



Nutrition education in medical schools
by Norma Ramirez Kent

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE in Home Economics
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Abstract:

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Questionnaires were sent to the 112 accredited medical schools in the United States including Puerto Rico. Answers were received from seventy-two. Only twenty schools offered a separate course in nutrition while seventy of the respondents said they integrated nutrition into a variety of disciplines. The content of the courses lacked uniformity and the background of those teaching the nutrition course varied. Most schools used a combination of professionals to teach the course in nutrition. Thirty-three schools had a person or committee coordinating efforts in nutrition education. The non-medical aspects of nutrition had no consideration in the curriculum of eighteen respondents. The responding faculty members assumed that the nutrition knowledge of their students varied greatly. The majority of respondents believed a nutrition course at premedical level would be desirable.

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NUTRITION EDUCATION IN MEDICAL SCHOOLS

by

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A thesis submitted to the Graduate Faculty in partial
fulfillment of the requirements for the degree

of

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Home Economics

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ABSTRACT

This study was undertaken to investigate the status of nutrition education in the medical schools in the United States.

Questionnaires were sent to the 112 accredited medical schools in the United States including Puerto Rico. Answers were received from seventy-two. Only twenty schools offered a separate course in nutrition while seventy of the respondents said they integrated nutrition into a variety of disciplines. The content of the courses lacked uniformity and the background of those teaching the nutrition course varied. Most schools used a combination of professionals to teach the course in nutrition. Thirty-three schools had a person or committee coordinating efforts in nutrition education. The non-medical aspects of nutrition had no consideration in the curriculum of eighteen respondents. The responding faculty members assumed that the nutrition knowledge of their students varied greatly. The majority of respondents believed a nutrition course at premedical level would be desirable.

CHAPTER I

INTRODUCTION

In the health field one of the questions widely debated today is whether or not practicing physicians have enough training in nutrition to meet modern demands. The medical profession has been a major source of nutrition information for most of the public, yet it has not had complete knowledge.^{1,2} As pointed out by Williams,

If more doctors really were experts with respect to nutrition and heredity, they would be able to give their patients sufficiently intelligent advice so that quackery and faddism could have very little scope.³

On the other hand, with the great advancements made daily in the field of medicine and the expansion of nutritional knowledge, it is difficult for these professionals to keep abreast. Some physicians are aware of the great assistance in paramedical professionals such as biochemists, nutritionists and dietitians, and they do take the opportunity to consult with them.

"Nutrition is the most important environmental factor affecting health."⁴ With the growth of the population and the limitations on resources, a new attitude of preventive medicine becomes important. The medical profession must think in terms of preventing disease by attacking the basic causes.

Need of the Study

As the population grows, so does the need for guidance of that population in nutritional matters. The question must be asked: how well prepared are our physicians to give diet advice?

Most past literature which concerns nutrition education in our medical schools points to the need for incorporating nutrition in the medical curriculum. This has been determined by surveys⁵⁻⁷ and several conferences, of which the most noted is the Chicopee Conference in 1962 sponsored by the Council on Foods and Nutrition of the American Medical Association.⁸ Even the work carried out at a later conference, Guidelines for Nutrition Education in Medical Schools. . . , was based on the Chicopee Conference.⁹ In writing to participants the goal of this later conference was stated as being

to formulate realistic practical guidelines for incorporation of nutrition education into the medical training in concurrence with the physician's responsibility as defined by the Chicopee Conference.¹⁰

No thorough formal survey to find out how nutrition information is included in a physician's training program has been done.¹¹

There is a need, therefore, to know if any improvement in incorporating the knowledge of nutrition has been made for the most recent and future graduates. If so, how is this being done: as a single course by itself, or by integrating nutrition in related courses?

Montana State University has been approved for participation in a regional medical education program including Washington, Alaska, Montana, and Idaho (WAMI). Curriculum planning of this program could greatly benefit from such a study.

Purpose of the Study

The purpose of this study was to ascertain if medical schools are insuring that our future physicians have the background knowledge in nutrition necessary to prevent, detect, and treat diseases that are related to an individual's nutritional status.

To do this the following questions were asked:

1. Does the medical curriculum include a course in nutrition?
2. If so, what type of nutrition information is included?

3. What are the qualifications of the person teaching the nutrition course?

4. Is nutrition integrated into a related area of study such as: biochemistry, physiology, pharmacology, obstetrics, pediatrics, medicine, surgery, physical diagnosis, clinical training, bacteriology, or any other pertinent area?

5. Are the non-medical aspects that affect nutrition included in the curriculum?

6. How are efforts coordinated to assure there is no duplication in the nutritional training and that as many areas as possible are being covered?

CHAPTER II

REVIEW OF LITERATURE

In the last year there has been renewed interest in nutrition education in the medical schools. This has been shown by the number of articles that were published on this topic during this time. Interest and concern about nutrition as a component of medical education and clinical practice has also come from our legislators.¹²⁻¹⁴

The Relationship of Medicine to Nutrition

Nutrition is an important part of the scientific basis of medical knowledge. The nutrition concepts integral to the practice of medicine are relevant in diagnosis, treatment, rehabilitation from chronic illness, prevention of disease and promotion of health. Nutritional diagnosis should be an integral part of medical diagnosis. Many disorders, whether infectious, metabolic, degenerative, or neoplastic influence the nutritional status of the patient. The physician, therefore, should be able to evaluate the nutritional status of a patient and appreciate the changes in nutritional requirements brought about by disease.¹⁵

Most physicians think of nutrition as a matter of dealing with deficiency diseases. These are rare in the United States although they do exist.^{16, 17} Most nutritional diseases in the United States today are of the "too much" variety, for example too much of an individual food or nutrient and too much of all foods. The primary nutrition problems relate to chronic and degenerative diseases, by-products of a long life made possible by good medical care coupled with adequate food to satisfy nutrient needs. As a health leader the physician should be informed broadly on these subjects.

Once again deficiencies, excesses, even diseases themselves can all result from environmental changes affecting nutritional needs and/or nutritional status. In view that these all relate to the needs of the practicing physician, every doctor should strengthen his knowledge of nutrition and his ability to apply this knowledge.

At the Conference on Nutrition Education in Medical Schools held in Chicopee, Massachusetts in 1962, it was decided that the physician's responsibilities in applying nutritional principles were defined as follows:

- 1) The use of nutritional measures for maintenance of health and prevention of disease,
- 2) Treatment of primary nutritional disease,

- 3) Treatment of malnutrition secondary to disease or injury,
- 4) The use of nutritional knowledge to modify metabolism for therapeutic purposes,
- 5) Supportive therapy of nutritional aspects of diseases and injuries, and
- 6) Counseling.¹⁸

The knowledge of nutrition upon which physicians depend is usually acquired during medical school. This training is inadequate.^{19, 20} Physicians have the valuable assistance of dietitians in dietary matters in hospitals but a great number of graduates open their own offices in an area where the services of a dietitian are not available. Hence, their patients depend on medical doctors as their singular source of nutrition information.

The American public is much better educated than before in nutrition, in medicine, in all aspects of living. Paradoxically, it is also more susceptible to misinformation transmitted by the mass media. Advertising constantly puts before the public, including physicians, claims about foods, diets, and vitamin and mineral supplements. Vitamin preparations and nutrient supplements are being sold in ever increasing amounts for major and minor complaints. Very often these are self-prescribed, used without the advice of a physician. In addition, "uninformed physicians may be unduly influenced by informational material on special

foods and diet products of dubious importance."²¹ There is need for more effective medical leadership in the best use and adaptation of nutrition information.

The Status of Nutrition Education
for the Medical Profession

Nutrition, or the science of food and its relation to health, is a relatively new field. If the information obtained by nutrition researchers is to be applied by the physician, early cognizance of the distance between them must be started during medical training.²²

Stare believes that nutrition is such a broad and important subject in the maintenance of health, that all physicians should have some awareness of the subject. He states

Nutrition should be an essential component of the standard medical curriculum. . . . Yet in most medical schools, organized instruction in nutrition is sadly neglected despite "lip service" to the contrary.²³

Wilson believes further that nutrition education in all of its aspects should be included in each of the clinical branches of medical instruction.²⁴ In a major sense, the degree of success in obtaining health improvement in patients by utilizing nutrition information or

dietary manipulation depends upon the physician's competence in nutrition. It is, therefore, of particular pertinence, according to Shank, to ask: "How adequately are physicians trained and informed in nutrition?"²⁵

At the Chicopee Conference medical schools were found to give inadequate recognition, support, and attention to nutrition in the curriculum.²⁶ More recently, the Committee on Nutrition Education in Medical Faculties of the International Union of Nutritional Sciences met to submit evidence concerning the urgent need to include nutrition in the education of undergraduates and post-graduates in schools of medicine all over the world. On the whole it was their conclusion that nutrition education in most schools of medicine is inadequate.²⁷

The White House Conference on Food, Nutrition and Health recommended that basic nutrition should be part of the required, or core curriculum, of medical schools. They based their recommendation on the concept "of the fundamental importance of nutrition in normal growth and development and in the maintenance of health."²⁸

The recent Conference Guidelines for Nutrition Education in Medical Schools, sponsored by the Council on Foods and Nutrition of the American Medical Association,

did "take a large step in advancing the recognition of nutrition as a field of learning vital to the education of the well-rounded physician."²⁹

Objectives of Nutrition Education for the Medical Profession

As a result of a survey of the nutrition instruction received by medical students, the American Dietetic Association has proposed the following objectives for nutrition education of future physicians:

- a) To acquaint the student with the importance of diet to the well being of the individual.
- b) To present reasons for the necessity of a good dietary history.
- c) To acquaint the student with the hospital dietary department and to give him some understanding of the problems involved in hospital food service.
- d) To present methods of maintaining adequate nutrition in various physiologic conditions as well as an understanding of each therapeutic diet as a modification of the normal diet.
- e) To stress appreciation of the importance of patient's understanding the reason for the diet.
- f) To recall psychologic disturbances which often accompany illness and affect attitudes toward food.
- g) To present the material in such a manner that the students can tell patients what to eat in terms of food with sufficient flexibility that the regimens will be acceptable to the patients.³⁰

These objectives agree, with few exceptions, with the physician's responsibility as defined by the Chicopee Conference. The differences are that the American Dietetic

Association enlarged the physician's responsibility to include an understanding of some of the non-medical aspects that affect dietary habits, importance of patient's understanding the reason for the diet, and problems in hospital food service.

Methods of Nutrition Education
for the Medical Curriculum

The teaching of nutrition to medical students allows room for great creativeness. Lewis gives an account of a nutrition course at Ohio State University, School of Medicine.³¹ The class meets for twelve two-hour periods. A lecture for one half-hour is followed by a lunch consisting of the foods being discussed. A formal discussion is held after the lunch. Trays with a breakfast and a supper for the same day are presented. Harlan described a meal conference series used at the Medical College of Virginia in Richmond.³² Using this format, six to ten students met for five sessions during a two week period. During the sessions five commonly prescribed modified diets were presented and served.

Another method is a nutrition clinic where there is an objective approach to the problem of nutrition.

Only three to four students were in the course at a time. There was a 30 minute discussion of a topic, then each student reviewed his patient chart for diagnosis, clinical findings, and reports from other clinics. The student was to take a diet history from his patient, and instruct the patient verbally on his diet including the purpose of the diet and explaining any unfamiliar terms to the patient. At the end the student would give the patient a written copy of the diet.³³ The objective of this method is to demonstrate the application of nutrition and dietetics to the social, economic, and psychological aspects of the patient's food intake. Lack of experience in food preparation, marketing, and many of the subjects which are part of the dietitian's background would be a handicap to this method of learning.

Frankle described a first year course for students at Mount Sinai School of Medicine. They use a combination of experiences: the student's dietary intake for three days and psychological reactions of the students, at the same time students are subjected to laboratory analysis for blood level of nutrients; grand round format; visit of a drug rehabilitation center; observation of malnourished or undernourished children as they are evaluated by the

Nutrition Division's pediatrician; and follow-up home visits of the student's case study patient.³⁴

Nutritionists and therapeutic dietitians that participate in ward rounds and conferences can augment the student's knowledge.³⁵ The dietitian's contribution to the education of medical students should be to anticipate the problems that will be encountered in the future by the physicians and to give the students the tools for discovering and solving them.³⁶

The evolution of the role of nutrition in the Mount Sinai School of Medicine curriculum was outlined recently by Christakis. This pioneering venture made nutrition a substantial and integral component of medical education. Possible reasons for the success of this program may relate to the following:

- 1) presence of faculty conducting clinical and community nutrition research and keenly interested in nutrition teaching;

- 2) presence of a Division entitled "Nutrition" making it obvious that nutrition exists as a distinct academic entity with a defined subject content;

- 3) fact that Mount Sinai is a relatively new medical school that established a medical curriculum de novo without the necessity of fracturing past traditions;

- 4) establishment of an institutional philosophy that included a commitment to community health problems and thus included nutrition;

- 5) opportunity to develop a Nutrition Division and faculty defined nutrition in relation to a specific

philosophy and goals, and taught nutrition with in vivo clinical and community examples of nutritional problems;

6) ability to maintain flexibility of the nutrition curriculum as the overall medical curriculum underwent evolutionary changes; and

7) presence of a Chairman of the Department of Community Medicine who recognizes the clinical and community medicine aspects of nutrition and encourages its participation in departmental services, research, and teaching efforts.³⁷

Nutrition education should ensure that future medical graduates can take their full share in the building of a better and healthier population. Each medical school should designate an individual or committee which would have the responsibility of proposing an integrated and well-rounded teaching program in nutrition to the medical school curriculum committee.³⁸

CHAPTER III

PROCEDURES

The purpose of this study was to ascertain if medical schools are insuring that our future physicians have adequate knowledge in nutrition. This is important in the prevention, detection, and treatment of diseases that are related to or have an effect upon an individual's nutritional status.

Selection of the Sample

Nutritional knowledge of future physicians in the United States is most likely to be acquired in the medical schools they attend. The population selected for this study, therefore, was the accredited medical schools in the United States of America, including Puerto Rico. These are listed in the booklet published by the Association of American Medical Colleges, Medical School Admission Requirements.³⁹ Total established schools number 112, including those scheduled to open in the fall of 1972.

Method of Collecting Data

The dean of each medical school was requested to provide the name of the person most involved in nutrition

education in his school. The simplicity and shortness of a post-card questionnaire (Appendix A) seemed to lend itself to the probability of a high return. These were sent in the form of self-addressed, stamped, double post-cards, coded to identify each school by using room numbers as part of the return address. The coding was done to be able to send reminders to the schools that did not answer. They were mailed in July, 1972.

A questionnaire was developed that would require a minimum amount of the time. The instrument was divided into three parts. Part I was to be answered by all recipients. It was intended to determine:

- 1) which non-medical aspects of nutrition were included in the curriculum,
- 2) what nutrition aspects were assumed to have been learned by the students at the pre-medical level,
- 3) whether a nutrition course at pre-medical level was desirable.

The need to complete Part II or III was dependent on the method used to incorporate nutrition into the curriculum. Those who offered a separate nutrition course were to complete Part II. It provided information concerning:

1) the type of nutrition information included in the nutrition course,

2) the qualifications of the person teaching the course,

3) the status of the course as requirement or elective,

4) the manner in which nutrition education was carried to the patient.

Those who integrated nutrition in other disciplines were to answer Part III. The aspects of nutrition integrated in each of thirteen disciplines was solicited.

Before final printing, the questionnaire was reviewed by the researcher's graduate committee for completeness of instructions and ease of understanding. Comments and suggestions helped to revise the instrument.

This questionnaire (Appendix B) was sent to the person or committee designated by the deans of the various medical schools. In the event the deans had not answered the original inquiry, this second questionnaire was mailed to the dean. In this way all 112 medical schools were contacted twice. A cover letter (Appendix B), explaining the reason for the study, and a self-addressed, stamped manila envelope accompanied the instrument. Questionnaires

were coded, again using room numbers for identification of each school. These were mailed December 1, 1972.

After three weeks a reminder (Appendix C) was sent to those persons designated by the deans that had not yet responded. Those deans who did not answer the original request or questionnaire were assumed to be uninterested and were not sent reminders.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to obtain information concerning the inclusion of nutrition in the medical curriculum.

Sample

It was important to ascertain the most knowledgeable person concerning nutrition in the curriculum in each of the 112 accredited medical schools in the United States, including Puerto Rico. Only in this manner could a true picture of the nutrition information included in a medical students' program be provided. Deans of 88 or 78.6 percent, of these schools responded.

An informational instrument was then sent to all 112 medical schools. In 54 instances they were sent to the instructor or coordinator designated by the dean to answer the instrument. The remaining 58 were sent to the dean, either by his own request or because no response had been received to the original inquiry. Response was received from 72 or 64.3 percent of the total population. This would seem to indicate some interest in nutrition education for medical students (Table 1).

TABLE I
CLASSIFICATION OF RESPONDENTS

	Number	Percent of Total Sample
Part I		
Post-Card	88	78.6
Part II		
Nutrition Education Questionnaire		
Deans	32	28.6
Designees	40	35.7
Total	72	64.3

Nutrition Education

The present generation has a questioning philosophy about nutrition. Answers for them should come from professionals who can provide sound information.

Medical schools should provide their students with the proper professional background in nutrition. Only by developing an appreciation of the part nutrition plays in prevention and treatment of disease can the proper advice be given to their future patients. In this way there is little room for faddism.

A Separate Course

One method of including nutrition in the curriculum is as a separate course where nutritional problems can be highlighted in a systemized series of lectures. There were 20, or 17.8 percent of the total sample, that did so.

Types of Courses. It is interesting that of the 88 schools which returned the post-card questionnaire, 25 or 22.3 percent, said a course in nutrition was offered. This compares with 20, or 17.8 percent that answered in the main instrument that their school offered a separate course in nutrition. This difference may be due to the fact that not all the schools that answered the initial inquiry answered the second questionnaire.

Of the twenty schools with a nutrition course, 16 or 14.3 percent of the total sample, were normal semester or quarter length courses; two or 1.8 percent offered a mini-course or module; and the same number held luncheon conferences in which they served the type of diet under discussion that day (Table II). One respondent commented that until students began to see the interrelationships of medicine and nutrition they appear

uninterested. Another respondent, whose school offers two elective courses in nutrition, said both courses were oversubscribed. A third, where nutrition education was in the form of a module, stated that 64 of 227 students, or 28.2 percent, chose the nutrition module in their independent study program. It was helpful to receive published articles explaining the nutrition curriculum from two schools.

TABLE II
TYPE OF NUTRITION COURSES
IN MEDICAL SCHOOLS

	No.	Percent	
		of Population	of Sample
Course	16	14.3	22.2
Mini-Course	2	1.8	2.8
Luncheon Conference	2	1.8	2.8
Total	20	17.9	27.8

To emphasize interest in nutrition one school reported a course in medical nutrition in the planning stage. Another included a copy of their presentation at a Senate Committee Hearing on Nutrition and Human Needs,

held on December 5, 1972. A third sent a copy of a proposed grant seeking funds from the Department of Health, Education and Welfare for nutrition education support. Still another told of organizing a division of nutrition. Should it come into being, it would substantially change the school's education program. One respondent thought inadequate time was allocated in the curriculum for a substantial inclusion of the medical aspects of nutrition and that a separate department would be ideal although it was impossible at the present time.

A National Institute of Health grant supported the nutrition education program in one curriculum. Included was a nutrition elective and integrated lectures for all students as well as:

- 1) Therapeutic nutrition luncheon conferences.
- 2) Guest lecture series (nutrition lectures given by outstanding physicians interested and involved in clinical aspects of nutrition).
- 3) Field experience with a nutritionist in a comprehensive Family Health Care program. Patients were instructed in modified diets as well as normal nutrition. Since large numbers of students rotated through this unit,

the need for nutrition was emphasized. In the planning stage are a series of nutrition seminar sessions.

4) A weekly nutritional bulletin distributed to the entire medical staff.

5) Student participation in nutritional research projects.

A less formalized way for students to improve their knowledge of nutrition is by working in conjunction with the dietitians and nutritionists in their teaching hospital. This can include carrying nutrition to the bedside whether by physicians or dietitians, so that relationships between medicine and nutrition can be better appreciated. Medical students in those schools that offered a nutrition course were required to work with a dietitian or nutritionist in the teaching hospital in five instances or 4.5 percent of the population. Only two respondents thought students had considerable exposure to the dietitian. One respondent thought it was a great idea, but pointed out that students were no longer under their jurisdiction when in the hospital units.

Nutrition was being carried to the bedside in ten of the twenty schools with a nutrition course. Eight had no such program. One was unsure if they had such a

program, and one was planning it for the future.

Personal correspondence with the Association of American Medical Colleges, revealed that fifty-two schools or approximately 50 percent of the medical schools in the country offer elective programs covering nutrition.⁴⁰ The response for this study could not confirm this statement. It was assumed a response indicated an interest in nutrition education. Seventy-two schools answered the questionnaire. Of these, only 20 or 17.9 percent of the population, had a nutrition course. For the total to reach 52, it would mean that thirty-two of the remaining forty schools from which there was no answer, had a nutrition course. In view of the responses received, this is highly unlikely.

Content of Courses. Ideally a nutrition course should have purpose, design, and relevance for the particular group of medical students enrolled. It should also fit within the time limitations of the medical curriculum. In the courses taught in the schools of the respondents eighteen, or 16.0 percent of the total sample, had both basic and clinical nutrition in their course. The remainder included modified diet applications (14.3%), cultural and sociological aspects that alter an individual's

response to diet (12.5%), nutrition and heredity (10.7%) and appearance and taste of modified diets (6.2%) (Table III).

TABLE III
CONTENT OF NUTRITION COURSES
IN SCHOOLS OF RESPONDENTS

Aspects	No.	Percent		
		of Population	of Sample	of Schools with Nutr. Course
Basic Nutrition	18	16.0	25.1	90.0
Clinical Nutrition	18	16.0	25.1	90.0
Modified Diet Applications	16	14.3	22.2	80.0
Cultural and Sociological	14	12.5	19.4	70.0
Nutrition and Heredity	12	10.7	16.7	60.0
Appearance and Taste of Modified Diets	7	6.2	9.7	35.0

Qualifications of Nutrition Teachers. Background and experience are important qualifications for any individual hired to instruct courses of a professional nature. A combination of professionals is usually most beneficial to the students as they can learn from the

various philosophies and experiences of each professional involved.

According to the response the background of the instructor of the nutrition course varies. Twenty schools had a nutrition course. In eight institutions nutrition education responsibility is delegated to a combination of professionals. These combinations included:

- 1) a M.D., and a M.D. with a Ph.D.
- 2) a M.D., and a dietitian
- 3) a Ph.D. in Nutrition, and a dietitian
- 4) a M.D. with a Ph.D.; and a dietitian
- 5) a M.D.; a M.D. with a Ph.D.; and a dietitian
- 6) a M.D., M.P.H. medical Nutritionist; a M.D., M.P.H. Pediatrician; and a dietitian
- 7) a M.D.; a M.D. with a Ph.D.; a Ph.D.; and a dietitian

In five institutions, nutrition education was the responsibility of a person with a Ph.D. Of these, two had studied Biochemistry and Nutrition; one, Biochemistry; one, Clinical Nutrition, and one, Nutritional Biochemistry. Four institutions delegated the responsibility to a physician; in two institutions to a physician with a Ph.D. In one instance the area of specialization was nutrition.

In the remainder, specialization was in a related discipline. One institution had employed a dietitian (Table IV).

TABLE IV
QUALIFICATIONS OF NUTRITION TEACHERS
IN MEDICAL SCHOOLS

Professional	No.	Percent		
		of Population	of Sample	of Schools with Nutr. Course
Combination	8	7.1	11.1	40.0
Ph.D.	5	4.5	6.9	25.0
Physician	4	3.6	5.5	20.0
M.D., Ph.D.	2	1.8	2.7	10.0
Dietitian	1	0.9	1.3	5.0
Total	20			

Nutrition as a Curriculum Requirement. Nutrition as a requirement in the medical curriculum would be an ideal method of giving physicians a sound basis for their dietary decisions. A second choice would be as a suggested elective. Of the twenty schools offering a nutrition course, six or 5.4 percent of the population, stated the

course was required. In the remaining 14 or 12.6 percent, the nutrition course was elective (Table V).

TABLE V
STATUS OF NUTRITION COURSES
IN MEDICAL SCHOOLS

Status	No.	Percent		
		of Population	of Sample	of Schools with Nutr. Course
Required	6	5.4	8.3	30.0
Elective	14	12.6	19.4	70.0
Total	20	18.0	27.7	100.0

Nomenclature for Nutrition Course. Nutrition education occurs under various rubrics which may give a clue as to the type of material included in a course. Many times nutrition is part of the title indicating that food is the central issue. Response indicated that in schools with a separate course, "nutrition," or "applied nutrition" were the most popular titles followed by "clinical nutrition," or "nutrition and metabolism." There were instances, however, when nutrition was only a section of a more

encompassing structure. One school, for example had a 26 credit course entitled Introduction to Medicine. It was offered in the first year, and had nutrition and dietetics as a mini-course within it. In one other school nutrition was a module section of biochemistry (Table VI).

TABLE VI
NOMENCLATURE FOR NUTRITION COURSE

	No.	Percent		
		of Population	of Sample	of Schools with Nutr. Course
Nutrition	4	3.6	5.5	20.0
Applied Nutrition	4	3.6	5.5	20.0
Clinical Nutrition	1	0.9	1.3	5.0
Nutrition and Metabolism	1	0.9	1.3	5.0
Total	10			

A Part of Another Discipline

Nutrition information is closely related to many academic disciplines. These include medical biochemistry, pediatrics, medicine, clinical training, physiology,

obstetrics, and surgery to name a few. It is possible to create a satisfactory nutrition foundation including pertinent nutrition topics in each of these areas.

Disadvantages to integrating nutrition in each of these disciplines are:

- 1) that many times students do not realize the relationships between the theoretical information and its application;

- 2) that these courses cannot provide personal experience with foods and the translating of scientific diets into terms of food.

These disciplines will be discussed in descending order of occurrence as shown in Table VII. An attempt will be made in each discipline to show that portion of nutrition related to each of these disciplines. It will be noted that in some instances respondents identified certain nutrition topics which could be related to a discipline, but failed to make a positive statement as to the place in their particular curriculum in which it was included. In these cases, the topics are shown with the discipline breakdown as listed in the questionnaire. This means there are times when a particular topic will be listed more often within this discipline than the number of

TABLE VII

RANK ORDER OF DISCIPLINES THAT INCLUDE
MEDICAL ASPECTS OF NUTRITION

Discipline	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Medical Biochemistry	58	51.8	80.6	82.9
Pediatrics	49	43.8	68.1	70.0
Medicine	46	41.1	63.9	65.7
Clinical Training	37	33.0	51.4	52.9
Physiology	34	30.4	47.2	48.6
Obstetrics	31	27.7	43.1	44.3
Surgery	24	21.4	33.3	34.3
Preventive Medicine	24	21.4	33.3	34.3
Physical Diagnosis	23	20.5	31.9	32.9
Pathology	21	18.8	29.2	30.0
Pharmacology	15	13.4	20.8	21.4
Laboratory Diagnosis	8	7.1	11.1	11.4
Bacteriology	7	6.2	9.7	10.0
Others:	14	12.5	19.4	20.0
Community Medicine or Health	3	2.7	4.2	4.3
Social and Behavioral Science	2	1.8	2.7	2.9
Pathophysiology of Disease	1	0.9	1.3	1.4
Family Practice	1	0.9	1.3	1.4
Biology of Disease	1	0.9	1.3	1.4
Nutritional Biochemistry	1	0.9	1.3	1.4
Abnormal Human Biology	1	0.9	1.3	1.4
Gastroenterology	1	0.9	1.3	1.4
Organ-System Approach	1	0.9	1.3	1.4
Ward Rounds-regularly	1	0.9	1.3	1.4
Noon Daily Conferences	1	0.9	1.3	1.4

respondents ascertaining nutrition was integrated in that particular area. This is true in eight instances: pediatrics, medicine or surgery, clinical training, obstetrics, preventive medicine, physical diagnosis, pathology, and bacteriology. This makes one question the true nutritional knowledge of some of the respondents. On the other hand, this problem may exist because respondents were not accustomed to looking at the medical curriculum from this point of view. Only as they examined the nutritional topics under each medical specialty in the questionnaire did they realize that these could be a part of the overall nutrition knowledge.

As a part of Medical Biochemistry or Physiology.

Medical biochemistry and physiology are the areas most closely related to nutrition. It was expected that nutrition information would be most often integrated here. The response showed that more of the population 58 school curriculums, or 51.8 percent, included nutrition in biochemistry than physiology. Only about 34 schools, or 30.4 percent of the population included nutrition in physiology (Table VII). Since these subjects are often a required part of the medical curriculum, nutrition information could reach all students.

Among the various aspects of nutrition included in medical biochemistry and/or physiology the most often discussed topic was the metabolic role of nutrients. Second, by only one less school, was digestion and absorption. Others, in descending order, were the function of nutrients; cellular nutrition; basic principles of nutrition and normal requirements of nutrients; and biochemistry measures for estimating nutritional status (Table VIII).

As a part of Pediatrics. Pediatrics deals with the child from birth to adolescence. The nutrition aspects involved in the development of the individual in this age group is important. Less than half, forty-nine respondents, or 43.8 percent of the population, stated that nutrition was included in pediatrics (Table VII).

Several topics could be included in pediatrics. Those cited most often were nutrition and the progress of growth; nutritional requirements of infants and children; and nutrition and the physiology of the newborn. All those cited were listed more often than those who said they integrated nutrition in pediatrics. Acute and chronic nutritional deficiencies, and nutrition and the significance of retarded growth were both above the 60 percent level of the sample. The least often discussed topic was applied

TABLE VIII

ASPECTS OF NUTRITION INTEGRATED INTO MEDICAL
BIOCHEMISTRY AND/OR PHYSIOLOGY

Aspects	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Metabolic Role of Nutrients	54	48.2	75.0	77.1
Digestion	53	47.3	73.6	75.7
Absorption	53	47.3	73.6	75.7
Functions of Nutrients and Associated Substances	45	40.2	62.5	64.3
Cellular Nutrition	41	36.6	56.9	58.6
Basic Principles of Nutrition	36	32.1	50.0	51.4
Normal Requirements of Nutrients	36	32.1	50.0	51.4
Biochemistry Measures for estimating Nutritional Status	27	24.1	37.5	38.6
Calcium and Phosphorus Metabolism	1	0.9	1.3	1.4
Lipids	1	0.9	1.3	1.4
Vitamins	1	0.9	1.3	1.4

nutrition or dietetics. One respondent suggested nutrition and mental development as part of the course. This is a new concept and one that is highly controversial. Since most of the schools answering this part of the questionnaire had no separate course in nutrition it would seem that a low percentage of the future physicians are exposed to nutrition topics related to pediatrics. When one recalls that pediatricians recommend both specific formulas and diet for babies and young children it is surprising to see how little of this information is included in their general training. It is hoped that they get this information in residency programs. It would seem more beneficial, however, if more schools would integrate nutrition into pediatrics or offer a separate course (Table IX).

As a part of Medicine or Surgery. Both medicine and surgery are closely related to nutrition. Both affect the nutritional status of the individual. Diet, in turn, affects the condition of the disease. Forty-six, or 41.1 percent of the population, included nutrition in medicine; and twenty-four, or 21.4 percent of the population, incorporated it in the surgery portion of the curriculum (Table VII, page 32). With no other place for such

TABLE IX

NUTRITION ASPECTS INCLUDED
IN PEDIATRICS

Aspects	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Nutrition and the Progress of Growth	56	50.0	77.8	80.0
Nutritional Requirements of Infants and Children	53	47.3	73.6	75.7
Nutrition and the Physiology of the Newborn	52	46.4	72.2	74.3
Acute and Chronic Nutritional Deficiencies e.g. ricketts, scurvy	46	41.1	63.9	65.7
Nutrition and the Signif- icance of Retarded Growth	45	40.2	62.5	64.3
Interrelationships Between Nutritional Deficiencies and Infec- tious Diseases in failure of Growth and Development	39	34.8	54.2	55.7
Applied Nutrition (Dietetics)	26	23.2	36.1	37.1
Nutritional and Mental Development	1	0.9	1.3	1.4

information to be included, this seems to be a very low proportion of the medical schools taking cognizance of the relationship of these aspects to nutrition.

Nutrition topics that could be integrated into medicine and/or surgery are calcium and phosphorus metabolism; supplementary feedings (oral, tube, and parenteral); nutritional problems in general medicine; obesity and malnutrition; evaluation of nutritional status; conditioned nutritional deficiencies; nutrition in convalescence, and in geriatrics; and use and abuse of commercial vitamin, mineral, and protein preparations. The highest number of respondents, 41.9 percent of the population and one more than those who integrated nutrition into medicine and twenty-three more than those who did in surgery said they included the first of the above mentioned topics. Information concerning the use and abuse of commercial vitamin, mineral, and protein preparations was included only by 20 or 27.8 percent of the respondents (Table X). Since there is such widespread use of self-prescribed vitamin and mineral preparations more emphasis should be given to this aspect in the medical training.

TABLE X

NUTRITION ASPECTS INTEGRATED INTO
MEDICINE AND/OR SURGERY

Aspects	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Calcium and Phosphorus Metabolism	47	41.9	65.3	67.1
Supplementary Feedings (oral, tube, and parenteral)	44	39.2	61.1	62.9
Nutritional Problems in General Medicine	43	38.4	59.7	61.4
Obesity and Malnutrition	42	37.5	58.3	60.0
Evaluation of Nutri- tional Status	39	34.8	54.2	55.7
Conditioned Nutritional Deficiencies	26	23.2	36.1	37.1
Nutrition in Convales- cence	25	22.3	34.7	35.7
Nutrition in Geriatrics	23	20.5	31.9	32.9
Use and Abuse of Commercial Vitamin, Mineral and Protein Preparations	20	17.8	27.8	28.6
Classical Nutritional Deficiencies	1	0.9	1.3	1.4
Symptoms and Signs That May be Associated with Inadequate Nutrition	1	0.9	1.3	1.4

As a part of Clinical Training. In clinical training, students begin to put their knowledge into practice. Nutrition application can also be a part of this training. One third, 37 or 33.0 percent of the population did so (Table VII, page 32).

Method used to do this includes bedside teaching cognizance of nutrition, specialty rounds (clinical and grand), and through correlation conferences (clinical-pathology). By far the greatest number of respondents used the first item. Even so only a very small group of respondents (one third to one fifth of the population), used this opportunity to demonstrate the relationships between nutrition and medicine (Table XI).

TABLE XI
NUTRITION INFORMATION INCLUDED
IN CLINICAL TRAINING

Aspect	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Bedside Teaching Cogni- zance of Nutrition	38	33.9	52.8	54.3
Specialty Rounds - Clinical and Grand Rounds	27	24.1	37.5	38.6
Correlation Conferences (Clinical-Pathology)	23	20.5	31.9	32.9

As a part of Obstetrics. Since nutrition influences the development of the fetus, obstetrics is an area where nutrition might be integrated. Thirty-one or 27.7 percent of the population stated that they did so (Table VII, page 32).

Three topics included as part of obstetrics are nutritional requirements in pregnancy and lactation; nutrition and its relation to complications of pregnancy and the health of the newborn; and importance of breast feeding. Many who had not cited obstetrics as a place where nutrition was integrated in the curriculum did indicate that the first two topics listed here were a part of their obstetrics unit (Table XII). One would think that more schools will include the above topics in their curriculum since it is so important to the development of the fetus and neonate. Perhaps it is expected that they would receive this information in their residency programs. The latter, however, was not within the realm of this study.

TABLE XII
NUTRITION ASPECTS
IN OBSTETRICS

Aspect	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Nutritional Requirements in Pregnancy and Lactation	48	42.9	66.7	68.6
Nutrition and its Relation to Complications of Pregnancy and the Health of the Newborn	41	36.6	56.9	58.6
Importance of Breast Feeding	28	25.0	38.9	40.0

As a part of Preventive Medicine. Nutrition is an important part of preventive medicine. It is, therefore, logical that nutrition be integrated here. Twenty-four, or 33.3 percent of the respondents in this study but only 21.4 percent of the population did so (Table VII, page 32).

Particular aspects of nutrition included in preventive medicine were nutrition and improved health; nutrition studies of population groups; nutrition and world economics; and nutrition and ecology. These ranged from 24.1 percent to 13.4 percent of the population. Nutrition

and improved health was mentioned most often while nutrition and ecology the least (Table XIII).

TABLE XIII
NUTRITIONAL INFORMATION INTEGRATED
INTO PREVENTIVE MEDICINE

Aspect	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Nutrition and Improved Health	27	24.1	37.5	38.6
Nutritional Studies of Population Groups	26	23.2	36.1	37.1
Nutrition and World Economics	16	14.3	22.2	22.9
Nutrition and Ecology	15	13.4	20.8	21.4

As a part of Physical Diagnosis. In physical diagnosis, the physician interviews and observes the patient in search of external signs of illness. He must also determine the need for tests or x-rays. In order to recognize signs of inadequate nutrition and nutritional deficiencies the physician must understand nutritional aspects of disease. A need for nutrition information in this discipline is thus established. Only twenty-three schools, or 20.5 percent of the population, include nutrition in physical diagnosis (Table VII, page 32).

Thirty-seven respondents, or 33.0 percent of the population, said that symptoms and signs that may be associated with inadequate nutrition were included in physical diagnosis. Twenty-five, or 22.3 percent of the population, reported that the classical nutritional deficiencies were discussed (Table XIV). It is interesting that this is one of the areas where the nutritional topics were cited more often than the discipline itself.

TABLE XIV
NUTRITION ASPECTS INCLUDED
IN PHYSICAL DIAGNOSIS

Aspect	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Symptoms and Signs that may be Associated with Inadequate Nutrition	37	33.0	51.4	52.9
Classical Nutritional Deficiencies	25	22.3	34.7	35.7

As a part of Pathology, Pharmacology, Laboratory Diagnosis or Bacteriology. Pathology deals with the origin, nature, and course of diseases. Twenty-one respondents, or 18.8 percent of the population, included nutrition in this discipline (Table VII, page 32). When a more specific

topic was given, pathology of nutritional deficiencies, forty-one respondents or 36.6 percent of the population, recognized that nutrition was indeed a part of their curriculum. This, however, is still a very small group, considering that pathology is a requirement in all schools of medicine (Table XV).

The relationship between drugs and food additives to food, and nutrient toxicity can be studied as part of pharmacology. Fifteen respondents, or 13.4 percent of the population, said that nutrition was included here (Table VII, page 32). Again when more specific topics were listed respondents recognized that nutritional information was included in their pharmacology course. In descending order of importance these topics were antimetabolites, food and nutrient toxicity, and additives and chemical residues. Even the most frequently included topic, antimetabolites, was discussed in the schools of only 33 respondents or 29.4 percent of the population (Table XV).

TABLE XV

NUTRITION ASPECTS INTEGRATED INTO PATHOLOGY
PHARMACOLOGY, LABORATORY DIAGNOSIS
AND BACTERIOLOGY

Discipline	Aspect	No.	Percent		
			of Population	of Sample	that Integrate Nutrition
Pathology					
	Pathology of Nutritional Deficiencies	41	36.6	56.9	58.6
Pharmacology					
	Antimetabolites	33	29.4	45.8	47.1
	Food and Nutrient Toxicity	15	13.4	20.8	21.4
	Additives	13	11.6	18.1	18.6
	Chemical Residues	6	5.4	8.3	8.6
Laboratory Diagnosis					
	Laboratory Methods in the Diagnosis of Nutritional Deficiencies	14	12.5	19.4	20.0
Bacteriology					
	Bacterial Nutrition (its Relation to Chemotherapy and to the study of Nutrition Problems in Man)	21	18.8	29.2	30.0

Laboratory diagnosis is a course in which future physicians learn the different laboratory procedures available today to aid in the diagnosis of a disease. Laboratory techniques used in the determination of

nutritional status may be included. Respondents of eight schools, or 7.1 percent of the population, indicated they did so (Table VII, page 32). Very few, only fourteen respondents or 12.5 percent of the population, included laboratory methods used in diagnosis of nutritional deficiencies (Table XV).

Bacterial nutrition and its relation to chemotherapy and to the study of nutrition problems in man seem to be of relevance under the discipline of bacteriology. While seven, or 6.3 percent of the population, stated they had nutrition integrated in bacteriology (Table VII, page 32), the above topic was listed by twenty-one respondents or 18.8 percent of the population as a part of their curriculum.

Other areas that include Nutritional Topics.

Nutrition might be integrated into the medical curriculum in many other ways. Three were mentioned by respondents in this study. One institution dealt with nutrition information in a course in abnormal human biology and another in its study of community medicine (Table XVI). One institution used the organ-system approach. They still attempted to supply their nutrition topics within the framework of the instrument.

TABLE XVI

NUTRITION ASPECTS INTEGRATED
INTO OTHER DISCIPLINES

Discipline	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Abnormal Human Biology				
Digestion	1	0.9	1.3	1.4
Absorption	1	0.9	1.3	1.4
Cellular Nutrition	1	0.9	1.3	1.4
Community Medicine				
Cultural Groups and Nutrition	1	0.9	1.3	1.4

Coordination of Nutrition in the Curriculum

Because of the many ways in which nutrition can be integrated into the curriculum, a person or committee should coordinate these efforts. In this way, the best use is made of time and resources, as well as insuring that there are a maximum number of topics with a minimum of overlap. The response showed that 33 schools, or 29.4 percent of the population, use some method of coordinating these efforts. In view of the wide range of disciplines in which nutrition can be integrated, and the obvious lack

of recognition nutrition topics had within the total medical effort, this is a very small percent.

Non-medical Aspects of Nutrition

Still other factors must be included in the future physicians nutritional knowledge if he is to be successful in its application. These are not medical in nature, but influence the acceptance of the diet or affect the availability of foodstuffs or the nutrient content of them. Included are the sociological influences on dietary habits, cultural background, economic status, education, factors in food processing, agriculture, environment, and geography. Of those listed above, the sociological influences on diet habits were most often reported as part of the curriculum. Others in descending order of use were the cultural aspects, economics, education, food processing and agriculture by 35.7 percent, 25.9 percent, 21.4 percent, 12.5 percent, 8.0 percent of the population, respectively. Still other factors mentioned by some respondents were food fads, geography, psychology, family or community assessment, and prevention of disease. Eighteen respondents or 16.0 percent of the population, who considered nutrition as an

integral part of the medicine curriculum reported no consideration of the non-medical aspects (Table XVII).

TABLE XVII
NON-MEDICAL ASPECTS OF NUTRITION
INCLUDED IN THE CURRICULUMS

Aspect	No.	Percent		
		of Population	of Sample	that Integrate Nutrition
Sociological Influences on Diet Habits	44	39.2	61.1	62.9
Cultural	40	35.7	55.5	57.1
Economic	29	25.9	40.2	41.4
Educational	24	21.4	33.3	34.3
None	18	16.0	25.0	25.7
Food Processing	14	12.5	19.4	20.0
Agricultural	9	8.0	12.5	12.9
Geographic	2	1.8	2.7	2.9
Fads or Today's Trends	2	1.8	2.7	2.9
Family and Community Assessment	2	1.8	2.7	2.9
Psychological	1	0.9	1.3	1.4
Prevention Aspects	1	0.9	1.3	1.4

Premedical Training

Students attending medical schools bring with them the background they received in basic sciences in their undergraduate or premedical training. Many programs allow electives at this level. Nutrition can be encouraged as an elective.

Of the respondents, 41 or 56.9 percent of the sample believed a nutrition course at premedical undergraduate level would be desirable. Only one commented it was an important elective and another said nutrition was useful but should not be required. On the other hand, 29 or 40.2 percent of the respondents, did not believe a nutrition course prior to medical training was needed.

The response showed that those who plan medical school training assumed students brought with them a great variety of nutrition information. There were however, eighteen or 25.0 percent of the respondents who assumed that students had not yet been exposed to nutrition. Another seven, or 9.7 percent of the sample, expected very little knowledge of nutrition. The

remaining schools assumed students had knowledge of:

- 1) biochemistry of carbohydrates, fats, proteins, vitamins, minerals and trace elements;
- 2) role of nutrients;
- 3) deficiency diseases and their treatment;
- 4) social and cultural aspects of nutrition;
- 5) sources of nutrients;
- 6) approximate Recommended Dietary Allowances; and
- 7) miscellaneous related topics

Undergraduate courses in biochemistry and physiology could supply such information. As can be seen from the response to this questionnaire however, such assumptions do not seem to be reliable (Figure 1).

Principles of Energy Balance

Biochemistry of Carbohydrates, fat, protein, vitamins,
minerals and trace elements

Deficiency diseases and their treatment

Role of Nutrients

Sources of Nutrients

Social and cultural issues regarding nutrition

Essential Nutrients

Approximate RDA's

Types of foods and their energy potential

Nutrient content of foods

Dietetics

Basic Composition of a Balanced Diet

Digestion and Absorption of Foods

Broad understanding of Consequences of Excess/
Deficiencies

Something about food production and economics

Regulatory agencies functions, and the reasons

Very little

Nothing

FIGURE 1

LIST OF NUTRITION TOPICS MEDICAL SCHOOLS RESPONDENTS
ASSUME STUDENTS KNOW BECAUSE OF PREMEDICAL
UNDERGRADUATE TRAINING

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Concern is expressed today about the role of nutrition in medical education as well as medical practice. Competent nutrition-oriented people in the medical field realize the importance of its being part of each medical school curriculum. The White House Conference on Food, Nutrition and Health more specifically recommended that basic nutrition should be a required part of the curriculum for medical students. This study was conducted to determine the nutrition content of medical school curriculums and to ascertain the manner in which it is being presented.

A post-card questionnaire was sent to the deans of the 112 accredited medical schools in the United States, including Puerto Rico. There were 88 or 78.6 percent respondents. A second informational instrument was then sent, 54 to the designees appointed by the dean in the original inquiry, and 58 to the deans themselves. Seventy-two or 64.3 percent completed and returned this second inquiry. The majority of these, 40 or 35.7 percent of the population, were from the designees.

Twenty of the 72 respondents had some type of nutrition course as part of the medical curriculum. Sixteen or 14.3 percent of the population, had a full unit course, two had a mini-course or module, and two had luncheon conferences. For most students this was not a required portion of the curriculum. A variety of professionals were doing the nutrition teaching. These included physicians; physicians with a Ph.D.; professors with a Ph.D.; dietitians or nutritionists, and a combination of two or three of the above mentioned.

Most of the respondents (80.6%) integrated nutrition into other disciplines. For the most part nutrition topics were included in medical biochemistry, pediatrics, medicine, clinical training, physiology, obstetrics, surgery, preventive medicine, physical diagnosis and pathology-in descending order of occurrence.

Sociological influences on diet habits were part of the curriculum in 61.1 percent of the respondent's schools and cultural influences in 55.5 percent of them. On the other hand, eighteen or 25.0 percent of these respondents, reported that no consideration of non-medical aspects was made.

The respondents assumed that the student's knowledge of nutrition varied greatly. Most of the respondents assume little or no knowledge of nutrition on the part of the students while others assumed that the student had had considerable exposure to nutrition information. The majority of the respondents (56.9%) believed a nutrition course at the premedical level would be desirable.

Conclusions

From the data collected in this study the following can be concluded:

- 1) Nutrition as a separate course of study in the medical curriculum is limited.

Of the 72 institutions that responded to the second inquiry only 20 were offering some type of nutrition course. If one assumes that absence of response indicates no interest or cognizance of nutrition as a separate entity, one can conclude that very few (17.8%) of the accredited medical schools offer such a course.

- 2) Type of nutrition information lacked uniformity.

The majority of the respondents (90%) that had a nutrition course included basic and clinical nutrition. Other topics of discussion were modified diet applications

(80%), cultural and sociological factors that alter a person's response to a diet (70%), and nutritional factors affected by heredity (60%). Only 35 percent of the institutions that offer a nutrition course concern themselves with the appearance and taste of the modified diets. The latter is very interesting, as many times these factors seem to determine whether or not a patient will adhere to his diet. Nutrition topics at most schools (97.2 percent of the respondents) were integrated into other disciplines. Often respondents did not recognize that nutrition was being taught as a part of other disciplines. Frequently it was included as a chemical or physiological reaction within the body or as an indication of disease.

3) Qualifications of the instructors was diverse.

The qualifications of the nutrition instructor varied from one institution to another. Most of them had medical training only or training in medicine and a related scientific field. Few dietitians were included. Because most of these professionals lacked study of nutrition from the point of view of the person's general health and food habits, one can question whether a medical doctor or even one with additional training in a related scientific field is fully qualified to teach a nutrition course.

4) Most nutrition is integrated into other disciplines.

Nutrition information can be integrated into at least thirteen related disciplines. This course of action was followed by 51.8 percent of the population. Those areas most often dealing with nutrition topics (over 1/3 of the population) were medical biochemistry, pediatrics, medicine, and clinical training. While it was discussed in obstetrics, surgery, preventive medicine, physical diagnosis, pathology, and pharmacology, it was limited to between 13 and 28 percent of the population. Only if properly coordinated could such action result in a satisfactory program.

5) Non-medical aspects that affect nutrition application was limited.

Non-medical aspects are important in the study of nutrition. Even those included most often, sociological influences on diet habits, cultural aspects, economic factors, and educational influences, were in courses of 21 to 40 percent of the population. As many as 16.1 percent of the population did not include any of these.

6) Efforts to coordinate the nutritional training is limited.

Of the 88 deans that responded to the original inquiry only 33 had a person or committee in charge of coordinating nutrition education efforts between departments. More than half of the respondents who recognize nutrition as a concern in their program could be wasting valuable time in duplication of topics, while others are not even considered.

Recommendations

For Improvement of the Study

Looking in retrospect, all studies can be improved. Several weaknesses were noted in the questionnaire. Confusion could have been avoided if Part II had started at the top of a new page rather than at the bottom of the first part. As a result of this, some respondents that did not have a nutrition course, answered sections of Part II.

The questionnaire was designed to solicit information about nutrition included in different disciplines. This approach seemed to cause difficulties for many respondents. Some did not answer question four, in which

the related field could be identified, and then checked topics listed under the discipline in Part III. This gives rise to the question of whether the topic was indeed discussed in this discipline. For the purpose of this study this was assumed to be the case. A possible answer might be that some respondents lacked a method of coordinating the nutrition training. While the designee was familiar with the content of nutrition information in his own discipline, he was unaware of what was being offered in other areas. Another answer may be that some of the problem may have resulted from the dean's failure to realize that not all the nutrition information provided in his school came from the designated individual.

For the WAMI Regional Medical Program at MSU

At least an elective graduate level course in nutrition should be offered in the School of Home Economics for the students of the WAMI regional medical program. This course should be for students with a strong background in biochemistry, physiology, and anatomy, but not necessarily an exposure to nutrition.

Those students without a science background perhaps would benefit from an undergraduate basic course in nutrition.

For Medical Curriculums

Nutrition-oriented members of medical faculties should strive to obtain a firm commitment to establish a philosophy of preventive medicine rather than retain the present attitude of curing diseases. In this way, the position of nutrition, an important factor in preventive medicine, could be improved.

More effort should be made to educate students as to the expertise of medical dietetic specialists or therapeutic dietitians.³³ This should inform the future physician of the specialist's ability to assist physician's in dietary decisions or even assume the responsibility of diet prescription. Many medical schools are located on university campuses. This gives students the advantage of taking nutrition courses offered in other disciplines, or it is possible in such an environment that an interdepartmental and/or a multidisciplinary approach to nutrition could be used.

For Premedical Programs

Advisors of premedical students should encourage students to elect a course in basic nutrition. If interest is evidenced some applied nutrition might also be available. More advanced work could then be made a part of the medical curriculum.

For the Medical Profession

This research supports the known fact that the medical profession lacks adequate knowledge in nutrition, consequently, they should delegate the function of diet prescription to the qualified people in the field, e.g. medical dietetic specialists or therapeutic dietitians. This might also insure that patients who must change diet will do so. These people not only can recommend foods but what is available within the patient's income and community, his likes and dislikes if an ethnic group is involved as well as how to cook the foods in an acceptable manner.

For Schools of Home Economics

Programs should be oriented so that students

interested in medical dietetics can have better background to assume the responsibility of prescribing diets. Those schools associated with a premedical program and/or a medical school, should offer courses in nutrition, both at undergraduate and graduate levels so it can be included at least on an elective basis.

For Future Studies

Only the future will tell what progress can be made in the change of attitude of the medical profession toward nutrition. Investigation of the following areas may prove helpful.

- 1) A survey comparing competence in nutrition of graduates of medical schools that offer nutrition as a separate course with those of medical schools that integrated nutrition in other disciplines. This would reveal the adequacy of each type of program.

- 2) A study of the depth and breadth of nutrition information required by each of the medical specialties in actual practice would be informative. This might enable nutrition education specialists to tailor content and concentration for each of these specialties.

3) A survey of physician's opinions regarding the physician's attitude toward delegation of diet prescription to medical dietetic specialists or therapeutic dietitians.

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APPENDIX A

3

APPENDIX A
ORIGINAL INQUIRY

Dear Dr.

Montana State University has been approved for participation in a regional medical education program between Washington, Alaska, Montana and Idaho. We need to know how you include nutrition education in your curriculum.

Please answer the attached pre-addressed post-card questionnaire and return as soon as possible.

Please indicate whether the person you suggest we contact is in residence this summer.

Thank you kindly,

Norma R. Kent (Mrs.)
Registered Dietitian

1. Do you have a nutrition course in your curriculum?

_____ Yes What is its title? _____
_____ No _____

2. Do you have a person or committee responsible for coordinating efforts among departments in nutritional training?

_____ Yes
_____ No

If yes, who is it? _____

If no, who do you suggest to contact concerning nutrition education in your school?

APPENDIX B

Montana State University

*Bozeman, Montana 59715**Tel. 406-587-3121*

School of Home Economics

The School of Home Economics at Montana State University is sponsoring a study to determine the nutrition education in the medical curriculum available to future physicians. Information obtained will be used in curriculum planning for Montana State University's participation in a regional medical education program recently approved for the states of Washington, Alaska, Montana, and Idaho.

Data from all responding schools will be kept in strict confidence with no individual institution identified. Overall results will be available upon request.

Please take five minutes to complete and return the enclosed questionnaire. An attempt has been made to make it easy to complete and take a minimum of your time. Please return within a week to:

Mrs. Norma R. Kent
Registered Dietitian
School of Home Economics
Montana State University
Bozeman, Montana 59715

Thank you very much for your help.

Sincerely,

Norma R. Kent (Mrs.)
Registered Dietitian

APPENDIX B

SURVEY OF NUTRITION EDUCATION IN MEDICAL SCHOOLS

INSTRUCTIONS:

Please check the answer that most nearly applies at your institution and return to:

Mrs. Norma R. Kent
Registered Dietitian
School of Home Economics
Montana State University
Bozeman, Montana 59715

PART I:

1. Do you believe a basic nutrition course should be included at the pre-medical level?

_____ Yes

_____ No

2. What things about nutrition do you assume students have learned at the pre-medical level?

3. Which of the listed non-medical aspects of nutrition are included in your curriculum?

_____ Sociological influences on
diet habits

_____ Cultural

_____ Food Processing

_____ Agricultural

_____ Economic

_____ Educational

_____ None

_____ Other (Specify)

4. How is nutrition included in your curriculum

- A. _____ as a separate nutrition course?
- B. _____ integrated in any of the following disciplines?
- _____ Medical Biochemistry
- _____ Physiology
- _____ Pharmacology
- _____ Clinical Training
- _____ Bacteriology
- _____ Pathology
- _____ Physical Diagnosis
- _____ Laboratory Diagnosis
- _____ Pediatrics
- _____ Obstetrics
- _____ Medicine
- _____ Surgery
- _____ Preventive Medicine
- _____ Other (please specify)

PART II:

If you have a nutrition course please check all items that apply. (If not, go to Part III).

Does your nutrition course include

- _____ modified-diet applications?
- _____ appearance and taste of modified diets?
- _____ cultural and sociological aspects that would alter an individual's response to a diet?
- _____ basic nutrition?
- _____ clinical nutrition?
- _____ nutrition and heredity?

Is your course required for all students?

_____ Yes

_____ No

Who is responsible for the teaching of nutrition in your medical school?

_____ M. D.

_____ M. D., Ph.D.

_____ Ph.D. IN _____

_____ Dietitian or Nutritionist

_____ Other (please specify)

Are your medical students required to work in conjunction with a dietitian or nutritionist in the teaching hospital?

_____ Yes

_____ No

If yes, to what extent?

Is nutrition teaching carried to the bedside?

_____ Yes

_____ No

PART III:

If nutrition education is integrated into any of the following courses, please indicate the type of information included by checking the appropriate blanks.

Medical Biochemistry and/or Physiology

_____ Basic Principles of Nutrition

_____ Functions of Nutrients and associated substances (cellulose, etc.)

_____ Biochemistry measures for estimating nutritional status

Medical Biochemistry and/or Physiology (cont.)

- _____ Digestion
- _____ Absorption
- _____ Normal Requirements of Nutrients
- _____ Metabolic Roles of Nutrients
- _____ Cellular Nutrition

Pharmacology

- _____ Food and Nutrient Toxicity
- _____ Antimetabolites
- _____ Additives
- _____ Chemical Residues

Clinical Training

- _____ Bedside teaching cognizance of nutrition
- _____ Specialty Rounds---Clinical
Grand Rounds
- _____ Correlation Conferences (clinical-pathology)

Bacteriology

- _____ Bacterial nutrition and its relation to chemotherapy and to the study of nutritional problems in man.

Pathology

- _____ Pathology of Nutritional Deficiencies

Physical Diagnosis

- _____ Symptoms and Signs that may be associated with inadequate nutrition
- _____ the Classical Nutritional Deficiencies

Laboratory Diagnosis

_____ Laboratory methods in the diagnosis
of Nutritional Deficiencies

Pediatrics

_____ Nutrition and the physiology of the
newborn

_____ Nutrition and the progress of growth

_____ Nutrition and the significance of
retarded growth

_____ Nutritional requirements of infants
and children (and how these require-
ments are met).

_____ Acute and chronic deficiencies e.g.
rickets, scurvy, anemias, etc.

_____ Applied nutrition (dietetics)

_____ Interrelationships between nutritional
deficiencies and infectious diseases
in failure of growth and development

Obstetrics

_____ Nutritional requirements in Pregnancy
and Lactation

_____ Importance of Breast Feeding

_____ Nutrition and its relation to compli-
cations of pregnancy and the health
of the newborn

Medicine or Surgery

_____ Evaluation of nutritional status

_____ Nutritional Problems in General
Medicine

Medicine or Surgery (cont.)

- _____ Conditioned nutritional deficiencies
- _____ Obesity and Malnutrition
- _____ Calcium and Phosphorus Metabolism
- _____ Nutrition in Convalescence
- _____ Use and abuse of commercial vitamin, mineral and protein preparations
- _____ Supplementary feedings (oral, tube and parenteral)
- _____ Nutrition in Geriatrics

Preventive Medicine

- _____ Nutrition and improved health
- _____ Nutrition and world economics
- _____ Nutrition and ecology
- _____ Nutritional studies of population groups

Other Comments

APPENDIX C

APPENDIX C

REMINDER

Dear Dr.

You were chosen by the Dean to answer our survey "Nutrition Education in the Medical Schools," which was mailed to you in December. Please complete questionnaire and return within a week to:

MRS. NORMA R. KENT, R.D.
SCHOOL OF HOME ECONOMICS ROOM 48
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA 59715

Thank you kindly.

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