Vegetable Soup

ENTREES
- Sirloin Tips - Gravy
- Baked Veal Chops

VEGETABLES
- Noodles
- Baby Green Lima Beans
- Leaf Spinach

SALAD
- Pineapple Slice with Cottage Cheese - Mayonnaise

DESSERTS
- Strawberry Shortcake - Whipped Cream
- Vanilla Ice Cream
- Cantaloupe

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Night

ROOM_____ NAME_____

PLEASE HAVE MENU READY BY 9:30 A.M.

Thursday A

APPETIZERS
- Tomato Juice
- Cream of Mushroom Soup

ENTREES
- Spaghetti with Meat Balls with Tomato Sauce - Parmesan Cheese
- Chicken Club Sandwich

VEGETABLES
- Mixed Vegetables
- Acorn Squash
- French Fried Potatoes

SALAD
- Mixed Green Salad - French Dressing

DESSERTS
- Baked Apple - Whipped Cream
- Fruit Cocktail

WHOLE MILK SKIM MILK CHOCOLATE MILK BUTTERMILK
COFFEE TEA SANKA POSTUM COCOA
CREAM LEMON SUGAR SUGAR SUB. SALT PEPPER
BUTTER JELLY
WHITE BREAD WHEAT BREAD RYE BREAD
MELBA TOAST ROLLS

SPECIFY SERVINGS: SMALL REGULAR LARGE

Subject No._____

Interview--Information Form

1. What is the age of patient? (years)_____

2. How many children does patient have? _____

3. What is the education level of the patient?

_____Less than High School
_____High School Completion
_____University Completion
_____Graduate School

4. Is the patient employed outside the home? _____Yes _____No

5.* What is the occupation of the patient?

_____Professional, Technical, Managerial
_____Sales and Clerical
_____Craftsman
_____Operatives and Transportation Operatives
_____Laborers--except Farm
_____Farmer, Foremen, and Farm Laborers
_____Service
_____Private Household

6. Is the head of household employed? _____Yes _____No

7.* What is the occupation of the head of household?

_____Professional, Technical, Managerial
_____Sales and Clerical
_____Craftsman
_____Operatives and Transportation Operatives
_____Laborers--except Farm
_____Farmers, Foremen, and Farm Laborers
_____Service
_____Private Household

* Virginia Employment Commission classifications.

8. What type of insurance coverage is provided?

_____Medicaid
_____Private Insurance Company
_____No Insurance Coverage

9. Have you been satified with the food during your stay?
_____Yes _____No

10. Are the foods offered on the menu similar to those which you normally eat? _____Yes _____No

11. Are there any menu items which you would like to see added, and, if so, what?

_____ _____
_____ _____
_____ _____

12. Have you found it necessary to have snacks between breakfast and lunch, or lunch and dinner? _____Yes _____No

13. If you did have snacks, what were they?

_____ _____
_____ _____
_____ _____

14. Did you like the bedtime snack of fruit, cheese and crackers? _____Yes _____No

15. Would you like milk and cereal or a sandwich in addition to the bedtime snack? _____Yes _____No

16. Did the patient consume all food on trays? (Determined from observation at each meal, plus discussion with patient.)

_____
_____
_____
_____
_____
_____

17. From what source have you received most of your information on nutrition?

_____Mother, Grandmother, Friends
_____School
_____Mass Media (Radio, TV, Magazines, Newspapers or Consumer Pamphlets)
_____Physician, Nutritionist, Clinic

18. How often do you eat away from home? _____

19. What type of restaurant do you usually go to?

_____Fast Food Service
_____Table Service Restaurant

20. Have you had any problems during this pregnancy? _____Yes _____No

21. How much weight did you gain during this pregnancy? _____

22. Have you taken supplemental vitamins and minerals during this pregnancy? _____Yes _____No

If yes, what? _____

23. Do you regularly take any type of medication? _____Yes _____No

If yes, what? _____

Individual Nutrient Intake Data

Subject	Age	Calories	Protein	Calcium	Iron	Vitamin A	Thiamin	Ribo	Niacin	Vitamin C
1 N*	32	2651	109	1461	18.2	28,254	1.49	3.73	19.8	145
2 L**	27	2968	118	1631	14.7	7,612	1.63	2.80	19.2	129
3 L	24	2803	106	999	16.2	8,931	1.30	1.91	20.9	150
4 N	22	2605	97	915	14.6	7,056	1.20	1.71	17.6	220
5 L	24	3385	140	2148	17.4	14,845	1.66	3.48	21.3	212
6 N	16	2780	96	928	15.7	20,600	1.32	2.84	20.6	182
7 L	25	3418	140	1923	21.8	14,650	1.63	3.06	22.6	212
8 N	23	3142	125	1533	17.8	7,585	1.75	2.76	20.8	201
9 N	33	3262	113	1120	17.9	11,252	1.41	2.00	22.9	219
10 L	18	3431	124	1837	14.9	6,496	1.50	3.01	20.8	215
11 L	27	2740	120	1780	16.0	14,511	1.27	2.92	18.2	193
12 N	26	1586	66	471	9.3	4,538	0.92	1.07	15.6	206
13 L	30	2913	124	1726	17.1	22,850	2.03	4.08	22.6	189
14 L	42	2553	122	2011	16.2	14,866	1.45	3.22	17.6	182
15 L	31	3308	138	1966	17.6	11,989	1.70	3.39	20.3	183
16 N	25	3140	119	1542	15.8	9,127	1.71	2.71	20.1	204
17 N	33	2923	120	1621	19.5	24,035	1.53	3.89	20.4	194
18 N	25	2908	107	1258	18.3	24,495	1.40	3.26	20.3	192
19 L	23	2581	104	1172	18.1	28,142	1.30	3.36	18.9	199
20 N	28	2844	111	1279	15.9	12,517	1.21	2.31	19.4	196
21 N	25	2804	103	1021	17.7	21,048	1.76	3.26	22.2	205
22 L	29	3005	118	1626	17.3	27,587	1.50	3.87	18.3	233
23 N	25	3192	114	1456	18.1	27,792	1.40	3.47	19.2	195
24 N	25	2731	103	981	16.1	11,243	1.22	1.87	20.6	236

* N = Non-lactating
** L = Lactating

Subject	Age	Calories	Protein	Calcium	Iron	Vitamin A	Thiamin	Ribo	Niacin	Vitamin C
25 L	36	3692	165	2379	23.6	26,950	2.06	5.17	27.0	216
26 N	32	3057	122	1647	22.1	29,179	1.71	4.06	19.9	197
27 L	24	2375	76	1685	13.6	15,912	1.43	2.83	11.1	165
28 N	20	3060	123	1827	14.2	9,194	1.44	2.98	17.8	144
29 N	24	3037	106	996	16.1	7,355	1.76	2.09	20.1	190
30 N	29	2446	90	1098	14.1	14,192	1.22	1.98	16.9	176
31 N	29	3221	124	1456	17.2	11,333	1.85	2.74	22.2	205
32 N	31	2437	103	1232	17.1	22,896	1.35	3.18	19.2	180
33 N	36	3082	115	1458	17.4	20,914	1.80	3.66	19.8	173
34 L	24	2638	112	1474	14.7	10,713	1.33	2.49	18.2	199
35 L	35	2464	117	1329	21.8	20,794	1.76	3.82	21.1	126
36 L	25	3447	131	1869	20.8	13,829	1.85	3.34	24.1	238
37 N	20	2790	116	1815	14.1	9,098	1.43	2.85	18.5	181
38 N	20	2998	112	1477	14.5	10,920	1.43	2.45	19.3	174
39 N	20	3295	139	2216	19.6	8,912	1.76	3.57	21.0	159
40 N	28	2517	94	810	14.8	7,723	1.28	1.58	19.4	186
41 L	39	3421	145	2074	22.4	12,352	1.67	3.47	22.9	193
42 N	21	3151	112	1356	15.6	5,113	1.39	2.44	18.6	143
43 L	21	3102	120	1589	16.6	13,538	1.64	2.76	20.8	201
44 L	24	3120	129	1923	18.2	29,764	1.75	4.43	21.7	226
45 N	22	2983	107	1063	17.9	11,355	1.60	2.00	20.5	167
46 L	32	3540	129	1754	19.7	27,060	2.10	4.29	23.0	239
47 N	26	3300	116	1643	17.3	20,846	1.37	3.84	18.6	169
48 L	28	2583	118	1631	17.7	30,126	1.26	3.90	19.8	195
49 L	28	3715	142	2065	18.0	10,070	1.96	3.60	22.2	182
50 N	16	2267	86	615	15.7	24,211	1.16	2.43	19.7	168
51 L	34	2227	84	729	18.3	13,463	1.04	1.40	19.8	196
52 N	21	3555	130	1707	20.7	29,184	2.02	4.23	23.3	220
53 N	24	2953	118	1518	19.9	15,779	1.78	2.76	19.7	192
54 L	26	3143	118	1490	21.5	27,339	1.84	3.83	21.1	234

Subject	Age	Calories	Protein	Calcium	Iron	Vitamin A	Thiamin	Ribo	Niacin	Vitamin C
55 L	30	3264	133	2070	19.2	25,780	1.47	4.48	19.4	197
56 N	29	2731	97	1023	14.4	7,186	1.21	1.76	17.2	160
57 N	28	2773	104	951	22.9	26,523	1.32	2.90	20.3	192
58 N	17	3577	129	1711	19.7	24,412	1.57	4.02	23.0	173
59 L	30	2500	102	1075	17.1	26,952	1.37	3.18	19.8	211
60 L	30	3587	136	2060	17.1	11,370	1.99	3.55	20.7	206
61 N	37	3562	131	1869	17.4	12,881	1.69	3.30	22.1	229
62 N	23	3407	127	1674	17.1	9,103	1.56	2.86	22.0	156
63 N	17	2918	113	1329	15.9	12,441	1.38	2.34	20.2	168
64 N	25	2796	119	1663	17.3	12,204	1.49	2.77	19.7	219

Demographic Data - I

Subject	Preconceptional Weight (lbs.)	Weight Gain (lbs.)	Infant Weight (lbs./oz.)		Hgb (g/100 ml)	Hct (%)
1			8	10		
2			7	1	13.0	37
3			9	8		
4	190		7	15	12.2	34
5			7	0	13.1	37
6			7	8	12.3	36
7			9	10		
8			8	9	10.6	30
9			6	1	11.7	35
10			7	9	13.7	38
11			9	1		
12			8	1		
13			7	4		
14			7	2	11.8	34
15	130	20	8	0	12.7	37
16		25	7	3	11.3	34
17	145	25	9	0	13.4	38
18		25	8	3	12.3	35
19		14	3	12	12.0	35
20	112	30	7	7	12.2	35
21		41	8	3	11.9	35
22		30	7	8		
23		13	6	3	10.4	30
24	199	15	6	10		39
25		35	6	13	12.4	35
26	170	14	8	3		
27	110	25	6	11	11.6	37
28	123	26	6	9	11.0	31.4
29		25	8	4		
30*		35	3	9	11.8	36
			4	1		
31		23	6	8		
32	115	25	6	10	13.3	38
33		31	6	5	11.0	32
34		17	6	14		

* Twins--information not used in calculations for relationship of weight gain/birth weight.

Subject	Preconceptional Weight	Weight Gain	Infant Weight		Hgb	Hct
35		9	4	13	12.6	36
36		17	6	3	12.8	39
37		28	7	2	11.8	34
38		20	6	7	11.1	31
39*	122	40	6	2		
			7	2		
40		30	9	14	11.0	36
41	185	30	7	10	14.3	42
42	142	18	8	15	8.2	26
43	132	40	5	6		
44	176	28	9	5	12.3	37
45	98	36	6	8	10.9	34
46	190	17	9	6	12.0	34
47	120	26	8	7	11.8	35
48	119	26	6	1	10.9	31
49	128	26	6	15	11.5	35
50	98	14½	6	3	11.2	32
51		45	8	1	12.1	36
52	118	24	5	11	11.0	33
53		30	6	5		
54		23	7	3	11.2	33
55	123	34	8	4	10.6	32
56	140	40	7	12	11.8	35
57		40	8	0	9.8	30
58	122	30	5	4	11.3	35
59	140	27	7	12		
60	193	20	6	0	13.3	40
61		20	7	0	11.9	37
62		35	6	4	12.5	38
63		20	5	4	11.5	37
64		35	9	0		

Demographic Data - II

Subject	Age	Race	Education of Subject	Occupation Head of Household	Other Children	Source of Nutrition Information
1	32	W	H/S	Trans. Operative	1	School + physician at first pregnancy
2	27		Univ.	Professional	1	Family + physician at first pregnancy
3	24		H/S	Technician	0	Family (sister)
4	22	W	H/S	Trans. Operative	0	Home
5	24	B	H/S	Technician	0	Prenatal clinic & consumer pamphlets
6	16	B	Less H/S	Laborer*	0	Grandmother
7	25	W	H/S	Craftsman	0	High School + magazines
8	23	W	H/S	Technician	0	High School + friends with babies
9	33	W	H/S	Sales	2	High School + magazine article
10	18	B	Less H/S	Laborer	0	School + nutritionist at clinic
11	27	B	H/S	Technician	1	School + brother (a physician)
12	26	B	Less H/S	Service	1	Mother
13	30	W	H/S	Technician	0	Mass media
14	42	W	Univ. +	Professional**	0	Mass media
15	31	W	Univ.	Professional	1	Home
16	25	B	H/S	Sales/Clerical**	0	Home
17	33	B	Univ.	Professional	2	Physician, home & reading
18	25	B	Univ.	Professional	0	Home
19	23	B	Less H/S	Unemployed	2	Nutritionist at clinic
20	28	W	Univ.	Professional	0	Home
21	25	B	H/S	Sales/Clerical**	2	Home
22	29	W	Univ.	Professional	2	Home + friend (a dietitian)
23	25	B	H/S	Service	1	Mother-in-law + physician at clinic
24	25	B	Univ.	Sales/Clerical**	0	Mother

* Mother is Head of Household.

** Subject is Head of Household.

Subject	Age	Race	Education of Subject	Occupation Head of Household	Other Children	Source of Nutrition Information
25	36	W	Univ.	Professional	3	Mother + college science courses
26	32	W	H/S	Sales/Clerical	0	Mother
27	24	B	H/S	Craftsman	1	Grandmother + nutritionist at clinic
28	20	B	Less H/S	Service	0	Mother
29	24	B	H/S	Unemployed**	2	Mother
30	29	B	Less H/S	Unemployed**	2	Friends
31	29	B	Univ. +	Professional	1	Mass media
32	31		Univ.	Sales/Clerical	0	Husband (she is Malaysian)
33	36	B	Less H/S	Unemployed**	3	Prenatal clinic
34	24	B	H/S	Operative**	0	Nutritionist at clinic
35	31	W	H/S	Professional	0	School + physician at first pregnancy
36	25	B	H/S	Unemployed	3	Friends
37	20	B	Less H/S	Unemployed**	0	Mother
38	20	B	H/S	Operative**	1	Mother
39	20	W	H/S	Service	0	Mother
40	28	B	H/S	Sales/Clerical	2	Grandmother
41	39	W	H/S	Professional	4	Physician at first pregnancy
42	21	B	Less H/S	Unemployed**	3	Mother
43	21	W	H/S	Craftsman	0	Mass media
44	24	W	H/S	Sales/Clerical	0	Physician & nutritionist this pregnancy
45	22	B	H/S	Laborer	1	High School
46	32	W	Univ. +	Professional	2	Mother + High School
47	26	B	H/S	Service	1	Mother + at first pregnancy
48	28	W	H/S	Professional	0	Mother
49	28	W	Univ.	Professional	0	Mother
50	16	B	Less H/S	Laborer*	0	Mother

Subject	Age	Race	Education of Subject	Occupation Head of Household	Other Children	Source of Nutrition Information
51	34	W	H/S	Sales/Clerical	2	Mother
52	21	B	H/S	Sales/Clerical	0	Mother
53	24	B	H/S	Professional	2	Mother + nutritionist at first pregnancy
54	26	W	Univ.	Professional	1	Mother
55	30	W	Univ.	Professional	1	Mother
56	29	B	H/S	Sales/Clerical**	3	Mother
57	28	B	H/S	Service	0	Mother + High School classes
58	17	B	Less H/S	Laborer*	0	Mother
59	30	W	Univ.	Professional	1	Mother + physician at first pregnancy
60	30	W	Univ.	Professional	2	Mother + FDA regulations, etc.
61	37	B	Less H/S	Unemployed**	6	Mother
62	23	B	Less H/S	Laborer	0	Mother
63	17	B	Less H/S	Sales/Clerical*	0	Mother
64	25	W	H/S	Sales/Clerical	1	Mother + physician at first pregnancy

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NUTRIENT INTAKE OF HOSPITAL PATIENTS ON SELF-SELECTED DIETS

by

Dorothea Little Slater

(ABSTRACT)

Mean daily nutrient intake was calculated for 64 obstetrical patients from three-day selective menus. Judged by the standard of the 1974 Recommended Dietary Allowances, the mean intake of 27 lactating subjects was adequate in energy and all nutrients; the intake of 37 non-lactating subjects met the allowance for all nutrients with the exception of iron. Mean intake of these subjects was higher than similar groups in national surveys for all nutrients with the exception of thiamin. Higher nutrient density was in ratio to higher caloric intake.

Relationship of nutrient intake to age, education of subjects, and occupation of household head was investigated. Nutrient intake below the allowance was observed at all age and educational levels and in all occupational classifications. Nutrient intake was positively associated with lower age groups (15-22 years) and higher educational levels. Association with occupation was not as positive.

Percentage of calories in the diet from protein sources was similar to the average North American diet. Distribution of calories from carbohydrate was similar to the average United States dietary pattern, and from fat was slightly lower.

A positive association was observed between birth weight of infant and weight gain of subjects; the effect of preconceptional weight on birth weight was observed to be similar to that of other reports.

Patients listed mothers and grandmothers most frequently as the source of their nutrition information. Motivation for putting prior knowledge and information into actual practice was associated with the first pregnancy. Physicians, nutritionists, and dietitians exerted a positive influence in this respect.