

Effects of a Nutrition Education Program on the  
Knowledge, Opinions and Counselling Practices of  
Family Physicians

by

Peggy Murphy

A thesis

presented to the University of Manitoba  
in partial fulfillment of the requirements  
for the degree of Master of Education in the  
Faculty of Education

Winnipeg, Manitoba, 1987

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ISBN 0-315-37449-7

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FAMILY PHYSICIANS

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A thesis submitted to the Faculty of Graduate Studies of  
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## ABSTRACT

There has been limited research demonstrating the objective effects of nutrition education programs directed at physicians. This study used a self-administered questionnaire to investigate the knowledge, opinions and counselling practices of two groups of physicians trained in Manitoba. Family practice residency trained physicians (FPRT) who had received a comprehensive nutrition curriculum were compared to a group of hospital trained (HT) physicians who had not received the program. There was no significant difference ( $p > .05$ ) in mean nutritional knowledge scores between the two groups, however, the mean nutritional opinion score was significantly ( $p < .05$ ) higher for the FPRT physicians. Counselling practices which included the initiation of counselling, the frequency and duration of counselling sessions and the counselling activities employed by physicians were not significantly different ( $p > .05$ ) between the two physician groups. This study found that the nutrition education program had a positive effect on the opinions of physicians toward nutrition counselling, which was not accompanied by changes in nutritional knowledge or counselling practices. Considerations for future curriculum development and evaluation are recommended.

## ACKNOWLEDGEMENTS

I would like to extend my gratitude to several people who have supported me during the completion of my thesis. Thank you to my advisor, Dr. Dexter Harvey, for his encouragement and guidance, and to my committee members, Dr. Joanne Keselman and Dr. Gary Beazley for their direction and assistance during the methodological stage of the research.

As well, my thanks go to David Rose for assisting me during the computer analysis of the research data.

I would like to thank the Department of Family Medicine for their financial support, and to Dr. Patricia Mirwaldt for her guidance during the development of the questionnaire.

I would like to extend my appreciation to all the physicians who assisted in the pre-testing of the questionnaire, and those who participated in the research and whose data contributed to this study.

A thank you to my husband Barry, my sons Kyle and Cameron, and my parents for their understanding and continuous support.

Peggy Murphy

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## CHAPTER I

### STATEMENT OF THE PROBLEM

#### General Background

Opportunities occur frequently for the family physician to assist patients with nutritional concerns. In a large national study of the content of family practice, Rosenblatt, Cherkin, Schneeweiss, Hart, Greenwald, Kirkwood, Perkoff (1982) reported that the 12 most common clinical entities encountered by American family physicians in everyday practice include hypertension, prenatal care, well-child care, ischemic heart disease, diabetes mellitus, and obesity, all requiring substantial expertise in nutrition for their management. Gjerde and Sinnott (1982) showed that conditions with a possible nutritional implication accounted for more than 25 percent of patients' visits.

Historically, the teaching of nutrition in medical schools has been given little recognition and support. As recently as the late 1970's, nutrition had a limited focus, its teaching being centered mostly on nutritional deficiency diseases. In response to the need to improve the clinical teaching of nutrition, the American Medical Association Council on Foods and Nutrition and the Nutrition Foundation held a conference in 1962 on the "Teaching of Nutrition in Schools of Medicine" (The Conference on Nutrition Teaching in Medical Schools, 1962). This conference helped to define the responsibilities and challenges of medical

schools in the teaching of nutrition. The objectives of this conference were to: (a) define nutritional concepts integral to the practice of medicine, (b) determine appropriate application of nutrition knowledge to the prevention and treatment of disease, and (c) explore methods of teaching nutritional concepts. The major recommendation of the conference was to have medical schools place authority in an individual or committee to develop and maintain an integrated and well rounded teaching program in nutrition. Adequate facilities for, and supervision of experience in applied nutrition were proposed as a qualification to be met prior to approval of hospital internships and residencies. Active efforts in post-graduate education were urged as a means of keeping practising physicians up-to-date in nutrition.

Despite this painstaking effort to plan for nutrition to become an integral aspect of medical education, the proposed recommendations lay dormant for more than a decade. The continued lack of sufficient emphasis on nutrition in the medical curriculum was documented by two surveys of the American Medical Association Council on Foods and Nutrition (Cyborski, 1977; Geiger, 1979). These surveys revealed that even though 70 percent of the curricula in American medical schools had an elective course in nutrition, only 25 percent had a required course in nutrition. Although more than 90 percent of the schools incorporated some nutrition into other courses, the teaching was fragmented and it lacked emphasis on the clinical application of nutrition in medical practice.

Subsequently, further surveys helped to identify nutritional

concepts perceived by medical faculty, practising physicians, residents and dietitians as being essential in the nutrition training of physicians (Gautreau & Monsen, 1979; Gjerde & Sinnott, 1982). Gjerde and Sinnott (1982) identified 29 nutrition skills as being very important for family physicians to acquire during training. Furthermore, the results of the Louis Harris and Associates survey on the status of medical education, indicated that among the 1983 graduating medical students (N = 10,481) surveyed, almost 60 percent believed that inadequate time was devoted to nutrition (Association of American Medical Colleges, 1983). These later studies demonstrated the importance and acceptance of nutrition education in medical training.

To determine whether basic nutrition principles could be satisfactorily taught in undergraduate programs, Gutherie and Teply (1979) conducted an opinion survey of students in two medical schools. Undergraduate nutrition training was viewed as useful by the majority of respondents, but only three percent felt that this alone would be adequate for a physician. This finding together with the problem of finding a place for nutrition in a crowded medical curriculum has served to focus increasing emphasis on teaching nutrition at the post-graduate level. Creager, Turner and Cook (1984) used a mailed questionnaire sent to directors of 385 family practice residency programs in the United States to find out how many had a dietitian on staff and whether their program had written behavioral objectives in nutrition. There were 342 questionnaires returned (89 percent response rate). Forty percent of the responding programs had a dietitian on staff, and 35 percent of the 342

programs had instituted written behavioral objectives in nutrition. There have been some descriptive studies reporting the experiences of residency training programs where nutrition curricula have been instituted. Flynn, Keithly and Colwill (1974) described the response to implementing a nutrition curriculum at the University of Minnesota as favorable in stimulating resident awareness of deficiencies in their knowledge, and in increasing their receptiveness to acquiring counselling skills. Moore and Larsen (1983) supported these observations. They reported that residents recognized the value of nutrition by applying newly acquired nutritional skills when caring for their patients. In Canada, the experience has been similar (Murphy & Vogel, 1984). The study by Creager et al, (1984) showed that program directors expressed significant differences regarding the perceived benefit of nutrition education depending on whether they already had a dietitian. Those program directors with dietitians perceived a greater benefit than those directors without a dietitian on staff.

#### Specific Problem Statement

Despite the numerous positive appraisals of the inclusion of a nutrition curriculum in the residency training years, objective data on the effects of such programs have not been documented in the literature. The question remains, "What is the effect of the presence or the absence of a nutrition education curriculum on the knowledge, opinions and counselling practices of family physicians?" Research to address this question may provide insights as to whether physicians continue to apply nutrition information learned in a residency training program. It may

have significant impact on the development of future curricula in nutrition for primary care physicians by serving as a valid indicator of the effectiveness of nutrition training. This research would reveal whether any relationship exists between the knowledge, opinions, and counselling practices among physicians and their gender, number of years in practice, and continuing nutrition education.

### Statement of the Hypotheses

Based on the literature review, the following research hypotheses have been postulated:

- (1) Family practice residency trained (FPRT) physicians who received a nutrition education program will have more knowledge of nutritional concepts than hospital trained (HT) physicians who did not receive a nutrition education program.
- (2) FPRT physicians who received a nutrition education program will have a more positive attitude toward applied nutrition than HT physicians who did not receive a nutrition education program.
- (3) FPRT physicians who received a nutrition education program will be more aggressive in their nutrition counselling practices than HT physicians who did not receive a nutrition education program.
- (4) FPRT physicians who received a nutrition education program will

report a more preventive orientation to nutrition counselling than HT physicians who did not receive a nutrition education program.

- (5) FPRT physicians who received a nutrition education program will report using more nutrition counselling skills than HT physicians who did not receive a nutrition education program.

The study subjects consisted of family physicians trained in Manitoba between 1978 and 1983. Among these were 70 family practice residency trained physicians (FPRT) and 112 hospital trained (HT) physicians. The physicians in both groups trained on a rotating basis through a series of specialty services. The HT physicians received all their training in tertiary care hospital wards or ambulatory care clinics, whereas the FPRT physicians were trained in these settings and in a family practice clinic. The FPRT physicians received the nutrition education program while in the family practice clinic where they spent 20 weeks on a full time basis plus one half day a week throughout their program providing care to ambulatory patients.

The nutrition program experienced by the FPRT physicians consisted of (a) a seminar series, (b) direct patient counselling, and (c) group teaching programs for patients (Appendix A, page 82). The HT physicians were not exposed to the nutrition program.

The hypotheses were tested using the data obtained from the

physicians on a mailed questionnaire asking them about their nutritional knowledge, opinions and counselling practices. The dependent variables were operationally defined as:

- (1) Nutritional knowledge was measured by a score on a knowledge test consisting of 21 test items concerned with the application of basic nutritional concepts on prenatal and infant nutrition, and therapeutic principles in the nutritional management of diabetes and hypertension.
- (2) Nutritional opinions were measured by a score on an opinion survey consisting of 24 statements of opinion concerning attitudes toward current nutritional concepts in prenatal and infant nutrition, diabetes and hypertension.
- (3) Nutrition counselling practices were measured by scores on three dimensions of physicians' behaviours called "aggressiveness of counselling style" and "indications for routine counselling", and "nutrition counselling skills". Aggressiveness was operationally defined as successive steps that physicians take in counselling patients which included the initiation of counselling, the frequency of counselling sessions and the duration of counselling sessions. Indications for routine counselling was measured by selections of statements indicating primary or tertiary prevention or lack of prevention orientation with respect to nutrition counselling. Nutrition counselling



skills that physicians engaged in when caring for patients were measured by a counselling skills score. Aggressiveness, indications and skills scores were determined for prenatal and infant nutrition, diabetes and hypertension.

### Limitations and Delimitations

Several limitations of the research were apparent. First, this was a retrospective study. The lack of a controlled environment precludes the establishment of a cause and effect relationship between the nutrition education program and the dependent variables measured. The data were based on a self-administered questionnaire and therefore subject to response error and selection bias in favour of physicians who have more favorable knowledge, opinions and counselling habits. Third, the physician groups used were not equivalent in the training lengths of their postgraduate experiences. The residency program was two years long, whereas the hospital program was only one year. Fourth, there were biases toward more females in the family practice residency program, as well as a possibility of selection of applicants who might have a more favorable attitude toward developing nutritional skills.

The delimitations were that the study included only physicians who were in the University of Manitoba family practice residency program or the hospital program between 1978 and 1983. The data reflected only those physicians who were presently in general practice, excluding all those who were emergency room physicians or in specialty areas.

## CHAPTER II

### LITERATURE REVIEW

While the physicians' lack of formal training in nutrition has been well documented, there is strikingly little information as to what medical students and physicians actually know about applied clinical nutrition. Although various studies have pointed out that the physician is the primary professional on whom people rely for nutritional information (Young, Waldner & Berresford, 1956; Fox, Fryer, Lamkin, Vivian & Eppright, 1970; Medical Post, 1984), the physician is generally not a nutrition expert (Phillips, 1971; Podell, Gary & Keller, 1975). Phillips tested 284 second-year students from four New England medical schools and found that their mean scores ranged from 41.5 percent to 46 percent correct answers on a nutrition knowledge test. Unfortunately, Phillips did not report on specific areas of strength and weakness. In addition, her subjects were second-year students with minimal exposure to clinical medicine. Podell et al. (1975) assessed the knowledge of residents and practicing physicians with respect to a variety of nutrition topics. They found that only one in five respondents answered correctly questions dealing with diet therapy for high triglycerides, foods recommended on a controlled sodium diet, potential complications of long-term fasting, caloric value of physical activity, and recommended dietary allowances. Within specific areas of nutrition there were remarkable variations of knowledge. High knowledge was demonstrated for several topics which were currently in the press and non-professional journals. The authors

suggested that medical students and physicians do learn about nutrition, but that their learning is relatively haphazard and, like that of the general public, is highly dependent upon the non-professional literature.

Krause and Fox (1977) reported data based on the responses of 292 members of the Nebraska Medical Association (22 percent of the total population). They found that physicians answered 65 percent of the knowledge questions correctly, with a tendency to score higher on basic nutritional knowledge questions than on those relating to therapeutic nutrition. A significant negative relationship was found between the years in practice and nutritional knowledge. No significant relationship was found between number of years in practice and attitude toward nutrition. The subjects for this study, however, were not randomly selected. They constituted a self-selected group where the authors requested participation from 1,350 physicians, of whom 400 indicated a willingness to do so. Of the 400 physicians 292 responded to the questionnaire. The self-selected physicians may have held favorable attitudes toward nutrition and dietetics which could have affected the study results.

Opinions and practices of physicians toward nutrition counselling have received little attention in the literature. Two studies have been directed at assessing the influence of selected variables on physicians' decisions to initiate nutrition counselling. Using a mailed questionnaire, Johnston and Schwartz (1978) surveyed 1,753 family physicians to gather data on their opinions and counselling

practices in the area of maternal and infant nutrition. Two scores were calculated for each physician - an opinion and a counselling practices score. The opinion survey was designed to measure physicians' familiarity with current nutrition concepts in maternal and infant nutrition, and the degree of confidence they placed on their opinion. The highest possible score for a statement answered positively with the highest degree of confidence was 7. The counselling practices score was based on the frequency of a specific practice. Each statement was scored from zero to 3, with high scores indicating favorable nutrition counselling practices. Of the 41 percent who responded, the mean opinion score was 5.1 and the mean counselling practices score was 1.8. Analysis of variances, utilizing a step-wise regression, indicated that a number of variables were significantly related to the mean scores. Physicians in practice more than ten years scored significantly lower on both the opinion and practice sections of the questionnaire than those who had been practising for a shorter time. Likewise, physicians who used pharmaceutical brochures as a source of nutritional information scored significantly lower on the practice test. Family physicians who consulted with a nutritionist-dietitian scored significantly higher on both the opinion and practice tests than those who did not use this expertise. Females scored significantly higher on both tests. In all, 98 percent of the family physicians had received no formal nutrition education in their medical training. Unsolicited comments from some physicians indicated that nutrition had been integrated with material in biochemistry courses and had little practical relevance. Approximately 25 percent of the family physicians had additional training for specialization in areas related to

nutrition and 19 percent had attended continuing education programs that included a section on nutrition. Attendance at any one continuing education program did not have a significant effect on nutrition opinion scores, but it did have a significant positive effect on practice scores. Furthermore, when physicians who had attended continuing education programs were compared to all other family physicians, they scored significantly higher on both the opinion and practice tests. A small number of physicians who had conducted research in the area of nutrition or who had taken additional courses in nutrition scored significantly higher on both tests. No other format of nutrition education in the medical school curriculum was significantly related to the mean scores. However, when all physicians with any formal nutrition education were compared with those with none, the former scored significantly higher on the opinion and practice tests.

To assess the extent to which physicians provide dietary interventions and referrals to registered dietitians, Kottke, Foels, Hill, Choz and Douglas (1984) surveyed a random sample of 64 family practice physician faculty. The purpose of the study was to determine (a) whether the physician considers that initiating nutritional counselling is appropriate for the patient who is not necessarily seeking it, (b) the proportion of patients given nutritional counselling, and (c) the reasons for not providing nutritional counselling. The authors found that 62 percent of physicians either agreed or strongly agreed with the statement that it is appropriate to give nutritional advice to a patient when the patient is at the doctor's office for a problem not directly related to

nutrition. However, the majority of these same physicians provided nutrition counselling to less than 40 percent of their patients. Similar to the attitude results obtained by Johnston and Schwartz (1978), as the number of years in practice increased the tendency to give nutrition counselling decreased. The majority of physicians used the high-risk strategy to decide who was appropriate to receive nutritional care. The study results indicated that other significant barriers to intervention included anticipated lack of interest and expected non-adherence to nutritional intervention. This study provided evidence that physicians do not learn to practice preventive medicine and nutritional recommendations unless trained to do so. The authors recommended that physicians be taught (a) the rationale of the community approach to disease prevention, and (b) that patients are seeking nutritional information and will change their behaviour in response to an intervention.

In summary, it is apparent that nutrition training in medical schools is inadequate in helping physicians deal with the nutritional needs of patients. This is reflected in physicians' low scores on nutrition knowledge tests. Physicians' opinions toward nutrition appear to be positively correlated with the presence of any formal nutrition education, and with attendance at continuing medical education programs that include nutrition. However, even when physicians view giving nutritional advice to patients as valuable, the majority of physicians do not practice preventive nutrition counselling. The literature implies that the reasons for the latter finding is that physicians are not trained to view preventive nutrition strategies as worthwhile and are not

convinced of their effectiveness. Implications of these findings are that a comprehensive nutrition education program designed to train physicians to apply nutritional concepts may significantly affect the knowledge, opinions and counselling practices of family physicians.

### CHAPTER III

#### METHOD

##### Sampling Procedures

The sampling frame for this study consisted of 245 physicians who were registered for post-graduate medical education with the University of Manitoba between 1978 and 1983 and who were presently engaged in general or family practice. Among these physicians were 70 Family Practice Residency trained (FPRT) physicians and 175 hospital trained (HT) physicians. The entire group of 70 FPRT physicians were included in the study. These physicians had received a comprehensive nutrition education program as part of their training. Of the 175 HT physicians, addresses for 112 physicians were obtained through the Canadian Medical Directory (1984). It was not possible to locate 63 of the HT physicians, and thus they were not included in the study. This was acknowledged as a limitation in the study design, though there was no reason to believe that the 112 physicians were not representative of the HT group. The HT physicians did not receive a comprehensive nutrition education program as part of their training. Thus, the final sample was composed of 182 physicians who were believed to be presently engaged in general or family practice - 70 FPRT and 112 HT physicians. Specialty and emergency room physicians were excluded from the study.



### Instrument Selection

A self-administered mailed questionnaire was used to measure the variables of interest in this study. It was chosen as the data collection instrument for two important reasons. First, since both the FPRT and HT samples were located across Canada and the United States, a mailed questionnaire would offer the most efficient data collection method in terms of time and expense. Second, a mailed questionnaire would allow a larger sample of subjects to be studied as compared to interviews and observational methods of data collection. However, there are limitations inherent in the use of a mailed questionnaire. Knowledge testing using a self-administered questionnaire carries the risk of subjects referring to a reference book for the correct answers. Respondents may randomly check off responses or have another person complete the survey. Non-responders may be a source of bias if they are measurably different in some relevant characteristic from the responders. Since these factors were not in the direct control of the researcher, care had to be exercised in explaining the significance of the study to the contacted subjects. This could promote a higher return rate and honesty of responses to items on the questionnaire. In a sample of professional studies, the mean return rate using self-administered questionnaires was reported to be 65 percent (Mouly, 1978). Questionnaires were more likely to be returned if they were judged to be salient to the respondent. Surveys with non-salient questionnaires averaged a 42 percent return rate (N=43), while questionnaires (N=26) judged to be salient for the respondent obtained a 77 percent return (Mouly, 1978). University-based surveys showed 62

percent returns (Heberlein & Baumgartner, 1978). Since the questionnaire proposed for this study would bear salience to the sample chosen and was university-based, it was expected the subjects would be willing to respond. Though it was acknowledged that the mailed questionnaire has its limitations, if carefully constructed and administered, it could be a valid descriptor of what it purports to measure.

The questionnaire addressed four areas of nutrition - namely, prenatal and infant nutrition, diabetes and hypertension, to compare the nutrition knowledge, opinions and counselling practices of the FPRT and HT family physicians. The selection of these nutrition areas was based on the findings of Rosenblatt et al. (1982) that revealed that prenatal care, well-child care, diabetes mellitus and hypertension were among the six most common clinical entities encountered by family physicians. It was felt that if physicians were trained in nutrition in these four areas they would be equipped to meet most of the nutritional needs of patients encountered in family practice. Appendix B (page 85) lists the educational objectives (for prenatal and infant nutrition, diabetes and hypertension) that appeared in the nutrition curriculum for the FPRT family physicians. Prenatal and infant nutrition were the areas of primary nutrition prevention and diabetes and hypertension were the areas of secondary prevention that were studied.

A mailed questionnaire (Appendix C, page 88) was designed to measure separately nutrition opinions, nutrition knowledge, and nutrition counselling practices among physicians. In addition, demographic and

professional data were collected to determine the comparability of the two groups. The same questionnaire was used for both physician groups.

In total, twenty-four statements of opinion (Section A of the questionnaire) were designed to measure physicians' attitudes toward current nutritional concepts (Appendix D, page 89) in prenatal and infant nutrition, diabetes and hypertension. Opinion statements were defined as "sets of beliefs that involve a person's judgments about the likelihood of events or relationships" (Oskamp, 1977). The statements were measured by checking "agree", "undecided", and "disagree" on a scoring scale of minus one to plus one. Each attitude statement was scored according to the desirability of the response. A score of "+1" was assigned to statements answered positively with agreement; statements answered negatively with disagreement received a score of "-1". A score of "0" was assigned to an "undecided" response as it was more favorable than an undesirable opinion. Some statements were worded such that an agreement would be desirable. Other statements were worded such that a disagreement would be desirable. The highest score possible on the opinion survey was 24 points.

A total of twenty-one knowledge questions (Section B of the questionnaire) to which respondents answered "true", "false", or "undecided" were formulated in two major categories of nutrition: normal and therapeutic. Test items on normal nutrition covered nutritional concepts (Appendix D, page 89) related to nutrients and their functions, general nutritional information, food composition, and recommended nutrient intakes during pregnancy and infancy. Test items on therapeutic

nutrition focused on diabetes and hypertension which required modified diets. Questions were primarily concerned with the practical application of basic nutritional concepts and current theories in therapeutic nutrition. A score of "1" was assigned to correct answers only. Incorrect answers and "undecided" responses received a score of "zero". The highest score possible for the knowledge test was 21 points.

Content validity of the knowledge test and opinion survey was determined by two medical faculty, two registered dietitians and five recently graduated FPRT physicians who were not participating in the study. These judges were requested to carefully examine all knowledge items on the questionnaire for both item and sampling validity based on the educational objectives of the nutrition curriculum. Likewise, the attitude statements were reviewed by these same examiners to assess the degree to which they reflected an attitude construct deduced from theory and considered the correct course of professional action. Internal consistency for the knowledge test and opinion survey were determined from an administration of these tests to eight first and second year family practice residents currently enrolled in the residency program and eight HT physicians. An estimate of internal consistency was calculated through the application of the Kuder-Richardson formula.

In section C of the questionnaire, the nutrition counselling practices of family physicians were investigated based on the Health Habit Counselling Questionnaire (HHCQ) developed by Wells, Ware, and Lewis (1984). These authors developed and tested a model of two dimensions of

physicians' behaviors in counselling patients about four health habits (smoking, weight control, alcohol consumption and regular exercise). The two dimensions studied were the aggressiveness of counselling style and the indications for routine counselling. Aggressiveness and indications Guttman scalograms were developed for each habit. The coefficients of scalability (discriminate validity) for the aggressiveness subscales of smoking, weight control, alcohol intake and exercise were calculated to be 0.72, 0.78, 0.78 and 0.84 respectively. The coefficient of scalability for the indications for counselling were 0.97, 0.96, 0.83 and 0.91 respectively for each habit subscale. The coefficient of reproducibility (reliability) was indicated for the aggressiveness dimension to be 0.93, 0.95, 0.93 and 0.95 respectively. Likewise, the coefficients for the indications dimension was recorded as 0.99, 0.99, 0.93, and 0.97 respectively for each subscale. Based on these results the reliability and discriminate validity of the self-report responses were considered acceptable.

This same questionnaire was applied to counselling practices related to prenatal and infant nutrition, diabetes and hypertension in the study. Nutrition counselling was defined as any activity intended to encourage patients to improve their dietary habits. A broad definition was used to encourage family physicians to consider a wide variety of their behaviors as counselling activities.

The first dimension to be studied was the aggressiveness of nutrition counselling. "Aggressiveness was operationally defined in terms

of successive steps that physicians take in counselling patients" (Wells et al., 1984). These steps included:

- (1) initiating counselling,
- (2) determining the frequency of counselling sessions, and
- (3) determining the duration of counselling sessions.

To determine the first step in the aggressiveness dimension, physicians were asked to indicate whether they do or do not counsel patients (prenatals, infants, diabetics and hypertensives). Physicians who counsel patients reflect aggressiveness with respect to nutrition counselling. Next, physicians were asked to indicate separately how often they bring up the subject of nutrition with each of the types of patients. The degree of aggressiveness was determined based on the frequency of counselling; the more frequent the counselling, the more aggressive the physician was with respect to nutrition counselling. Finally, the duration of counselling sessions was determined by responses indicating the number of minutes physicians spent on counselling patients on nutrition. The longer the counselling session, the more aggressive the physician was with respect to nutrition counselling.

The second dimension to be studied was the indications for routine counselling. Physicians were categorized into three groups according to whether their choice of patients for routine counselling reflected a primary or tertiary preventive orientation or a lack of preventive orientation with respect to nutrition counselling. At one extreme were physicians who provided nutrition counselling to all or most

patients as a matter of routine practice (primary prevention), and at the other extreme were physicians who did not counsel or who did so minimally. In the middle were physicians who targeted their efforts to patients who already had the disease or condition whose progress might be affected by their nutritional practices. Such counselling was seen as an indication of tertiary prevention orientation. Physicians were asked to indicate when they would bring up the subject of nutrition with their patients. Physicians who "did not counsel on nutrition" or counselled only "when the patient brought it up" would indicate a lack of preventive orientation with respect to nutrition counselling. On the other hand, physicians who responded "even when there is no immediate health threat" would reflect a primary prevention orientation with respect to nutrition counselling. Those who responded with "when I feel the diet is immediately harmful" would reflect physicians with a tertiary orientation to nutrition counselling. An additional question item served to elicit the types of nutrition counselling activities physicians engaged in when caring for patients. The response alternatives were based on a content analysis of nutrition counselling items in the literature (Wells et al., 1984) and focused on concrete, potentially observable behaviors. The frequency of each response category for counselling practices was calculated for the two groups and compared.

Provisions were made for items on the questionnaire which were left unanswered or not answered according to the instructions given to the respondent. For the knowledge test (Section B), the opinion survey (Section A) and the counselling practices questions (Section C) unanswered

or "spoiled" questions (where more than one response is indicated) were considered as missing data. These items were not tabulated in the data analysis.

Demographic and professional data were collected in Section D of the questionnaire. This information was used to determine the comparability of the two groups of family physicians for sex, years of practice, practice profile, location of practice and type of nutrition education during medical school and while in practice.

#### Research Design

The post-graduate medical training experiences of the FPRT physicians and HT physicians were similar in that both groups rotated through a series of specialty services. The HT physicians received all of their training in tertiary care hospital wards and ambulatory care clinics. On the other hand, the FPRT physicians were trained in these settings as well as in a family practice clinic. In this clinic they spent twenty weeks on a full time basis plus one half day a week during the remainder of their program providing primary continuing care to ambulatory patients. During this period they received a comprehensive nutrition education program instructed by a registered dietitian. The HT physicians did not train in the family practice clinic and were not exposed to the nutrition instruction experienced by the FPRT physicians.

The research design utilized in this study was the



causal-comparative design. This design was used because it would not be possible to randomly assign subjects into the comparison groups since the independent variable (the nutrition education program) had already been administered to the FPRT family physicians. In order to compare the two groups on variables that might influence the study results, carefully selected background information was collected.

### Procedure

The 182 physicians in the study were requested to complete a physician's nutrition opinion, knowledge and counselling practices survey. Questionnaires mailed to FPRT physicians were pre-coded with numbers from 001 to 070. Those mailed to HT physicians were precoded from 071 to 182. All coding for the study was done by an individual not directly involved in planning the study. This person was responsible for the mailing of the questionnaires and for checking off each returned questionnaire from a master listing. Both groups received a cover letter (Appendix E, page 91) from the researcher and the department head of Family Medicine by whom co-operation was requested. The cover letter briefly described the relevance of the questionnaire to the respondent and encouraged a response within two weeks. A stamped and addressed return envelope was provided. Two weeks after the mailing of questionnaires, a reminder post card was sent to the subjects who did not respond. This was followed one week later by a telephone reminder from a medical faculty member. Subsequently, a follow-up letter was sent to the non-responders to elicit their reasons for not returning the completed questionnaire.

Prior to the start of the study, a pilot study was conducted. The pretest subjects were eight family physicians who graduated from the residency program in 1984 and eight HT physicians who completed their training in the same year. Questionnaires complete with cover letters were mailed to the pretest subjects. They were encouraged to make comments and suggestions concerning the cover letter, directions, recording procedures, and specific items on the questionnaire. Feedback from the respondents was carefully studied and considered for questionnaire revision. Data tabulation and analysis procedures were applied to the pretest data. The end product was a revised instrument ready to be mailed to the FPRT and HT physicians.

### Limitations

There are several limitations that may have affected the data. A self-administered questionnaire was used which was less desirable than an interview. There may have been a selection bias operating, since the study lacked randomization and control. Physicians entering a family practice program may have a more positive orientation to nutrition than those entering a hospital based training program. More females enter family practice programs and this may influence the nutritional knowledge and practices. The literature indicates that females score more favorably than males in these areas. Non-equivalent groups were used to compare results and this is less favorable than using equivalent study groups for comparison. As a result caution must be exercised when interpreting the findings of this study.

### Data Computerization Process

The data were coded and placed into a data-set for analysis. Frequency distributions and cross tabulations were used to profile the respondents. Univariate and multivariate analyses of variance were performed using the Statistical Analysis System (SAS) package at the University of Manitoba and were used to test the study hypotheses. Both analyses were used to test the hypotheses related to nutritional knowledge and opinions. Univariate analyses of variance were omitted for testing the hypotheses for aggressiveness of counselling, prevention orientation and nutrition counselling skills, since the multivariate analyses would provide the most useful information. In addition, univariate analyses of variance were performed to test for significant differences between knowledge, opinion and counselling practice scores (dependent variables) as a function of gender, years in practice, and continuing education (independent variables). A level of significance of 0.05 was used for testing the hypotheses postulated in this study. Since little documented literature has occurred in the area of nutrition education using comparison groups of physicians, this study was considered to be exploratory research. As such, the risk of failing to reject any of the null hypothesis when it should be (Type II error) could have the consequence of prematurely abandoning nutrition education programs as having little value in the training of family physicians. For this reason, a smaller level of significance was not adopted, and each hypothesis was tested at the conventional level of .05.

CHAPTER IV

## FINDINGS

Of the 182 study physicians, 89 responded to the mailed questionnaire which represented a 49 percent return rate. Forty-eight or 69 percent of the FPRT group responded as did 41 or 37 percent of the HT group. Twenty-seven (24 percent) of the questionnaires sent to the HT group were returned uncompleted. Of these, 16 physicians stated they were not in general practice, and therefore the questionnaire did not apply to them. The other 11 uncompleted surveys were returned due to wrong addresses, and these physicians could not be located on a subsequent search. These problems did not occur with the FPRT physician group. Based on this information, it is conceivable that the response rate was falsely lowered further by other HT non-respondents in similar situations. In addition, 6 FPRT physicians and 3 HT physicians responded past the date for entry into the analyses, and were not included in the study results. After taking into consideration the 16 physicians who were not in general practice and the 11 physicians who could not be located, for those physicians who met the study criteria and received a questionnaire, the actual return rate was 63 percent.

Table 1 is a descriptive composite of the 89 physicians who responded to the questionnaire. Chi-square analysis revealed no significant relationship ( $p > .05$ ) between physician group membership,

Table 1

Frequency of Selected Demographic Characteristics  
of the Respondents According to Physician Group

Characteristic	Group		Degrees of Freedom	X <sup>2</sup>	p
	FPRT (n=48)	HT (N=41)			
Gender					
Males	30	27	1	0.11	0.74
Females	18	14			
Location of Practice					
Metropolitan (> 500,000)	27	20	2	0.62	0.73
Urban (25,000-500,000)	6	5			
Rural (< 25,000)	15	16			
Number of Years in Practice					
< 1	0	0	3	1.89	0.60
1 - 2	11	8			
3 - 4	16	13			
5 - 6	13	16			
7 - 8	8	4			
Nutrition in Undergraduate Training					
None	5	12	2	5.1	0.06
Integrated in Other Areas	34	26			
Formal nutrition course	9	3			

gender, location of practice, number of years in practice and type of nutrition education in undergraduate training. The majority of respondents were males (64 percent) who practised in large metropolitan cities (53 percent), and who had been out in practice for between 3 - 6 years (65 percent). Most respondents (67 percent) reported some nutrition education which was integrated into other courses during their undergraduate medical training.

### Physicians' Knowledge and Opinions

#### Hypothesis I

"Family practice residency trained physicians (FPRT) who received a nutrition education program will have more knowledge of nutritional concepts than hospital trained (HT) physicians who did not receive a nutrition education program."

The mean scores and standard deviations for the nutritional knowledge test are presented in Table 2. The highest possible score on the knowledge test was 21 points. Thus, on average, the physicians scored 70 percent correct answers. Appendix F (page 92) indicates the percent of correct answers for each item on the knowledge test and the mean scores for the FPRT and HT groups. Physicians had a tendency to score higher on questions related to general dietary recommendations, and more likely to

Table 2

Mean Nutritional Knowledge Scores and Standard Deviations  
According to Physician Group

Knowledge Score	Physician Group	
	FPRT (N=45)	HT (N=43)
Overall Score		
Mean	14.98	14.30
Sd	2.14	2.69

score low on questions asked on specific dietary advice involving knowledge of food composition. A single factor analysis of variance (Table 3) was performed using physician group membership as the independent variable and mean knowledge score as the dependent variable.

Table 3

Analysis of Variance on the Overall Nutritional  
Knowledge Scores for the FPRT and HT Physician Groups

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Groups	10.53	1	10.53	1.82
Within Groups	503.96	87	5.79	
Total	514.49	88		

Adopting a .05 critical value, the obtained F value of 1.82 was not found to be statistically significant ( $p > .05$ ). Hence, there was insufficient evidence to conclude that the mean overall knowledge score of the FPRT physician group was statistically different from the mean score of the HT physician group.

Using the four subscores of the knowledge test (prenatal, infant, diabetes and hypertension), a single factor multivariate analysis of variance was performed using physician group membership as the independent variable and the mean knowledge scores for each of the areas of prenatal, infant feeding, diabetes and hypertension as the dependent variables. The mean knowledge subscores and standard deviations for prenatal and infant nutrition, diabetes and hypertension care appear in Table 4. While the FPRT physicians scored marginally higher in nutritional knowledge related to prenatal, infant, and diabetes care, the multivariate analysis of variance results indicated that these scores were not significantly higher than those of the HT physicians ( $F = 0.74$ ;  $df = 4,83$ ;  $p = 0.57$ ). These results did not support the original hypothesis that physicians who received a comprehensive nutrition education program would have more knowledge of nutritional principles than a group of physicians who did not receive the program.

### Hypothesis II

"FPRT physicians who received a nutrition education program will have a more positive attitude toward



Table 4

Mean Nutritional Knowledge Subscores and Standard Deviations  
for Prenatal, Infant Feeding, Diabetes and Hypertension

Knowledge Score	Physician Group	
	FPRT (N=45)	HT (N=43)
Prenatal Subscore		
Mean	3.33	3.12
Sd	1.02	1.10
Infant Subscore		
Mean	3.22	3.16
Sd	0.85	0.90
Diabetes Subscore		
Mean	4.82	4.42
Sd	1.09	1.37
Hypertension Subscore		
Mean	3.60	3.60
Sd	0.86	0.82

applied nutrition than HT physicians who did not receive a nutrition education program."

Analysis of the data obtained on the opinion survey were identical to the procedures described for the knowledge test. The mean

scores and standard deviations for physicians' overall nutritional opinions appear in Table 5. The maximum score possible was 24. A single

Table 5

Mean Overall Nutritional Opinion Scores and Standard Deviations  
According to Physician Group

Opinion Score	Physician Group	
	FPRT (N=45)	HT (N=43)
Overall Score		
Mean	19.52	17.80
Sd	2.86	3.20

factor analysis of variance was used to investigate whether the presence or the absence of a nutrition education program significantly influenced the mean opinion scores of the physicians. The results are summarized in Table 6 and indicate that the opinion of physicians differs significantly as a function of the presence or the absence of a nutrition education program ( $p < 0.05$ ). Specifically, the FPRT group have a more positive attitude toward applied nutrition than the HT physician group.

Table 7 indicates the mean subscores and standard deviations for the four areas of nutritional opinion. These mean scores indicate that the FPRT physicians appear to have more favorable attitudes toward counselling prenatal patients, parents of infants and diabetics as

Table 6

Analysis of Variance on the Overall Nutritional  
Opinion Scores for the FPRT and HT Physician Groups

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Between Group	65.11	1	65.11	*7.35	.008
Within Group	770.42	87	8.86		
Total	835.53	88			

\*Significant  $p < .05$

compared to the HT group. However, a single factor multivariate analysis of variance examining group differences on these four dependent variables of opinion found no significant effects ( $F = 1.98$ ;  $df = 4,83$ ;  $p > .05$ ). Therefore, the FPRT physician group did not have significantly more favorable attitudes in any particular area of nutrition than the HT physician group. Appendix G (page 97) indicates the percent of favorable responses to each of the opinion statements. In general, all physicians indicated very positive opinions toward the various nutrition counselling principles. The mean scores for each of the FPRT and HT groups on each opinion statement are also reported. A mean score of 1 indicates a favorable opinion for a statement. Zero represents a neutral opinion, while -1 indicates an unfavorable opinion to the statement. The results indicated that the FPRT group had more favorable opinions toward statements involved in the dietary management of diabetic patients. In

Table 7

Mean Nutritional Opinion Subscores and Standard Deviations for  
Prenatal, Infant Feeding, Diabetes, and Hypertension

Opinion Score	Physician Group	
	FPRT (N=45)	HT (N=43)
Prenatal Subscore		
Mean	5.27	4.93
Sd	1.37	1.61
Infant Subscore		
Mean	4.67	4.21
Sd	1.21	1.12
Diabetes Subscore		
Mean	4.44	3.81
Sd	1.55	1.72
Hypertension Subscore		
Mean	5.04	5.05
Sd	1.15	1.09

addition, the FPRT group tended to report more positive opinions toward counselling patients for primary prevention. This was reflected in opinions on (1) the use of calcium supplements for prenatal patients, (2) dietary reviews for underweight pregnant patients, (3) dietary inquiries for infants and concerns about overfeeding, and (4) sodium control for

infants and adults as a preventive strategy. The HT physicians scored more favorably on three statements related to the appropriate energy needs of pregnant adolescents, the usefulness of a high potassium diet, and the value of a 4.5 kilogram weight loss in the control of hypertension. The latter two opinion statements were not directed toward primary prevention per se, and reflected management plans for the treatment of hypertension. This study supported the hypothesis that family physicians who receive a nutrition curriculum will have more positive attitudes toward applied nutrition than physicians who did not receive the nutrition education program. Furthermore, there was a tendency for the FPRT physicians to answer more favorably to questions with a focus on primary prevention as compared to the HT physicians. Therefore, based on the study results, Hypothesis II was not rejected.

### Physicians' Counselling Practices

#### Hypothesis III

"FPRT physicians who received a nutrition education program will be more aggressive in their nutrition counselling practices than HT physicians who did not receive a nutrition education program."

Table 8 indicates the percent of physicians from both groups who initiated nutrition counselling with their patients, and the frequency and duration of the counselling session. The results indicate that the

Table 8

Number and Percent of all Physicians who Initiate Counselling  
and the Frequency and Duration of Counselling Sessions

Initiation of Counselling	Number and percent of Physicians	
	Yes	No
Prenatal	79 (89)*	10 (11)
Infant	84 (94)	5 (6)
Diabetes	82 (92)	7 (8)
Hypertension	89 (100)	0 (0)

Frequency	Rarely or Occasionally	Every few Visits or so	Almost Every Visit	Every Visit
Prenatal	6 (7.6)	54 (68.4)	14 (18)	5 (6)
Infant	1 (1.2)	18 (21.4)	18 (57.1)	17 (20.1)
Diabetes	6 (7.3)	35 (42.7)	31 (37.8)	10 (12.2)
Hypertension	23 (25.8)	54 (60.7)	10 (11.2)	2 (23)

Duration	Minutes			
	Up to 2	2 - 5	5 - 10	> 10
Prenatal	30 (38.0)	43 (54.4)	4 (5.1)	1 (1.3)
Infant	24 (28.6)	50 (59.5)	7 (8.3)	2 (2.4)
Diabetes	21 (25.6)	45 (54.4)	14 (17.1)	1 (1.2)
Hypertension	55 (61.8)	29 (32.6)	4 (4.5)	1 (1.1)

\* percent of physicians in brackets

majority of physicians initiate counselling with their patients. Of all the physicians surveyed, 94 percent and 92 percent reported counselling parents of infants and diabetic patients respectively. Hypertensive patients were reported to be counselled in nutrition by all respondents. While 11 percent of all physicians did not counsel prenatal patients, the majority of these non-counselling physicians did not have prenatal patients in their practices.

Data collected on the frequency of nutrition counselling revealed that physicians reported counselling parents of infants more often than other patients. Fifty-seven percent of all physicians counselled parents of infants "almost every visit", compared to 14, 31 and 10 percent of physicians who counselled prenatal, diabetic and hypertensive patients respectively. Data on duration of counselling sessions indicated that approximately 55 percent of all physicians spent between two to five minutes discussing nutrition with prenatal patients, parents of infants and diabetics, while over 60 percent of all physicians spent less than two minutes with hypertensive patients discussing nutritional issues.

A single factor multivariate analysis of variance statistic was used to determine whether the presence or absence of a nutrition education program (independent variable) would result in significant differences in the degree of aggressiveness toward nutritional counselling in each of the four areas (dependent variables).

At the outset, a separate multivariate analysis of variance on each of the three dependent variables of (1) initiation of counselling, (2) frequency of counselling, and (3) duration of counselling sessions was proposed to examine this hypothesis. However, this test could not be applied to "initiation of counselling" because, in the case of counselling hypertensive patients, all physicians in the study reported initiating counselling. Therefore, the variable "initiation of counselling" was deleted from the results. Furthermore, on reflection it was decided to combine the scores for "frequency" and "duration" of counselling to define "aggressiveness of counselling" as the product of frequency X duration, resulting in a single multivariate analysis. Using this modified definition, the highest possible score was 16, which indicated a response where a physician counselled "every time he saw the patient", and where he/she spent "greater than 10 minutes" in each counselling session.

Table 9 indicates the mean subscores and standard deviations for the newly defined "aggressiveness of counselling" variable for each of the four nutritional areas. A single factor multivariate analysis of variance was used to determine if any differences between physician groups existed on the dependent variables of counselling aggressiveness for the four areas of prenatal, infant, diabetes and hypertension counselling. The resulting F value of 1.16 (df = 4,64; p = .34), revealed no significant differences (p > 0.05) in "aggressiveness of counselling" between the two physician groups. Thus, the results do not support the hypothesis that physicians who receive a nutrition program will be more aggressive in their



Table 9

Mean Subscores and Standard Deviations for Aggressiveness of  
Counselling According to Physician Group

Aggressiveness of Counselling (frequency x duration)	Physician Group		F
	FPRT (N=45)	HT (N=43)	
Prenatal			
Mean	3.78	4.21	
Sd	2.59	2.08	
Infant			
Mean	5.67	5.21	
Sd	2.75	2.53	
Diabetes			
Mean	5.36	4.91	
Sd	3.31	2.36	
Hypertension			
Mean	3.06	2.82	
Sd	2.46	1.87	1.16

counselling habits than a group of physicians who did not receive this nutrition instruction.

Hypothesis IV

"FPRT physicians who received a nutrition education program will report a more preventive orientation to nutrition counselling than HT physicians who did not receive a nutrition education program."

The mean subscores and standard deviations for physicians' "indications for counselling" appear in Table 10. A maximum score of 3 indicated a primary prevention orientation whereas the minimum score of 1 represented a lack of prevention orientation toward nutrition counselling. A score of 2 indicated a tertiary prevention orientation. The mean subscores for both physician groups showed a strong trend toward preventive nutrition counselling. The areas of prenatal and infant nutrition received a stronger primary prevention emphasis by the FPRT physicians as compared to the HT physicians. Conversely, the HT physicians reported a slightly more favorable trend to primary prevention in the counselling of hypertensive patients. However, a single factor multivariate analysis of variance investigating any differences between physician groups (independent variable) on the dependent variable of "indications for counselling" for the four counselling areas of prenatal, infant, diabetic and hypertensive patients found no significant differences between the groups ( $F = .31$ ,  $df = 4,66$ ,  $p = .87$ ). Thus, the hypothesis that physicians who received a nutrition education program would report a more preventive orientation in their counselling practices than a group of physicians that did not was not supported.

Table 10

Mean Subscores and Standard Deviations for Indications  
for Counselling According to Physician Group

Indications for Counselling*	Physician Group	
	FPRT (N=36)	HT (N=35)
Prenatal		
Mean	2.92	2.83
Sd	0.30	0.50
Infant		
Mean	2.97	2.94
Sd	0.15	0.27
Diabetes		
Mean	2.83	2.83
Sd	0.47	0.43
Hypertension		
Mean	2.81	2.83
Sd	0.63	0.37

\* A score of: 3 = primary prevention  
2 = tertiary prevention  
1 = lack of prevention orientation

Hypothesis V

"FPRT physicians who received a nutrition education program will report using more nutrition counselling skills than HT physicians who did not receive a nutrition education program.

Table 11 shows the frequency of use by physicians of the various counselling skills, along with the mean scores and standard deviations for the various activities. The maximum possible score for each activity was 1. The data indicate that the four most consistently used skills by physicians were (1) suggest specific food choices, (2) assess the patient's diet, (3) present pamphlets, and (4) explore the patient's feelings toward the diet. The mean scores for these skills were higher for the FPRT physicians in all instances with the exception of "suggest food choices" for counselling parents of infants. Physicians' referral to a nutrition specialist varied depending upon the type of patient seen. Diabetic patients were most likely to be referred (87 percent frequency). Physicians were less likely to refer for infant nutrition counselling (6 percent frequency). Use of a nurse for counselling and enlisting family support for dietary change were used infrequently by physicians. A single factor multivariate analysis of variance was applied to the mean scores for the seven counselling skills for each of the four nutrition areas. The resulting F values of 0.43 for prenatal nutrition ( $df = 7,70$ ,  $p = .87$ ), 1.69 for infant nutrition ( $df = 7,75$ ,  $p = .12$ ), 1.97 for diabetes care ( $df = 7,80$ ,  $p = .07$ ) and 1.71 for hypertension care ( $df = 7,72$ ,  $p = .12$ )

Table 11

Frequency of Use (%), Mean Scores and Standard Deviations of Various  
Counselling Activities According to Physician Group

Counselling Skill	Frequency (%)	Physician Group			
		FPRT		HT	
		Mean	Sd	Mean	Sd
<b>Prenatal Patients</b>					
Explore feelings toward diet	49	0.55	0.50	0.45	0.50
Assess diet	75	0.75	0.44	0.74	0.45
Suggest food choices	76	0.88	0.42	0.74	0.45
Present pamphlets	71	0.75	0.44	0.69	0.47
Refer to a nutrition specialist	30	0.30	0.46	0.29	0.46
Have a nurse counsel	6	0.10	0.30	0.03	0.16
Enlist family support	5	0.08	0.43	0.03	0.16
<b>Parents of Infants</b>					
Explore feelings toward diet	57	0.69	0.47	0.43	0.50
Assess diet	94	0.94	0.25	0.95	0.23
Suggest food choices	83	0.82	0.39	0.85	0.37
Present pamphlets	72	0.74	0.45	0.69	0.47
Refer to nutrition specialist	6	0.07	0.25	0.06	0.23
Have a nurse counsel	2	0.05	0.21	0.00	0.00
Enlist family support	8	0.16	0.37	0.00	0.00

Table 11 - cont'd.

Counselling Skill	Frequency (%)	Physician Group			
		FPRT		HT	
		Mean	Sd	Mean	Sd
<b>Diabetic Patients</b>					
Explore feelings toward diet	70	0.83	0.38	0.60	0.50
Assess diet	76	0.76	0.41	0.75	0.44
Suggest specific food choices	75	0.80	0.41	0.70	0.46
Present pamphlets	81	0.92	0.27	0.70	0.46
Refer to nutrition specialist	87	0.82	0.38	0.92	0.27
Have a nurse counsel	4	0.05	0.22	0.02	0.16
Enlist family support	25	0.30	0.46	0.20	0.41
<b>Hypertensive Patients</b>					
Explore feelings toward diet	52	0.63	0.49	0.40	0.50
Assess diet	75	0.76	0.43	0.74	0.44
Suggest specific food choices	94	0.96	0.21	0.93	0.26
Present pamphlets	65	0.76	0.43	0.54	0.50
Refer to nutrition specialist	38	0.27	0.45	0.49	0.51
Have a nurse counsel	1	0.02	0.15	0.00	0.00
Enlist family support	13	0.14	0.34	0.12	0.32

revealed no significant differences ( $p > 0.05$ ) between the FPRT and HT physicians in the use of counselling skills. Thus, the hypothesis that the FPRT physicians would report using more nutrition counselling skills than the HT physicians was not supported by the results.

### Associated Factors

Since several factors associated with the nutritional knowledge, opinions and practices of physicians have been documented in the literature, further analyses were performed to investigate whether the observations of previous investigators could be verified in the present study. The mean knowledge and opinion scores for males and females are displayed in Table 12. Two single factor analyses of variance were used to determine whether the gender of the physician (independent variable) was significantly related to nutritional knowledge and opinion (dependent variables). The results of these analyses are contained in Table 13. The results indicate that the mean knowledge scores were significantly different ( $p < 0.05$ ) between male and female physicians. Specifically, female physicians scored significantly higher on nutritional knowledge than male physicians. For nutritional opinions, however, the obtained F value was nonsignificant indicating that the mean opinion scores were not significantly different ( $p > 0.05$ ) between male and female physicians.

Table 14 displays the mean knowledge and opinion scores and standard deviations as a function of physicians' continuing education in nutrition. Physicians with no form of continuing education obtained a

Table 12

Mean Knowledge and Opinion Scores and Standard Deviations  
for Male and Female Physicians

	Gender	
	Male (N=57)	Female (N=32)
Knowledge Score		
Mean	14.0	15.80
Sd	2.72	2.81
Opinion Score		
Mean	18.49	19.16
Sd	2.73	2.80

mean knowledge score of  $14.05 \pm 2.15$ . Those who attended seminars which included nutrition or read nutrition journals scored on average  $14.94 \pm 2.32$ . There was only one physician who reported attending a formal course in nutrition. This same individual obtained a mean score of 16.0, which was the highest knowledge score among all the physicians. These results provide some evidence of a trend toward higher mean knowledge scores among physicians with increasing degrees of continuing education as compared to physicians with no continuing education in nutrition. Similarly, the mean opinion scores shown in Table 14, indicate a positive influence of increasing degrees of continuing education in nutrition. Physicians with continuing education in the form of seminars



Table 13

Analyses of Variance on the Nutritional Knowledge and  
Opinion Scores based on the Gender of the Physician

Dependent Variable	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Nutritional Knowledge	Between Group	72.35	1	72.35	*14.24	.0003
	Within Group	442.14	87	5.08		
	Total	514.49	88			
Nutritional Opinion	Between Group	9.06	1	9.06	0.95	.31
	Within Group	826.47	87	9.50		
	Total	835.53	88			

\* Significant at  $p < 0.05$

or journal readings scored higher ( $19.16 \pm 2.78$ ) than those who did not seek further education ( $18.20 \pm 2.81$ ). Once again, the respondent who reported a formal course in nutrition obtained the highest score of 23. Two single factor analyses of variance were to be performed to test whether continuing education in nutrition would significantly influence knowledge and opinion scores. However, since there was only one physician who reported a formal course in nutrition, it was felt that this statistical analysis would be an invalid test to assess differences in the mean scores. Hence, this procedure was deleted and will not be reported.

Table 14

Mean Scores and Standard Deviations for Knowledge and Opinions  
According to Physicians' Continuing Education in Nutrition

	Continuing Education		
	None (N=32)	Seminars/ Journals (N=29)	Formal Nutrition Course (N=1)
Knowledge Score			
Mean	14.05	14.94	16.00
Sd	2.15	2.32	0
Opinion Score			
Mean	18.16	19.21	23.00
Sd	2.81	2.78	0

Table 15 reveals the mean knowledge and opinion scores and standard deviations as a function of the number of years physicians were in practice. Mean knowledge scores were very similar regardless of the number of years in practice. These scores ranged from  $14.50 \pm 2.48$  to  $14.76 \pm 2.55$ . Mean opinion scores ranged from  $18.20 \pm 2.18$  to  $19.75 \pm 2.63$ . Physicians who were in practice from between 7-8 years scored the highest opinion scores. There was no apparent trend toward higher or lower scores with either increasing or decreasing years in practice.

Table 15

Mean Knowledge and Opinion Scores According to the  
Number of Years in Practice

	Number of Years in Practice			
	1 - 2 (N=19)	3 - 4 (N=29)	5 - 6 (N=29)	7 - 8 (N=12)
Knowledge Score				
Mean	14.63	14.59	14.76	14.50
Sd	2.81	2.65	2.55	2.48
Opinion Score				
Mean	19.21	18.20	18.52	19.75
Sd	2.84	2.18	2.09	2.63

Table 16 summarizes the results of the two single factor analyses of variance used to determine whether significant differences existed on mean knowledge and opinion scores as a function of the number of years in practice. The resulting F values of 0.04 (df = 3,85;  $p = 0.40$ ) and 0.91 (df = 3,85;  $p = 0.98$ ) respectively, for mean knowledge and opinion scores, indicated no significant differences ( $p > 0.05$ ) as a function of the number of years in practice.

The mean practice scores and standard deviations for prenatal, infant feeding, diabetes and hypertension counselling according to physicians' continuing education appear in Table 17. The mean practice

Table 16

Analyses of Variance for Nutritional Knowledge and Opinion Scores  
Based on the Number of Years in Practice

Dependent Variance	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Nutritional Knowledge	Between Group	0.73	3	0.24	0.04	0.40
	Within Group	513.76	85	6.04		
	Total	514.49	88			
Nutritional Opinion	Between Group	26.12	3	8.71	0.91	0.98
	Within Group	809.41	85	9.52		
	Total	835.53	88			

scores (out of a maximum of 7 points) indicated a trend toward higher scores for physicians who sought continuing education in nutrition as compared to those who did not engage in these educational activities. A single factor multivariate analysis of variance could not be performed on the data for the same reason given previously for not performing these analyses on the mean knowledge and opinion scores.

Table 18 indicates the mean practice scores and standard deviations for prenatal, infant feeding, diabetes and hypertension counselling according to the number of years in practice. The results

Table 17

Mean Practice Scores and Standard Deviations According to  
Physicians' Continuing Education in Nutrition

	Continuing Education		
	None	Seminars/ Journals	Formal Course
Prenatal			
N	32	29	1
Mean	2.66	3.83	4.00
Sd	1.08	1.01	0
Infant			
N	33	32	1
Mean	2.82	3.62	3.00
Sd	1.03	1.01	0
Diabetes			
N	33	31	1
Mean	3.94	4.35	4.00
Sd	1.00	1.02	0
Hypertension			
N	37	33	1
Mean	2.92	3.85	4.00
Sd	1.01	1.02	0

Table 18

Mean Practice Subscores and Standard Deviations  
According to the Number of Years in Practice

		<u>Number of Years in Practice</u>			
		1 - 2 (N=16)	3 - 4 (N=24)	5 - 6 (N=24)	7 - 8 (N=8)
Prenatal					
	Mean	3.63	3.59	3.50	3.75
	Sd	0.89	0.98	0.99	1.02
Infant					
	Mean	3.50	3.33	3.27	3.63
	Sd	0.95	0.92	0.98	1.01
Diabetes					
	Mean	3.25	3.27	3.46	3.69
	Sd	0.99	0.98	1.05	1.01
Hypertension					
	Mean	3.41	3.29	3.42	3.75
	Sd	0.98	0.99	1.00	1.01

revealed very similar practice scores between each of the counselling situations. There appeared to be no trend toward higher or lower scores in relation to the number of years physicians were in practice. A single factor multivariate analysis of variance was performed using years in practice as the independent variable and the mean practice subscores as

the four dependent variables. The resulting F value of 0.90 (df = 12,201,  $p = .55$ ) indicated that the mean practice scores for the four dependent variables were not significantly different ( $p > 0.05$ ) as a function of the number of years in practice.

This study was primarily concerned with testing five research hypotheses. The findings for each hypothesis are summarized below.

Hypothesis 1 - "Family practice residency trained (FPRT) physicians who received a nutrition education program will have more knowledge of nutritional concepts than hospital trained (HT) physicians who did not receive a nutrition program." This hypothesis was not supported by the results of the study. The overall knowledge score of the FPRT physician group was not found to be significantly different from the mean score of the HT physician group. Also, the mean knowledge subscores for prenatal, infant, diabetes and hypertension were not significantly different for the two physician groups.

Hypothesis 2 - "Family practice residency trained (FPRT) physicians who received a nutrition education program will have a more positive attitude toward applied nutrition than hospital trained (HT) physicians who did not receive a nutrition education

program." As hypothesized, the overall mean score for nutritional opinions was significantly higher for the FPRT physicians as compared to the mean score for the HT group. However, the mean opinion subscores for prenatal, infant diabetes and hypertension were not significantly different for the two physician groups.

Hypothesis 3 - "Family practice residency trained (FPRT) physicians who received a nutrition education program will be more aggressive in their nutrition counselling practices than hospital trained (HT) physicians who did not receive a nutrition education program." The results from this study do not support this hypothesis. No significant differences were found for "aggressiveness in counselling" between the two physician groups.

Hypothesis 4 - "Family practice residency trained (FPRT) physicians who received a nutrition education program will report a more preventive orientation to nutrition counselling than hospital trained (HT) physicians who did not receive a nutrition education program." The hypothesis was not supported by this study. Both physician groups displayed a strong tendency toward preventive nutrition counselling. The mean subscores for the FPRT and HT groups were not



significantly different for any of the patient counselling situations tested.

Hypothesis 5 - "Family practice residency trained (FPRT) physicians who received a nutrition education program will report using more nutrition counselling skills than hospital trained (HT) physicians who did not receive a nutrition education program." The results revealed no significant differences between the FPRT and HT physicians in the use of counselling skills. This hypothesis was not supported by the study.

In addition to these results, further analyses of the data yielded the following findings:

1. A relationship exists between the gender of the physician and scores on the nutritional knowledge test. Females had significantly higher knowledge scores than did males.
2. The nutritional opinion scores were not significantly different as a function of the gender of the physician.
3. The nutritional knowledge and opinion scores were not significantly different as a function of the number of years physicians had been in practice.

4. There was a general trend toward higher nutritional knowledge and opinion scores among physicians using some form of continuing education in nutrition although inadequate cell size did not permit statistical testing.
5. There was no significant relationship between counselling practice scores and number of years in practice. Although inadequate cell size did not allow for statistical testing, there was a trend toward higher counselling practice scores among physicians with continuing education in nutrition.

### Discussion

The results of this study provide some interesting observations for discussion. Similar to the results documented by Krause and Fox (1977), and more recently by Lasswell et al. (1984), the family physicians in this study scored only modestly in nutritional knowledge (65, 69 and 70 percent correct answers respectively). Krause and Fox (1977) noted that physicians most often answered correctly questions related to general nutrition information and nutrition during illness and convalescence (85 and 82 percent correct answers respectively). Knowledge ranged from 61 to 73 percent correct answers in the areas of pregnancy, infant nutrition, cardiovascular disease and diabetes. Lasswell et al. (1984) found physicians scored higher on nutrition related to obesity, alcoholism, cardiovascular disease and diabetes; however they did not indicate the percent of correct answers in these areas. Knowledge scores in the areas

of infant and prenatal nutrition were intermediate. The least knowledge was in the areas of nutrition counselling techniques, geriatric nutrition and nutrition in cancer. In the present study, physicians had greater knowledge of nutrition for the therapeutic management of diabetes and hypertension (78 and 72 percent correct answers respectively), than of infant and prenatal nutrition (64 and 65 percent correct answers respectively). These studies indicate a remarkable similarity in results.

Furthermore, in the present study the mean overall nutritional knowledge scores were not significantly different between the FPRT and HT physician groups. Results of the analysis on the mean knowledge subscores revealed that FPRT physicians did not have more knowledge than the HT physicians in any specific area of nutrition studied. These findings are similar to those of Lasswell et al. (1984), who compared the nutritional knowledge of residents who were and were not exposed to a nutrition course during their undergraduate medical school training. A tendency for physicians to score higher on knowledge questions addressing general nutritional principles as compared to specific information about nutrient composition, confirmed the earlier reports by Krause and Fox (1977). When considering that specific details are less likely to be remembered than more general guidelines, this observation is not surprising. Since the goal of residency training programs is to have an impact on the future practice patterns of graduates, knowledge testing in itself provides little information as to the actual influence of the educational effort on physicians when in practice.

It is interesting to note that the gender of the physician was associated with the knowledge score obtained by that physician. The 1984 Canada Health Survey also found a substantial sex difference among Grade 10 students for nutritional knowledge. The fact that females in both studies scored significantly higher appears to reflect the greater socialization emphasis placed on health and nutrition issues for females in our society.

The results of the nutritional opinion survey suggested that the nutrition education program significantly influenced the attitudes of physicians toward nutrition counselling. This was reflected by the significant differences in the overall opinion scores between the two physician groups. However, multivariate analysis of the variance performed on the subscores for prenatal, infant, diabetes and hypertension care revealed nonsignificant results. This unexpected finding could not be explained by the data. The fact that overall opinions were significantly more positive for the FPRT physicians supports the previously reported positive appraisals by residents of similar nutrition curricula in family practice residency training programs (Flynn et al., 1974; Moore & Larsen, 1983). Although physicians' opinions toward nutrition have been described as generally favorable (Krause & Fox, 1977), DuBose et al. (1981) found that attitudes toward nutrition among various health care professionals differed significantly. Physicians rated the influence of nutrition as significantly less important than did nurses and dentists in the areas of disease prevention, disease treatment, and the maintenance of good health. Furthermore, DuBose et al. (1981) speculated

that "since physicians' training emphasizes the necessity of obtaining scientifically rigorous data to establish association between degenerative diseases and nutritional variables, and since there is a paucity of such data at present, that the cautious attitude by physicians might be accounted for by this factor". In the present study, the opinion survey results can be viewed as significant if one considers the extent to which an attitude can be conceived as the mediating construct which relates social situations to responses. This study and the one by DuBose et al. (1981), suggest that individuals' nutrition attitudes reflect the training and experience received in their respective fields, and these differences in attitude would likely be reflected in the nutritional advice and guidance that they give to patients. Consistent with this view, the Association of American Medical Colleges report (1984) on the status of medical education recommended that medical students' general professional education should provide them with the knowledge and skills required to work with patients and communities to prevent or ameliorate disease. The report emphasized the need to focus continual attention to teaching the concepts of prevention throughout all phases of medical education.

Despite the more favorable opinions given toward nutrition by the FPRT physicians, these were not reflected by any significant differences in counselling practices when the two physician groups were compared. Several factors may offer a plausible explanation. Firstly, the self-reported data reflected the general activities that physicians engage in when counselling patients. A more sensitive instrument would be required to evaluate the more specific details of counselling encounters

to assess the quality of nutritional management or advice provided, the quality of nutrition education materials used, and the effect on patient outcomes. Secondly, clinical practice may not be expected to change in the light of the complex processes involved in behaviour change. Research in educational efforts designed to effect behaviour demonstrate that, although acquisition of new knowledge, skills and changes in attitude are necessary for improved clinical practice, they are insufficient.

Pinkerton et al. (1980) conducted an educational program in preventive dentistry for family practice residents, and evaluated changes in systemic fluoride prescribing habits related to newly acquired knowledge. Two groups of residents were shown a videotape describing preventive dental techniques. One group was given supplemental information as to the specific steps and a strong imperative to implement the information in patient care. Both groups significantly increased their knowledge on correct prescribing of fluoride and this was maintained three months after the program. However, residents exhibited no improvement in fluoride prescribing habits to pediatric patients as measured by chart audit regardless of group assignment. Subsequently, a faculty physician was assigned to each resident to ensure compliance with the established fluoride protocol. Through this "accelerated encouragement", 90.7% of pediatric patients were ingesting the correct amount of fluoride by the end of a six week period. Only subsequent individual monitoring and reinforcement achieved the desired behaviour. This experience suggested that residency programs may not be rigorously evaluating whether a specified behaviour has changed. Several authors (Calloway, 1977; Flynn et al., 1974; Lasswell et al., 1984) have stressed the importance of

physician role models who can convey and demonstrate to their students the value of competence in nutrition. More recently, Dappen et al. (1986), recommended the need for residents to observe faculty physicians using nutrition as part of the physician's examination, care of the patient, and use of effective nutrition intervention. Based on the experiences of the authors cited, it would appear that the lack of objective change in counselling skills among FPRT physicians may be due to inadequate individual feedback and reinforcement of nutritional skills during the educational process. The fact that no significant differences were found between the FPRT and HT physician groups on initiation of counselling, indications for counselling, frequency and duration of counselling practices may be partially attributable to the potential barriers to providing nutrition counselling. It can be speculated as Kottke et al. (1984) suggested that the anticipated lack of interest and expected non-adherence to nutritional intervention on the part of patients are probable barriers to changing physicians' nutrition counselling behaviours. In addition, lack of time to devote to nutrition counselling and lack of financial incentive to do so may also be relevant barriers. The extent to which these factors serve as significant deterrents to nutrition counselling in the FPRT physicians, may explain the lack of significant differences in behaviour between the FPRT and HT physician groups.

In contrast to the study by Krause and Fox (1977), the present study did not find a significant relationship between the number of years physicians were in practice and nutritional knowledge. Krause and Fox interpreted the moderate but significant negative relationship to suggest

that an expansion of postgraduate nutrition education programs would be beneficial to physicians. However, the differing study results may be attributable to the differences in the number of years in practice between the physicians in the two studies. In the Nebraska study (Krause & Fox, 1977) the mean length of time in practice was twenty years with a range of one year to fifty-six years.

In contrast, physicians had a mean of 4.5 years in practice in the present study, with a maximum of eight years in practice. It may be that as the number of years in practice exceed ten years for the FPRT and HT study groups, that nutritional knowledge will decrease significantly. Alternatively, it may be possible that younger physicians may be more motivated to pursue continuing education in nutrition, and therefore maintain their level of knowledge compared to older physicians.

Previous studies have shown conflicting results regarding the relationship of nutritional opinions and years in practice. Johnston and Schwartz (1978) found that physicians in practice more than ten years scored significantly lower on opinion scores than those in practice for a shorter length of time. The results of the present study are similar to those of Krause and Fox (1977) which showed no significant relationship between opinion scores and the number of years in practice. The reason for this discrepancy may be partially attributable to the differences in the focus of the opinion statements used in these studies. Krause and Fox (1977) obtained nutritional opinions related to general nutritional attitudes about the role of nutrition in health care, whether physicians



should know principles of diet therapy and how to apply them, and opinions about the role of dietitians in prescribing appropriate dietary modifications. It can be speculated that these types of opinions would be formulated early in medical training and highly resistant to change. In contrast, Johnston and Schwartz (1978) used opinion statements similar to the present study which were specifically related to opinions about taking particular actions to ensure adequate nutritional management of patients. The results from these two studies are comparable, however the findings were conflicting. A possible explanation may lie in the differences in the number of years in practice between the physicians in the two studies. Since the present study used physicians who had been in practice for eight years or less, and since Johnston and Schwartz (1978) noted significantly lower opinion scores for physicians who were in practice for over ten years and not for those in practice for less than this length of time, a similar decline in opinions might be expected when the physicians in this study exceed ten years in practice.

Inadequate cell size did not permit the statistical testing of nutritional knowledge and opinion scores based on continuing education in nutrition. Therefore, the present study was unable to provide evidence to confirm the observation of Johnston and Schwartz (1978) who found that physicians who attended continuing education programs scored significantly higher on the opinion survey when compared to those who had not. The present study however showed a general trend toward higher opinion scores with continuing education, an observation consistent with results obtained by Johnston and Schwartz. It cannot be assumed however that the

continuing education efforts of these physicians contributed to their more favorable opinion scores. It is possible that physicians who already possessed highly favorable nutritional opinions were motivated sufficiently to pursue more continuing education in nutrition.

The present study suggests a positive relationship between nutritional knowledge and continuing education in nutrition although statistical testing was not possible. In the study documented by Pinkerton et al. (1980) it was demonstrated clearly that it is possible for individuals to learn and maintain their level of knowledge for the short-term based on programs using a continuing education format.

Contrary to the results obtained by Johnston and Schwartz (1978) and Kottke et al. (1980), this study did not find a significant difference between mean counselling practice scores and the number of years physicians had been in practice. These authors found physicians in practice more than ten years scored significantly less on counselling practice scores compared to those practising for a shorter time. Perhaps the results of the present study would have been similar if an older physician group had been available for comparison. The trend, however insignificant, was for the physicians in practice longer to have higher counselling practice scores, an observation that indicates the use of more and varied counselling strategies by physicians with more practice experience.

Although inadequate cell size did not allow for statistical testing, there was a trend toward higher mean counselling practice scores among physicians with continuing education in nutrition. This observation lends some support to the results obtained by Johnston and Schwartz (1978) in which they found continuing education had a significant impact on physician's practice scores.

CHAPTER V

## CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of the study was to determine the effects of a comprehensive nutrition education program on the nutritional knowledge, opinions and counselling practices of family physicians. A questionnaire was mailed in September 1985 to 182 family physicians who graduated from the University of Manitoba between the years 1978-1983. Among these physicians were 70 family practice residency trained (FPRT) physicians who were exposed to a nutrition education program during their two year residency training experience. The remaining 112 physicians comprised the comparison group who were hospital trained (HT) and did not receive the nutrition instruction. Eighty-nine physicians returned the completed questionnaire, for a response rate of 49 percent. Additionally, 27 questionnaires were returned unanswered. Among these were 16 physicians who indicated that they were not in general practice, and 11 physicians who could not be located. After considering the latter 27 physicians, the adjusted response rate to the questionnaire was 63 percent.

Residency training programs have been identified as the appropriate settings for integrating nutrition curricula as they are designed to provide physicians with experiences to consolidate past learning and to impact on physicians' future nutrition counselling

practices. Residency training programs which have instituted nutrition curricula have described favorable experiences, however objective data on the effects of these programs on physicians' knowledge, opinions and counselling patterns have not been studied. There was a need for this study to provide insights into whether physicians who were trained in nutrition during their residency training program were able to apply the information and skills when out in practice.

The following was the research question:

What is the effect of the presence or the absence of a nutrition education program on the knowledge, opinions and counselling practices of family physicians?

The review of the literature indicated that:

1. The physician is the primary health care professional on whom people rely for nutritional information but is generally not a nutrition expert. Wide variations of knowledge have been reported within specific areas of nutrition, and physicians learn about nutrition primarily through non-professional literature.
2. Physicians' nutritional opinions are generally favorable. Physicians in practice more than ten years score significantly lower on both nutritional opinions and counselling practice

sections of questionnaires than physicians who have been practicing for a shorter time.

3. Physicians who attend continuing education programs on nutrition score significantly higher on both nutritional opinions and counselling practice surveys compared to those who do not attend these programs.
4. The majority of physicians do not practice preventive nutrition counselling even when they view giving nutritional advice to patients as valuable. Significant barriers include anticipated lack of interest and expected non-adherence to nutritional intervention (Kottke et al., 1980). As the number of years in practice increase, the tendency to provide nutrition counselling to patients decreases.

Overall nutritional knowledge, opinions and counselling practice scores for each physician group were compared for significant differences using the analysis of variance statistic. Multivariate analysis of variance was used to test for significant differences between the four areas of nutrition for nutritional knowledge, opinions, and practice scores, indications for counselling, counselling skills and aggressiveness (frequency X duration) of counselling. Eight 2-factor analyses were performed to test three demographic and professional variables (gender, years in practice, continuing education) with knowledge, opinion and counselling practice scores. The Statistical Analysis System at the

University of Manitoba (written and maintained by the SAS Institute Inc. of Cary, North Carolina) was used for the data analysis.

### Conclusions

This study found that the nutrition education program received by the family practice residency trained (FPRT) physicians did not significantly change the mean nutritional knowledge and mean practice scores from those of the hospital trained (HT) physicians. Also, it did not influence the FPRT physicians' level of initiation or indications for counselling, the aggressiveness of counselling sessions and the counselling skills over those of the comparison group. The program was found to have a significant positive impact on the nutritional opinions of FPRT physicians. The FPRT group reported significantly more favorable nutritional opinions toward primary prevention than the HT group.

The main purpose of residency training programs is to have an impact on physicians' practice behaviours. This study has demonstrated the need for an intensified effort in observing physicians' clinical behaviors through the monitoring of patient encounters and the provisions of appropriate feedback and reinforcement during the residency period. Nutrition knowledge testing is not a useful indicator for predicting the future counselling practices of physicians and should therefore be replaced by observational methods to evaluate the impact of the educational effort on practice patterns of graduates. Positively influencing the nutritional opinions of physicians is one step closer to

the desired goal of effecting behaviours, however it does not guarantee better practice behaviour.

Although it was impossible to test for a significant relationship between continuing education efforts and practice scores, the trend for higher scores with continuing education suggests that attempts should be made to attract physicians to attend nutrition workshops aimed at teaching practical and effective counselling skills. This study did not confirm the findings of previous studies that nutritional opinions and counselling practice scores decrease as number of years in practice increases. This may reflect the shorter length of time the study physicians were in practice compared to previous studies. A follow-up study of these physicians would be required to delineate the relationship between these variables and years in practice.

#### Limitations

In the light of certain limitations, the results of this study must be viewed with caution. The questionnaire used the self-report method with closed questions to gather the data. Personal interviews might have allowed for less restricted responses. The use of pseudo-patients or observational methods would have permitted evaluation of the quality of nutritional advice and materials used in counselling patients. This would have provided a better assessment of nutrition counselling



skills than the self-reporting of the general activities that physicians engaged in when counselling patients.

Since this is a retrospective study lacking a controlled environment and a longitudinal format, it could not establish with certainty cause and effect relationships. Therefore, aside from the nutrition program, there may be other factors which could influence the dependent variables. Despite the inability to establish cause and effect relationship with confidence, the results of this study were important in identifying existing differences and/or lack of differences in the behaviour or the status of the two physician groups toward nutrition.

Since the HT and FPRT programs differed in certain aspects, it was acknowledged that there were certain limitations and biases in using the non-equivalent groups to make comparisons. As mentioned in the Research Design, the HT and FPRT programs consisted of training experiences through a series of specialty services. The two groups, however, were not similar in terms of the length of the training periods. The residency program was a two year program. The minimum length of the hospital program was one year, though some may have chosen to rotate through additional hospital services before entering general practice. The argument might be made that, apart from the presence or the absence of a nutrition curriculum, the additional time the FPRT physicians spent in training may be responsible for any favorable differences in the study variables. This argument does not appear to be validated by past research. For instance, when physicians with any formal nutrition

education were compared to those with none, the former scored higher on both the knowledge and opinion tests. Furthermore, even when physicians view giving nutritional advice to patients as valuable, the majority of physicians do not practise preventive nutrition counselling. This provides some evidence to support the contention that unless physicians are taught preventive nutritional skills, they are unlikely to counsel their patients. Therefore, it seems improbable that the length of the training program itself would influence physician practices in nutrition.

Another point to raise is that there may have been a selection bias of physicians into the FPRT program. There is good reason to suspect that physicians who undertake a formal residency training program in family medicine have a different orientation toward family practice as compared to those who enter the hospital-based training program. In other words, nutrition is more likely to be viewed in a more positive light among residency trained physicians who are selected for a program where nutrition education is emphasized. However, since there are limited positions available in residency programs, and many more applicants than positions, the potential differences between the two groups would be diluted. The unsuccessful applicants would have either found placement in another specialty program or in the hospital-based training program.

Forty-three percent of the sample of residency trained physicians were females, whereas the hospital trained sample consisted of only 25 percent females. Since family practice residency programs are known to attract more female applicants, this was not an unusual

circumstance. In the literature, however, the gender of the physician has been reported to affect the dependent variables. Females have more favorable nutritional opinions and perform higher on nutrition counselling practice scores. Although matching procedures for sex were desirable, it was anticipated that its advantages would be outweighed by the reduction of sample size that would occur with this procedure.

### Recommendations

Physicians recognize the importance of acquiring nutrition counselling skills during their training (Gjerde & Sinnott, 1982). Basic nutritional principles should be taught, particularly during the residency training years, when they are most likely to be needed and applied in the clinical setting. Implications from this study for future curricula development in nutrition are listed below.

1. Since nutritional knowledge of a specific nature, such as food composition is often needed but rarely remembered by physicians, residents should be taught reliable sources of nutrition information and encouraged to read journal articles which focus on effective use of nutrition principles in patient care.
2. Since economic factors such as time and lack of financial reimbursement for nutrition counselling appear to be potential barriers to nutrition counselling, residents should be taught nutrition interventions which are limited to five minutes of

patient counselling time. Since it may be unrealistic to expect physicians to lengthen the duration of counselling sessions, having patients with nutrition related conditions return more frequently would have its benefits in reinforcing patient compliance to dietary modifications.

3. Since behaviour change through educational efforts is rarely achieved in the absence of feedback and intense monitoring of the behaviour, nutrition programs designed to impact on residents future practice patterns must be prepared to provide this experience to residents while in training.
4. Research indicates that the acquisition of new knowledge, skills and changes in attitude are insufficient to produce behaviour change. Reinforcement of the expected nutrition counselling skills must involve family practice faculty members who can provide individual monitoring and performance feedback. Faculty can act as positive role models for residents by demonstrating to them that nutrition is a part of the physician's examination, and how to use nutrition interventions in the care of patients.
5. Faculty members need to utilize clinical process measures such as chart audit and pseudo-patients to ensure that favorable changes in nutritional knowledge and counselling behaviours are occurring among residents.
6. Continuing medical education programs in nutrition that are

specifically targeted to family physicians should be available and attendance encouraged by those responsible for their organization.

7. Nutrition education of the physician should begin early in undergraduate medical training, since opinions toward nutrition formulated at this time are more resistant to change in subsequent years.

#### Research Recommendations

Process evaluation is needed to evaluate which teaching strategies are best suited to improving the counselling behaviours of physicians.

The evaluation of nutrition education programs for physicians should focus on the quality of physicians' counselling behaviours such as the nutritional advice provided and the source and type of educational materials utilized. Observational methods such as using pseudo-patients to assess physicians' nutrition counselling practices should be utilized more frequently rather than depending on knowledge testing for program evaluation.

More research is needed on the effects of continuing nutrition education in nutrition for maintaining and reinforcing the use of nutrition counselling skills learned by physicians during residency training.

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## Appendix A

### Nutrition Education Curriculum

Under the guidance of the dietitian in the family practice clinic, the family practice residency trained physicians participated in three nutrition education activities.

I. Bimonthly nutrition counselling seminars occurred on family medicine rotations. Each resident attended ten seminars over the two-year program. The seminars were two hours long and covered an extensive list of nutritional issues grouped into three distinct categories:

- (1) nutrition concerns related to specific stages of the life cycle,
- (2) nutrition and disease management, and
- (3) nutrition and alternate dietary practices (eg. vegetarianism).

The seminars involved small group teaching techniques and focused on case-oriented discussions about nutrition counselling within the patient/physician encounter. Discussions were generated around the questions typically encountered by the practising physician. These served to highlight the relevance of knowledge and skill in nutrition counselling. The dietitian directed attention to specific counselling strategies and approaches to patient education.

II. Direct patient counselling was the second teaching method included in the curriculum. It occurred as a shared responsibility of the resident and dietitian. Residents sought consultation with the dietitian, participated in the counselling, and saw their patients in follow-up appointments in conjunction with the dietitian. In doing so residents learned to apply acquired knowledge and counselling skills based on the patient's needs.

III. Group programs were conducted for diabetic, hypertensive and obese patients in the family medicine clinic. These served as a third approach to teaching the practical application of nutrition knowledge and counselling skills. The programs were conducted by the dietitian together with family practice residents and nursing staff. Each group session was planned to include topics relevant to the self-management of the condition. The program facilitated learning through group interaction. It allowed the resident to practice teaching techniques and to develop skills in answering patients' questions about concerns related to the disease.

Evaluation of each resident's progress was addressed formally through quarterly progress meetings with the dietitian. The evaluations were based on a record of initial and follow-up counselling sessions, nutrition seminar participation and the resident's involvement in group programs.

All FPRT physicians were given nutrition instruction by one of two registered dietitians with similar professional training and experience. Both dietitians had similar professional experience. All nutrition seminar topics, counselling guidelines, materials and resident evaluation criteria used by each dietitian were identical. Close collaboration between the dietitians occurred during the study period.

Appendix BNutrition Curriculum Educational Objectives

1. The resident shall, in all nutrition counselling sessions with prenatal patients:
  - (i) explain the role of nutrition in pregnancy,
  - (ii) assess the patient's diet,
  - (iii) instruct the patient on the types and quantities of foods required during pregnancy,
  - (iv) correctly prescribe nutritional supplements whenever indicated,
  - (v) assess the patient's pattern of weight gain and counsel the patient accordingly, and
  - (vi) provide dietary modifications to patients with digestive problems related to pregnancy.
  
2. The resident shall, in at least one nutrition counselling session with a parent of a well infant:

- (i) teach the parent the principles of infant feeding using currently recommended guidelines,
  - (ii) correctly prescribe nutritional supplements to infants whenever indicated,
  - (iii) counsel the parent on how to manage nutritional problems that might arise with infant feeding, and
  - (iv) counsel the parent against feeding practices which may lead to obesity or hypertension in later life.
3. The resident shall, in at least one nutrition counselling session with a diabetic patient:
- (i) counsel the patient on the role of diet in the treatment of diabetes,
  - (ii) demonstrate knowledge of the nutritional principles of a diabetic diet,
  - (iii) counsel the patient on the types and quantities of foods required to control blood sugar levels, and
  - (iv) demonstrate knowledge of the food choice system for diabetic diets.

4. The resident shall, in at least one nutrition counselling session with a hypertensive patient:

- (i) counsel the patient on the role of weight loss in the treatment of hypertension,
- (ii) demonstrate knowledge of the nutritional principles of a controlled sodium diet,
- (iii) counsel the patient on the role of sodium in the treatment of hypertension,
- (iv) demonstrate knowledge of high sodium foods to be avoided on a 3-5 gram (130-217 mmol) sodium diet,
- (v) demonstrate knowledge of suitable food substitutes for foods high in sodium content, and
- (vi) teach the patient to select a high potassium diet when prescribing a potassium wasting diuretic.



Appendix CPhysicians' Opinion, Knowledge and Counselling Practices Survey

The following questionnaire will be mailed to each subject in the study. The questionnaire is divided into four sections. Section A is concerned with physicians' attitude with respect to nutrition. Section B is the nutrition knowledge test. Section C is concerned with physicians' nutrition counselling practices, their sources of nutrition information and reasons for not counselling patients. Section D collects physicians' demographic and professional data.

For  
Computer Use  
Only

SECTION A - FAMILY PHYSICIANS OPINION SURVEY

Listed below are a variety of opinion statements on issues related to nutrition in pregnancy, infancy, diabetes, and hypertension. Indicate your agreement or disagreement with each statement. Check [✓] the one box that best describes your feelings about each statement.

	Agree	Disagree	Undecided	
It is important to encourage prenatal patients to drink 3-4 cups (750-1000 ml) of milk or milk equivalents daily.	1 [ ]	2 [ ]	3 [ ]	1-3 _____ 4 _____ 5 _____
Salt restriction is necessary for the majority of the pregnant population.	1 [ ]	2 [ ]	3 [ ]	6 _____
As long as the prenatal patient is gaining weight, I don't need to worry about what she is eating.	1 [ ]	2 [ ]	3 [ ]	7 _____
A 1800 kilocalorie (7500 kilojoule) diet is sufficient for the majority of adolescent prenatal patients.	1 [ ]	2 [ ]	3 [ ]	8 _____
It is important to prescribe a calcium supplement for a prenatal patient who cannot tolerate milk and milk products.	1 [ ]	2 [ ]	3 [ ]	9 _____
Women who conceive at more than 10% below desirable body weight require an evaluation of dietary habits early in pregnancy.	1 [ ]	2 [ ]	3 [ ]	10 _____
Many mothers are anxious to have their infants ingest solids as soon as possible and I feel that it is best to go along with this.	1 [ ]	2 [ ]	3 [ ]	11 _____

	Agree	Disagree	Undecided	
As long as a child is gaining weight I don't need to worry about his nutrition.	1 [ ]	2 [ ]	3 [ ]	12 _____
It is important to investigate the infant's dietary intake at each office visit.	1 [ ]	2 [ ]	3 [ ]	13 _____
A high sodium diet during infancy predisposes infants to hypertension in later life.	1 [ ]	2 [ ]	3 [ ]	14 _____
Time devoted to counselling parents on infant nutrition is time well invested.	1 [ ]	2 [ ]	3 [ ]	15 _____
Overfeeding infants may encourage the habit of overeating which is carried into later life.	1 [ ]	2 [ ]	3 [ ]	16 _____
It is important to advise diabetic patients to purchase foods found in the dietetic food section of a grocery store.	1 [ ]	2 [ ]	3 [ ]	17 _____
It is important to encourage diabetics to eat fresh, whole fruits rather than juices.	1 [ ]	2 [ ]	3 [ ]	18 _____
A diabetic can include alcohol in the diet.	1 [ ]	2 [ ]	3 [ ]	19 _____
It is important to investigate a diabetic's diet for fat content.	1 [ ]	2 [ ]	3 [ ]	20 _____
A diabetic diet is based on Canada's Food Guide.	1 [ ]	2 [ ]	3 [ ]	21 _____

	Agree	Disagree	Undecided	
It is important to attempt dietary control for the obese non-insulin diabetic before prescribing medication.	1 [ ]	2 [ ]	3 [ ]	22 _____
It is important to encourage a hypertensive patient to avoid high sodium foods and condiments.	1 [ ]	2 [ ]	3 [ ]	23 _____
A minimum weight loss of 10 pounds (4.5 kilograms) can significantly lower blood pressure in obese hypertensive patients.	1 [ ]	2 [ ]	3 [ ]	24 _____
Hypertensive patients on a controlled sodium diet can eat in fast food restaurants regularly.	1 [ ]	2 [ ]	3 [ ]	25 _____
To increase serum potassium levels one should prescribe a potassium supplement rather than encourage a high potassium diet.	1 [ ]	2 [ ]	3 [ ]	26 _____
Patients with a family history of high blood pressure should be cautioned against eating high sodium foods regularly.	1 [ ]	2 [ ]	3 [ ]	27 _____
I believe that an individual's taste for salt diminishes after following a controlled sodium diet.	1 [ ]	2 [ ]	3 [ ]	28 _____

Please proceed to Section B

SECTION B - FAMILY PHYSICIANS KNOWLEDGE QUESTIONNAIRE

Listed below are a variety of statements concerning nutrition and pregnancy, infancy, diabetes and hypertension. For each statement indicate whether it is a true or false statement. Check [] the appropriate box. If you are undecided, indicate this.

	True	False	Undecided	
The daily Recommended Nutrient Intake for calcium during pregnancy is 1200 mg.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	29_____
In most cases, the only nutrient supplements necessary during pregnancy are iron <u>and</u> folic acid.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	30_____
It is recommended that an obese woman limit her weight gain during pregnancy to under 15 pounds (6.8 kg).	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	31_____
A one-half cup (125 ml) serving of ice cream contains the calcium equivalent of 1 cup (250 ml) of 2% milk.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	32_____
Rolled oats would be a recommended source or dietary fiber for a pregnant woman with constipation.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	33_____
It is advisable to supplement the full-term breast fed infant with vitamin C within the first three months or life.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	34_____
It is recommended to add infant cereals to the diet of a breast or bottle fed infant before three months of age.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	35_____
Solids do not have any effect on the length of the baby's sleep periods.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	36_____
Bacon, wieners and luncheon meats are not recommended in an infant's diet particularly during the first year.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	37_____
An infant with acute diarrhea should be prescribed a "clear fluid" diet consisting of soft drinks, clear broth and apple juice.	1 [ <input type="checkbox"/> ]	2 [ <input type="checkbox"/> ]	3 [ <input type="checkbox"/> ]	38_____

Day-to-day consistency of the ratios of carbohydrate, protein, and fat for each meal is crucial for the insulin-dependent diabetic.

True      False      Undecided  
1 [ ]    2 [ ]    3 [ ]

39\_\_\_\_\_

A recommended snack for an insulin-dependent diabetic would be a glass of unsweetened juice.

1 [ ]    2 [ ]    3 [ ]

40\_\_\_\_\_

All vegetables are allowable in unlimited amounts on a diabetic diet.

1 [ ]    2 [ ]    3 [ ]

41\_\_\_\_\_

Combination dishes such as macaroni and cheese, stew and pizza should be avoided by diabetics.

1 [ ]    2 [ ]    3 [ ]

42\_\_\_\_\_

Peanut butter is allowed on a diabetic diet.

1 [ ]    2 [ ]    3 [ ]

43\_\_\_\_\_

For the person on a controlled sodium diet, a meal containing roast pork would contain less sodium than a meal containing corned beef.

1 [ ]    2 [ ]    3 [ ]

44\_\_\_\_\_

In order to follow a 3-5 gram (130-217 mmol) sodium diet, a hypertensive patient must eliminate salt in cooking as well as at the table.

1 [ ]    2 [ ]    3 [ ]

45\_\_\_\_\_

Onion and garlic powders would not be suitable spices for a patient on a controlled sodium diet.

1 [ ]    2 [ ]    3 [ ]

46\_\_\_\_\_

A 4-ounce glass (125 ml) of orange juice is a better source of potassium than a medium baked potato.

1 [ ]    2 [ ]    3 [ ]

47\_\_\_\_\_

Fresh or frozen vegetables are a better choice than canned for a hypertensive patient.

1 [ ]    2 [ ]    3 [ ]

48\_\_\_\_\_

It is recommended that hypertensive patients avoid eating luncheon meats.

1 [ ]    2 [ ]    3 [ ]

49\_\_\_\_\_

Please proceed to Section C

SECTION C - FAMILY PHYSICIANS PRACTICES

The following items are concerned with the nutrition counselling practices of family physicians. Indicate your response with a check [✓] in the appropriate box.

- Part A
- |   |  |         |
|---|--|---------|
| 1. Do you counsel prenatal patients on nutrition?   | 1 [ ] Yes→[Go directly to question 2]<br>2 [ ] No → [Turn the page to question 6]  | 50_____ |
| 2. How often do you bring up the subject of nutrition with prenatal patients?                                       | 1 [ ] Once during the pregnancy<br>2 [ ] Every few visits or so<br>3 [ ] Almost every visit<br>4 [ ] Everytime I see the patient.  | 51_____ |
| 3. On the average, how much time do you spend on the subject of nutrition during one visit with a prenatal patient? | 1 [ ] Up to 2 minutes<br>2 [ ] 2-5 minutes<br>3 [ ] 5-10 minutes<br>4 [ ] More than 10 minutes   | 52_____ |
| 4. When do you bring up the subject of nutrition with prenatal patients?  | 1 [ ] When the patient brings it up<br>2 [ ] When I feel the diet is immediately harmful<br>3 [ ] Even when there is no immediate health threat  | 53_____ |
| 5. How do you provide nutrition counselling to prenatal patients? [One or more boxes may be checked].               | 1 [ ] Explore the patient's feelings toward her diet during pregnancy<br>2 [ ] Assess the patient's diet<br>3 [ ] Suggest specific steps to take in making food choices<br>4 [ ] Present pamphlets or educational materials<br>5 [ ] Have a nutrition specialist (eg. dietitian, nutritionist, or home economist) counsel your patient<br>6 [ ] Have your nurse counsel your patient<br>7 [ ] Ask the patient to enlist the support of other family members in carrying out prenatal nutrition guidelines<br>8 [ ] Do something else (Please else specify) | 54_____ |
|   |  | 55_____ |
|   |  | 56_____ |
|   |  | 57_____ |
|   |  | 58_____ |
|   |  | 59_____ |
|   |  | 60_____ |
|   |  | 61_____ |

-----  
Please proceed to Part B

To be answered only if you responded NO to question 1.

6. Please check [✓] the factor(s) which may influence your decision not to provide nutrition counselling to prenatal patients.

- 1 [ ] Not convinced that diet is important
- 2 [ ] Patients are not interested
- 3 [ ] Lack of time to teach
- 4 [ ] Do not have the help of a nutrition specialist
- 5 [ ] Not sure what to recommend to the patient
- 6 [ ] Nutrition education is not my responsibility
- 7 [ ] Patient probably won't comply to the diet
- 8 [ ] Other (Please specify)

62 \_\_\_\_\_  
63 \_\_\_\_\_  
64 \_\_\_\_\_  
65 \_\_\_\_\_  
66 \_\_\_\_\_  
67 \_\_\_\_\_  
68 \_\_\_\_\_  
69 \_\_\_\_\_

Part B

7. Do you counsel parents of infants on nutrition? 1 [ ] Yes→[Go directly to question 8]  
2 [ ] No→[Turn the page to question 12]
8. How often do you bring up the subject of nutrition with parents of infants? 1 [ ] Rarely or occasionally  
2 [ ] Every few visits or so  
3 [ ] Almost every visit  
4 [ ] Everytime I see the patient
9. On the average, how much time do you spend on the subject of nutrition with parents of infants during a well baby check-up? 1 [ ] Up to 2 minutes  
2 [ ] 2-5 minutes  
3 [ ] 5-10 minutes  
4 [ ] More than 10 minutes
10. When do you bring up the subject of nutrition with parents of infants? 1 [ ] When the parent brings it up  
2 [ ] When I feel the diet is immediately harmful  
3 [ ] Even when there is no immediate health threat
11. How do you provide nutrition counselling to parents of infants? [One or more boxes may be checked]. 1 [ ] Explore the parent's feelings toward the infant's diet  
2 [ ] Assess the patient's diet  
3 [ ] Suggest specific steps to take in making food choices  
4 [ ] Present pamphlets or educational materials  
5 [ ] Have a nutrition specialist (eg. dietitian, nutritionist, or home economist) counsel the parent  
6 [ ] Have your nurse counsel the parent  
7 [ ] Ask the parent to enlist the support of other family members in carrying out infant nutrition guidelines  
8 [ ] Do something else (Please specify)

1-3 \_\_\_\_\_  
4 \_\_\_\_\_  
5 \_\_\_\_\_  
6 \_\_\_\_\_  
7 \_\_\_\_\_  
8 \_\_\_\_\_  
9 \_\_\_\_\_  
10 \_\_\_\_\_  
11 \_\_\_\_\_  
12 \_\_\_\_\_  
13 \_\_\_\_\_  
14 \_\_\_\_\_  
15 \_\_\_\_\_  
16 \_\_\_\_\_



To be answered only if you responded NO to question 7.

12. Please check [✓] the factor(s) which may influence your decision not to provide nutrition counselling to parents of infants.

- 1 [ ] Not convinced that diet is important
- 2 [ ] Parents of infants are not interested
- 3 [ ] Lack of time to teach
- 4 [ ] Do not have the help of a nutrition specialist
- 5 [ ] Not sure what to recommend to the parent
- 6 [ ] Nutrition education is not my responsibility
- 7 [ ] Parents probably won't comply to the diet
- 8 [ ] Other (Please specify)

17 \_\_\_\_\_  
18 \_\_\_\_\_  
19 \_\_\_\_\_  
20 \_\_\_\_\_  
21 \_\_\_\_\_  
22 \_\_\_\_\_  
23 \_\_\_\_\_  
24 \_\_\_\_\_

Part C

13. Do you counsel diabetic patients on nutrition?

- 1 [ ] Yes→[Go directly to question 14]
- 2 [ ] No→[Turn page to question 18]

25 \_\_\_\_\_

14. How often do you bring up the subject of nutrition with diabetic patients?

- 1 [ ] Rarely or occasionally
- 2 [ ] Every few visits or so
- 3 [ ] Almost every visit
- 4 [ ] Everytime I see the patient

26 \_\_\_\_\_

15. On the average, how much time do you spend on the subject of nutrition during one visit with a diabetic patient?

- 1 [ ] Up to 2 minutes
- 2 [ ] 2-5 minutes
- 3 [ ] 5-10 minutes
- 4 [ ] More than 10 minutes

27 \_\_\_\_\_

16. When do you bring up the subject of nutrition with diabetic patients?

- 1 [ ] When the patient brings it up
- 2 [ ] When I feel the diet is immediately harmful
- 3 [ ] Even when there is no immediate health threat

28 \_\_\_\_\_

17. How do you provide nutrition counselling to diabetic patients? [One or more boxes may be checked]

- 1 [ ] Explore the patient's feelings toward the diet
- 2 [ ] Assess the patient's diet
- 3 [ ] Suggest specific steps to take in making food choices
- 4 [ ] Present pamphlets or educational materials
- 5 [ ] Have a nutrition specialist (eg. dietitian, nutritionist, or home economist) counsel your patient
- 6 [ ] Have your nurse counsel your patient
- 7 [ ] Ask the patient to enlist the support of other family members in carrying out the diabetic diet
- 8 [ ] Do something else (Please specify)

29 \_\_\_\_\_

30 \_\_\_\_\_

31 \_\_\_\_\_

32 \_\_\_\_\_

33 \_\_\_\_\_

34 \_\_\_\_\_

35 \_\_\_\_\_

36 \_\_\_\_\_

-----  
Please proceed to Part D

To be answered only if you responded NO to question 13.

18. Please check [✓] the factor(s) which may influence your decision not to provide nutrition counselling to diabetic patients.

- |       |  |          |
|-------|--|----------|
| 1 [ ] | Not convinced that diet is important           | 37 _____ |
| 2 [ ] | Patients are not interested                    | 38 _____ |
| 3 [ ] | Lack of time to teach                          | 39 _____ |
| 4 [ ] | Do not have the help of a nutrition specialist | 40 _____ |
| 5 [ ] | Not sure what to recommend to the patient      | 41 _____ |
| 6 [ ] | Nutrition education is not my responsibility   | 42 _____ |
| 7 [ ] | Patient probably won't comply to the diet      | 43 _____ |
| 8 [ ] | Other (Please specify)                         | 44 _____ |
- 

Part D

- |   |   |          |
|---|---|----------|
| 19. Do you counsel <u>hypertensive patients</u> on nutrition?   | 1 [ ] Yes→[Go directly to question 20]  | 45 _____ |
|   | 2 [ ] No→[Turn the page to question 24]   |          |
| 20. How often do you bring up the subject of nutrition with <u>hypertensive patients?</u>                                       | 1 [ ] Rarely or occasionally  | 46 _____ |
|   | 2 [ ] Every few visits or so  |          |
|   | 3 [ ] Almost every visit  |          |
|   | 4 [ ] Everytime I see the patient   |          |
| 21. On the average, how much time do you spend on the subject of nutrition during one visit with a <u>hypertensive patient?</u> | 1 [ ] Up to 2 minutes   | 47 _____ |
|   | 2 [ ] 2-5 minutes   |          |
|   | 3 [ ] 5-10 minutes  |          |
|   | 4 [ ] More than 10 minutes  |          |
| 22. When do you bring up the subject of nutrition with <u>hypertensive patients?</u>  | 1 [ ] When the patient brings it up   | 48 _____ |
|   | 2 [ ] When I feel the diet is immediately harmful   |          |
|   | 3 [ ] Even when there is no immediate health threat   |          |
| 23. How do you provide nutrition counselling to <u>hypertensive patients?</u> [One or more boxes may be checked]                | 1 [ ] Explore the patient's feelings toward the diet  | 49 _____ |
|   | 2 [ ] Assess the patient's diet   | 50 _____ |
|   | 3 [ ] Suggest specific steps to take in making food choices   | 51 _____ |
|   | 4 [ ] Present pamphlets or educational materials  | 52 _____ |
|   | 5 [ ] Have a nutrition specialist (eg. dietitian, nutritionist, or home economist) counsel your patient | 53 _____ |
|   | 6 [ ] Have your nurse counsel your patient  | 54 _____ |
|   | 7 [ ] Ask the patient to enlist the support of other family members in carrying out the diet.           | 55 _____ |
|   | 8 [ ] Do something else (Please specify)  | 56 _____ |
-

To be answered only if you responded NO to question 19

24. Please check [✓] the factor(s) which may influence your decision not to provide nutrition counselling to hypertensive patients.

- 1 [ ] Not convinced that diet is important
- 2 [ ] Patients are not interested
- 3 [ ] Lack of time to teach
- 4 [ ] Do not have the help of a nutrition specialist
- 5 [ ] Not sure what to recommend to the patient
- 6 [ ] Nutrition education is not my responsibility
- 7 [ ] Patient probably won't comply to the diet
- 8 [ ] Other (Please specify)

57 \_\_\_\_\_  
58 \_\_\_\_\_  
59 \_\_\_\_\_  
60 \_\_\_\_\_  
61 \_\_\_\_\_  
62 \_\_\_\_\_  
63 \_\_\_\_\_  
64 \_\_\_\_\_

25. Please check [✓] the major sources that you personally use for nutrition information. Check no more than 5 sources that you use most often.

- 1 [ ] Professional journals
- 2 [ ] Professional news letters/bulletins
- 3 [ ] Government publications
- 4 [ ] Food and drug manufacturers publications
- 5 [ ] Films, tapes (audio and video)
- 6 [ ] Health agency publications
- 7 [ ] Radio, T.V., newspapers
- 8 [ ] Courses, seminars
- 9 [ ] Professional meetings
- 10 [ ] Popular magazines
- 11 [ ] Communication with a dietitian-nutritionist
- 12 [ ] Other, (Please specify)

65 \_\_\_\_\_  
66 \_\_\_\_\_  
67 \_\_\_\_\_  
68 \_\_\_\_\_  
69 \_\_\_\_\_  
70 \_\_\_\_\_  
71 \_\_\_\_\_  
72 \_\_\_\_\_  
73 \_\_\_\_\_  
74 \_\_\_\_\_  
75 \_\_\_\_\_  
76 \_\_\_\_\_

SECTION D - FAMILY PHYSICIANS PROFILE

Please check [✓] the appropriate box for each of the following items.

- Sex
- 1 [ ] Male
  - 2 [ ] Female
- Years in practice
- 1 [ ] less than one year
  - 2 [ ] 1 - 2 years
  - 3 [ ] 3 - 4 years
  - 4 [ ] 5 - 6 years
  - 5 [ ] 7 - 8 years
- Type or nutrition instruction in medical school
- 1 [ ] a formal course in nutrition
  - 2 [ ] integrated with other courses
  - 3 [ ] no formal nutrition instructions
  - 4 [ ] Other (Please specify)-----

1-3 \_\_\_\_\_  
4 \_\_\_\_\_  
5 \_\_\_\_\_  
6 \_\_\_\_\_  
7 \_\_\_\_\_

Post graduate medical education 1 [ ] University of Manitoba Family Practice Residency Training program 8 \_\_\_\_\_  
 2 [ ] Other Family Practice Residency Training Program 9 \_\_\_\_\_  
 3 [ ] A mixed/rotating internship 10 \_\_\_\_\_  
 4 [ ] Other (Please specify)----- 11 \_\_\_\_\_

Certification in family practice 1 [ ] Yes 12 \_\_\_\_\_  
 2 [ ] No

Type of nutrition education during internship/residency program 1 [ ] Ongoing nutrition program given given by a nutritionist-dietitian 13 \_\_\_\_\_  
 2 [ ] Occasional lecture by a nutritionist-dietitian  
 3 [ ] Informal interaction with nutritionist-dietitian in context of patient care  
 4 [ ] Minimal or no nutrition instruction  
 5 [ ] Other (Please specify)-----

Type of continuing medical education in nutrition while in practice 1 [ ] Post secondary course in nutrition 14 \_\_\_\_\_  
 2 [ ] Seminar, conferences with nutrition as a topic (Please specify)-----  
 3 [ ] No continuing education in nutrition  
 4 [ ] Other, ( Please specify)-----

Describe the area in which you practice 1 [ ] Metropolitan (greater than 500,000) 15 \_\_\_\_\_  
 2 [ ] Urban (greater than 25,000 but less than 500,000)  
 3 [ ] Rural (less than 25,000)

Estimate the number of the following patients you see in an average week. Check [√] the appropriate boxes.

	0	1-4	5 or more	
Prenatal Patients	1 [ ]	2 [ ]	3 [ ]	16 _____
Infants (birth- 1 year)	1 [ ]	2 [ ]	3 [ ]	17 _____
Diabetes	1 [ ]	2 [ ]	3 [ ]	18 _____
Hypertensive	1 [ ]	2 [ ]	3 [ ]	19 _____

Thank you for your cooperation in this study.

Appendix DNutritional Concepts Used for Knowledge and Attitude TestingNutritional Concept

- Meal Planning - Planning meals using a variety of foods according to Canada's Food Guide assists in ensuring nutritional adequacy of food intake.
- Recommended Nutrient Intake (RNI) - The RNI for Canadians defines recommended daily nutrient intakes for healthy people at specific age levels.
- Vitamin and Mineral Food Sources - Significant food sources of vitamins and minerals are useful in the prevention and treatment of specific diseases.
- Prenatal Nutrition - The nutritional status of the mother influences the health of the fetus. Nutrient and energy requirements increase during pregnancy. The pattern of weight gain will indicate the need for nutrition counselling.

- Infant Nutrition - Infant feeding methods affect the nutritional status and health of the infant. The infant's food intake should meet nutrient needs and suit the infant's stage of development.
- Diabetes - Foods containing carbohydrate must be controlled in both type and quantity in the treatment of diabetes. Significant sources of dietary fibre are useful in the treatment of diabetes.
- Hypertension - Foods containing high amounts of sodium should be controlled for the prevention and treatment of hypertension.

Appendix ECover Letter

Each mailed questionnaire will begin with the following cover letter. It will be typed on paper with the official letterhead of the University of Manitoba, Department of Family Medicine. Each letter will be individually signed by the principal researcher and the department head of Family Medicine.



THE UNIVERSITY OF MANITOBA

FACULTY OF MEDICINE  
Office of Student Affairs

S207 — 750 Bannatyne Avenue  
Winnipeg, Manitoba  
Canada R3E 0W3

(204) 788-6499

1985 September 1

Dear

Many recent studies support the fact that today's patient is nutrition conscious. Patients commonly look to their family physician for reliable nutritional advice. Therefore, you are in a unique position to provide your patient with accurate guidance. This is particularly true in the areas of prenatal and infant care. The care of hypertensive and diabetic patients affords you further opportunity to offer nutritional guidance.

With this in mind, the attached questionnaire has been developed to study the nutritional opinions, knowledge and practices of family physicians. We would appreciate your assistance in collecting this information. Your identity will be kept confidential. Only group data will be analyzed. The research results will be used to plan continuing medical education programs in nutrition for family physicians.


Please take time out to tell us what you think about nutrition in patient care. The questionnaire will take approximately 15 minutes to complete.

We realize that your time is valuable. To express our appreciation for your assistance a complimentary pocket-size "Nutrition Reference Book" will be sent to you.

It would be appreciated if the completed questionnaire could be returned in the stamped, self-addressed envelope by September 15, 1985.

We sincerely thank you for your cooperation.

Yours sincerely,





Appendix FResults of the Knowledge Test

The following pages list each item on the knowledge test, the percent correct answers achieved by the study physicians and the mean scores obtained by each physician group.

Percent Correct Answers and Mean Scores on the Knowledge  
Test According to Physician Group

<u>Question</u>	<u>% Correct</u>	<u>Mean Scores</u>	
		<u>FPRT</u>	<u>HT</u>
The daily Recommended Nutrient Intake for calcium during pregnancy is 1200 mg.	60	0.71	0.49
In most cases, the only nutrient supplements necessary during pregnancy are iron <u>and</u> folic acid.	85	0.87	0.84
It is recommended that an obese woman limit her weight gain during pregnancy to under 15 pounds (6.8 kg).	78	0.84	0.70

A one-half cup (125 ml) serving of ice cream contains the calcium equivalent of 1 cup (250 ml) of 2% milk.	34	0.29	0.40
Rolled oats would be a recommended source of dietary fiber for a pregnant woman with constipation.	66	0.62	0.70
It is advisable to supplement the full-term breast fed infant with vitamin C within the first three months of life.	55	0.60	0.51
It is recommended to add infant cereals to the diet of a breast or bottle fed infant before three months of age.	97	1.00	0.93
Solids do not have any effect on the length of the baby's sleep periods.	51	0.47	0.53
Bacon, wieners and luncheon meats are not recommended in an infant's			

diet particularly during the first year.	97	0.98	0.98
An infant with acute diarrhea should be prescribed a "clear fluid" diet consisting of soft drinks, clear broth and apple juice.	19	0.18	0.21
Day-to-day consistency of the ratios of carbohydrate, protein, and fat for each meal is crucial for the insulin-dependent diabetic.	87	0.91	0.81
A recommended snack for an insulin-dependent diabetic would be a glass of unsweetened juice.	61	0.67	0.53
All vegetables are allowable in unlimited amounts on a diabetic diet.	75	0.78	0.72

Combination dishes such as macaroni and cheese, stew and pizza should be avoided by diabetics.	75	0.73	0.77
Peanut butter is allowed on a diabetic diet.	91	0.91	0.91
For the person on a controlled sodium diet, a meal containing roast pork would contain less sodium than a meal containing corned beef.	75	0.82	0.67
In order to follow a 3-5 gram (130-217 mmol) sodium diet, a hypertensive patient must eliminate salt cooking as well as at the table.	66	0.64	0.67
Onion and garlic powders would <u>not</u> be suitable spices for a patient on a controlled sodium diet.	61	0.55	0.67
A 4-ounce glass (125 ml) of orange juice is a better source of potassium than a medium baked potato.	39	0.42	0.37

Fresh or frozen vegetables are a better choice than canned for a hypertensive patient.

100 1.00 1.00

It is recommended that hypertensive patients avoid eating luncheon meats.

93 0.98 0.88

Appendix GResults of the Opinion Survey

The following pages list each item on the opinion survey, the percent favorable responses achieved by the study physicians, and the mean scores obtained by each physician group.

Percent Favorable Responses and Mean Scores on the  
Opinion Survey According to Physician Group

<u>Question</u>	<u>% Favorable Responses</u>	<u>Mean Scores</u>	
		<u>FPRT</u>	<u>HT</u>
It is important to encourage prenatal patients to drink 3-4 cups (750-1000 ml) of milk or milk equivalents daily.	90	0.86	0.85
Salt restriction is necessary for the majority of the pregnant population.	93	0.91	0.90
As long as the prenatal patient is gaining weight, I don't			

need to worry about what she is eating.	99	1.00	0.95
A 1800 kilocalorie (7500 kilojoule) diet is sufficient for the majority of adolescent prenatal patients.	84	0.77	0.85*
It is important to prescribe a calcium supplement for a prenatal patient who cannot tolerate milk and milk products.	88	0.86*	0.76
Women who conceive at more than 10% below desirable body weight require an evaluation of dietary habits early in pregnancy.	89	1.00*	0.89
Many mothers are anxious to have their infants ingest solids as soon as possible and I feel that it is best to go along with this.	100	1.00	1.00
As long as a child is gaining weight I don't need to worry about his nutrition.	100	1.00	1.00

It is important to investigate the infant's dietary intake at each office visit.	88	0.86*	0.80
A high sodium diet during infancy could predispose infants to hypertension in later life.	19	0.05*	0.40
Time devoted to counselling parents on infant nutrition is time well invested.	97	1.00	1.00
Overfeeding infants may encourage the habit of overeating which is carried into later life.	85	0.91*	0.79
It is important to advise diabetic patients to purchase foods found in the dietetic food section of a grocery store.	81	0.80	0.79
It is important to encourage diabetics to eat fresh, whole fruits rather than juices.	80	0.81*	0.72



A diabetic can include alcohol in the diet.	71	0.57*	0.45
It is important to investigate a diabetic's diet for fat content.	84	0.90*	0.84
A diabetic diet is based on Canada's Food Guide.	69	0.69*	0.50
It is important to attempt dietary control for the obese non-insulin diabetic before prescribing medication.	98	0.96	0.95
It is important to encourage a hypertensive patient to avoid high sodium foods and condiments.	98	1.00	1.00
A minimum weight loss of 10 pounds (4.5 kilograms) can significantly lower blood pressure in obese hypertensive patients.	81	0.76	0.79*
Hypertensive patients on a controlled sodium diet can eat in fast food restaurants regularly.	92	0.95	0.95

To increase serum potassium levels one should prescribe a potassium supplement rather than encourage a high potassium diet.	89	0.90	1.00*
Patients with a family history of high blood pressure should be cautioned against eating high sodium foods regularly.	87	0.95*	0.85
I believe that an individual's taste for salt diminishes after following a controlled sodium diet.	80	1.00*	0.89

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\*Indicates more favorable opinion for the physician group.