THE STUDY OF THE NON-PRESCRIPTION VITAMIN GIVING BEHAVIORS OF MOTHERS OF PRESCHOOL AND SCHOOL AGED CHILDREN

by

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TABLE OF CONTENTS

CHAPTER PAGE

List of Tables

CHAPTER I

INTRODUCTION

In recent years, Americans have become increasingly conscious of the significance of nutrition and health. Consumers are deluged with information concerning foods, diets, additives and vitamins to the point that it is often difficult for the average citizen to separate fact from fiction. Nutrition misinformation has emerged from many sources, some accidental and some intentional. The increased receptiveness and consciousness of the public in regard to nutrition and health has provided an opportunity for the proliferation of such practices and fads as vegetarianism, the use of organic or natural foods, health foods, and a mystical belief in vitamin pills and potions.

While some consumers may be occasional purchasers of certain products, many are wholehearted believers in the mysticism surrounding the health food subject. There has been a proliferation of health food stores and publications promoting health foods and vitamins. The dramatic rise in the manufacture and use of vitamin and mineral supplements in the United States has been documented over the past twenty-five years (Statistical Abstract of the United States, 1973).

Many parents, in their desire to keep their family healthy or "extra healthy," are giving their children vitamin or megavitamin supplements. In contrast, pediatric health care providers advise parents that vitamin supplements are unnecessary for healthy children eating a normal diet. Vitamin supplements which are given to children after infancy are almost always unnecessary, costly, and may expose the child to a significant risk of vitamin overdosage. The consistent opinion of the Committee on

Nutrition of the American Academy of Pediatrics (1977) has been that normal children receiving a well-balanced diet do not need vitamin supplements in excess of Recommended Dietary Allowances (RDA).

Statement of the Problem

The belief that vitamin supplements are necessary for superior health and freedom from disease is stressed by health food groups and popular writers. Individuals consume self-prescribed vitamin supplements either to make up for what they feel they may not be getting in their diet, or because of certain magical qualities they attribute to vitamins (Cook & Payne, 1979). To this date there is no conclusive evidence to support the claims that extra amounts of vitamins are beneficial.

Most, if not all physicians, nutritionists, and nurses agree that healthy American children consuming a well-balanced diet will maintain a positive state of health and that the vitamins contained in the diet are adequate (American Medical Association, 1977; Fleischman & Finberg, 1977; Kuhn & Fisher, 1979; Johnston, 1977; National Dairy Council, 1972; Dipalma, 1978).

However, the use of non-prescriptive vitamins is commonplace. Guthrie (1979) notes that most non-prescription vitamin supplements given to children do not contain iron. The widespread use of vitamin supplements is assumed to be the result of cultural attitudes, conflicting and changing scientific research, and most importantly, the immense power of the advertising industry. Often, advertising relates vitamin giving to quality of mothering. Many mothers who give vitamin supplements have an unrealistic concept of the amount of food the child needs at different ages. They often do not know that rate of growth and caloric requirements vary from child to child or from age to age. If their child is not eating enough in their opinion, they believe their child needs vitamin supplements.

Information exists in the literature concerning the effect of the mothers' attitudes and beliefs upon utilization of pediatric services, compliance, and other health behaviors. Limited documentation was found concerning vitamin supplement usage in children or the relationship between mothers' health beliefs and vitamin supplement usage. This study examines the extent to which self-prescribed vitamin supplements are given to healthy children. In addition, it seeks to determine if personal and social factors,and health attitudes influence mothers in making their decision to give vitamin supplements in spite of the instructions of health care providers that they are unnecessary. Questions of special interest are: (1) Who or what influences the mother's decision to give or not give vitamin supplements? (2) Is there a danger of vitamin overdosage? (3) What do mothers believe health care professionals tell them about vitamins? (4) What are the effects of mothers' socio-economic, marital and employment status on their administration of vitamin supplements to their child? and (5) What are the effects of the child's sex and birth order on the mothers' administration of vitamin supplements?

Review of the Literature

Current recommendations for vitamin and mineral supplements in infancy are controversial. It is generally agreed that the breast fed infant (also the infant fed commercially prepared formula or evaporated milk formula) should receive supplements of iron, vitamin D and fluoride, while the infant fed commercially prepared iron fortified formula requires no supplements, except fluoride (Foman, 1979). It is further agreed that an iron fortified, dry infant cereal should be started between five and six months of age and fed daily (Foman, 1979). By about 18 months of age, infants should be eating foods representative of the four basic groups and vitamin supplements should not be necessary for the healthy child receiving a well-balanced diet (Guthrie, 1979).

Fluoride supplementation is recommended for the improvement of dental health until twelve years of age (Eiger, 1978). Iron is now the most common nutritional deficiency in the United States (Eiger, 1978) and is most frequently seen in infants and adolescent females. If iron deficiency or anemia is discovered, supplements are prescribed for a short period of time, along with increased intake of iron rich foods until the iron stores are replenished.

This study examines non-prescription vitamin supplementation for preschool and school aged children. Use of fluoride, a prescription drug, iron and other trace elements are not the focus of this study and will not be discussed directly. The review of the literature will be presented under the following headings: vitamins, Recommended Dietary Allowances (RDA), significant nutritional surveys, megavitamin supplements, recommendations for vitamin supplements in pediatrics, health practices and beliefs, and mothers' health beliefs and practices.

Vitamins

Vitamins may be defined as organic compounds different from minerals and trace elements, which are needed in the diet only in small amounts but which are essential for normal growth and the maintenance of health (Bogart, 1966). They are required for normal metabolism of amino acids, fat and carbohydrate to produce energy and synthesize tissue, enzymes, hormones and other compounds. Some of the vitamins act as coenzymes and participate as components of enzymatic reactions (Pipes, 1977).

Bogart (1966) explains the mode of action of vitamins as follows: when a vitamin is absorbed, it is converted in the cell to a coenzyme form (if it is not already in that form). Within the cell, it attaches to an apoenzyme, which is a protein synthesized within the cell. This combination of apoenzyme and coenzyme make up a holoenzyme. This enzyme catalyzes certain specific metabolic reactions which are the vitamin's function. Some of the vitamins are catabolized to varying degrees in the body and others are not.

Metabolic research has found that the apoenzymes for all vitamins are saturated at RDA levels or less. The maximum capacity of any cell to synthesize apoenzyme is limited and any extra coenzyme entering into the cell cannot serve its vitamin function because it is unable to bind to apoenzyme and is therefore excreted or stored in the body.

With few exceptions, vitamins are not synthesized in the body and must be furnished from exogenous sources. A lack of vitamins or the inability of the body to absorb or metabolize the vitamin properly results in the clinical manifestations associated with specific vitamin deficiencies. The vitamins have been classified according to their solubility in lipids and water.

Lipid-soluble vitamins to some degree require the presence of bile salts, fats, and, for vitamin A, pancreatic lipase in the intestine for absorption (Kuhn & Fisher, 1977). Children with malabsorptive syndromes or inherited abnormalities may require supplementation of large doses of specific vitamins from this group (Hodges, 1980). Intakes in excess of body requirements of the lipid-soluble vitamins are stored in the liver with only minimal renal excretion. Hence, if the lipid-soluble vitamins are consumed in excess amounts, toxic manifestations may result. Deficiencies in time of deprivation are slower to develop and are also slower to respond to therapy.

With the exception of vitamin B_{12}, the water-soluble vitamins are not stored in the body in appreciable amounts. A daily dietary supply is usually essential to avoid depletion.

Thirteen vitamins have been identified as being essential for human nutritional requirements (Mark, 1975). They are: vitamin A (retinol and provitamin A), biotin, cobalamin (vitamin B_{12}), folacin, niacin (nicotinic acid), pantothenic acid, pyridoxine (vitamin B_6), riboflavin, thiamine (vitamin B_1), ascorbic acid (vitamin C), vitamin D (D_2-activated calciferol; D_3-activated dehydrocholesterol), vitamin E (a-tocopherol acetate) and vitamin K (naphthoquinones). An accepted listing of vitamins, their characteristics, biochemical action, effects of deficiency and excess, recommended daily intake and food sources appears in Appendix D.

<u>Recommended Dietary Allowances</u>

Because daily nutritional requirements cannot be accurately established the term Recommended Dietary Allowances (RDA) is used to designate the nutritional values prepared by the Committee on Dietary Allowances, Food and Nutrition Board, under the direction of the National Academy of Sciences-National Research Council (Food and Nutrition Board, 1974). The RDA are intended to serve as general guidelines suggesting the recommended amounts of nutrients that should be consumed daily for the maintenance of health. Except for calories, the recommended allowances are all in excess of amounts actually needed for most people (Forbes, 1978). Individual requirements may vary depending on such factors as age, sex, muscle mass, genetic makeup, level of activity and nutrient stores.

The requirement estimates are derived from limited information. Since it is not ethical to use human subjects for experimentation, in most cases information is obtained from studying other mammals, food analysis and dietary surveys (Food and Nutrition Board, 1974).

In an effort to remain current, the RDA are revised every five years. Changes in the ninth revision (1979) are minimal (Bieri, 1980). Controversy continues over the lack of direct experimental evidence as rationale for the allowances for vitamins. Most of the values for children are still extrapolated from adult vitamin requirements. Added to the latest revision is a special section on the potential danger from excessive intakes of several vitamins and re-evaluation of safe limits.

Minimal or no changes were made in the recommendations for vitamins A, niacin, folacin, pyridoxine, or vitamin D. The committee did not change the allowances for vitamin E despite the multiple claims for beneficial effects of vitamin E supplements. Ascorbic acid was the only vitamin change recommended. This controversial vitamin was returned to the previous adult ascorbic acid level of 60 mg. Nutritionists at the conference made the allowance higher because ascorbic acid is relatively abundant and easily obtained in the United States food supply and recent evidence has shown that the amount of ascorbic acid in a meal may affect the utilization of non-heme iron (Bieri, 1980).

The minor changes made with each revision have little effect on meal planning or food consumption for which the RDA were originally intended (Food and Nutrition Board, 1974). The RDA should not be confused with the United States Recommended Daily Allowances (U.S. RDA) found on prepared foods and vitamin supplements. The U.S. RDA was formulated by the United States Food and Drug Administration and replaced the term "minimal daily requirements". The U.S. RDA values are generally the highest values of each age group taken from the RDA for the specific vitamins and minerals. The Recommended Daily Allowances, 1974 revision, appear in Appendix E.

Nutritional Surveys

Three national nutritional surveys have been conducted in the United States within the last fifteen years that have significant findings for this study. In 1967, Congress directed the Department of Health, Education, and Welfare to survey and identify the prevalence, magnitude and distribution of malnutrition and related health problems in the United States. This directive resulted in the Ten-State Nutrition Survey. The ten states were selected on the basis of the availability of trained manpower to conduct such a survey, of being representative of the major geographical areas of the country, and the economic, ethnic and socio-economic composition of the population. This survey was accomplished through contacts with state health departments and university schools of medicine. Because of limitations on time and money, the survey was limited to ten states and was not a national study as originally intended.

The survey had financial and sampling difficulties. Income groups were selected and sampled according to the 1960 Census. However, families had moved and some previously identified income groups were not living in the same areas. As a result, the sample studied was not representative of the entire population within a state or of the nation and the findings could not be extrapolated and generalized. (U.S.

Department of H.E.W., 1972). The survey was further weakened because of lack of control in training the large numbers of team members collecting data.

The survey collected general demographic, dietary-intake, clinical and anthropometric, dental, and biochemical data from approximately 30,000 families. Demographic data were obtained on 24,000 families containing over 86,000 persons. Selected subgroups received more detailed biochemical and dietary evaluations. These subgroups consisted of infants and children, adolescents, pregnant women and the elderly.

The largest percentages of persons in the sample were white, the next largest blacks, and the smallest percentage was Spanish-American. More than half of the families sampled lived at "above poverty levels" expressed in terms of a Poverty Income Ratio (U.S. Dept. of H.E.W., 1972).

Though the survey did not meet original expectations, it did yield significant findings. Iron deficiency was found to be prevalent among all ages and income ranges while nutritional deficiencies, when present, were more prevalent in the low-income ratio states. Income was a major determinant of nutritional status, but social, cultural and geographic differences also affected nutrition (U.S. Dept. of H.E.W., 1972). Adolescents had the highest prevalence of unsatisfactory nutritional status, while the elderly had the second highest prevalence.

The educational level of the person preparing meals was related to the nutritional status of children under age 17. As the homemaker's educational level increased, the evidence of nutritional deficiencies decreased. However, these findings could not be directly attributed to education since other factors, such as income status, are associated with number of years of school completed. The survey found that most people had money available for food but made poor food choices, especially regarding iron rich foods.

Vitamin A was the most common dietary deficiency found in the low income ratio states, mainly among Mexican-Americans in Texas. Riboflavin was found to be low in poor blacks. Deficiencies in ascorbic acid and other nutrients were not a problem. Obesity among all age groups was prevalent.

The Preschool Nutrition Survey (Owen, Kram, Garry, Lowe & Lubin, 1974) was conducted to provide descriptive data on the nutritional status of preschool children in the United States. It was hoped this survey would be more accurate than the Ten-State Survey, while at the same time it would focus only on preschool children. The Survey Research Center, University of Michigan, selected the 74 sample areas throughout the country. All interviews were conducted by 15 dietary specialists who collected dietary and family composition information. Descriptions of exact foods were noted including brand names, recipes for homemade foods and amounts of foods eaten. In addition, information on the use of vitamins and mineral supplements was collected.

Between November 1968 and December 1970, nursing teams and physicians examined children at clinics. They obtained medical histories and clinical, anthropometric, dental and biochemical data. In the sample areas there were approximately 5,300 children between one and six years of age eligible for participation in the study. Thirty-five percent of these children did not participate in the study. Of the eligible children in the total sample, complete information was gathered on about 40% and dietary and questionnaire information on 65%. No other national nutritional study has obtained the reliability or accuracy of the data collected in this large a sample (Owen et al., 1974). Similar findings had been reported in the pilot study of the nutritional status of Mississippi preschool children (Owen, Garry, Kram, Nelsen & Montalvo, 1969).

Findings from this study were similar to the Ten-State Survey in that the majority of preschool children were receiving adequate nutrients, and iron deficiencies were more common in children from the lowest socioeconomic level. The major nutritional problem was insufficient amounts of food among children of lower socioeconomic status rather than insufficient nutrients in the foods they received (Owen et al., 1974). The study showed that many preschool children were receiving vitamin supplements even though their dietary intake was adequate. It also showed that the percentage of children using supplements tended to increase as socioeconomic status improved. Of 1,731 children receiving vitamin supplements, 486 received preparations containing iron and 15 received calcium supplements (Owen et al., 1974). Owen et al. state that it was likely that most children on these supplements had vitamin intakes that were twice the RDA and that they were excreting large amounts of water-soluble vitamins in their urine.

Both of these national surveys show that the nutritional quality of children's diets are generally adequate in all areas except iron, and that adequacy of diet does not always correlate closely with socioeconomic status. Among the very poor, it is the lack of sufficient quantities and poor food choices that cause problems.

The third significant study, the Health and Nutrition Examination Survey (HANES) was conducted by the National Center for Health Statistics between April 1971 and June 1974 (U.S. Dept. of H.E.W., 1977). Data were collected on 28,043 persons examined at 65 locations. This was the first program to use a scientifically designed sample, representative of the U.S. population from 1-74 years of age, in collecting measures on nutritional status. The sample was designed, and the interviewing and home visits were carried out by the U.S. Bureau of the Census. Nutritional status was assessed by dietary intakes, biochemical, clinical and anthropometric measures. Teams of paraprofessional and professional examiners traveled to the various locations to interview and examine subjects. The data from this health survey showed that almost all nutrients were at or above RDA levels in children except iron (U.S. Dept. of H.E.W., 1972).

The above studies indicate that among the majority of children in the United States, nutrient intake meets or exceeds the RDA in all areas except iron. Guthrie (1979) in her analysis of the three nation-wide surveys asserts that nutrient intake exceeds the RDA in all areas except iron and calcium. Further, she states that for preschool children, the most serious deficiency is lack of iron, with 20 to 30% of children ingesting less than the RDA. Guthrie points out that calcium deficiencies show up in 10 to 15% of children aged two to six years, probably because of a decrease in milk consumption when solid foods become the main source of nutrients.

Several international studies have been undertaken to evaluate the nutrient intakes of males and females of different ages and income groups. A nutrient intake and food consumption survey conducted in Canada between 1970-72 reported findings similar to those of the United States (Myres & Kroetsch, 1978). When income had an adverse effect on nutrient intake in Canada, it was more evident in adults (Canadian Dept. of National Health and Welfare, 1975). A study in Sweden of 1,410 children aged 4, 8 and 13 years reported that nutrient intake met or exceeded that country's recommended allowances with the exception of iron and vitamin D. Another Swedish study demonstrated that socioeconomic conditions, especially the educational level of parents, were correlated to the frequency of the child's consumption of certain foods (Samuelson, 1974).

In the United States, the influence of socioeconomic status on the adequacy of nutrient intake for children has yielded differing results. A study of 104 preschool children showed that employment of the mother made no significant difference in the quality of her children's food intake (Matheny, Hunt, Patton & Heye, 1962). A second study of the diets of 2,000 preschool children in the North Central Region showed that the amount of money spent on food was more important than the income or education in influencing the intakes of calcium or iron (Fox, Fryer, Lamkin, Vivian & Eppwright, 1971). Another study in the United States found that the mean intake of all nutrients met or exceeded RDA levels for all socioeconomic groups (Sims & Morris, 1974).

Studies have generally failed to demonstrate a strong correlation between income and percentage of children who are deficient in two or more nutrients. The studies suggest that only at the very bottom of the socioeconomic scale are lack of funds the dominant factor in determining nutritional deficiency. It is likely that it is the overall family and individual lifestyle which reflects, among other things, a whole series of attitudes towards and knowledge about food and vitamins, that are important determinants of nutritional consumption.

Megavitamin Supplements

Large doses of vitamin supplements are seldom needed. There are certain clinical syndromes which are corrected or alleviated by large doses of specific vitamins. These may be differentiated into two major groups: malabsorptive syndromes, and some of the "inborn errors of metabolism". In such syndromes large doses of vitamins are indicated.

Recently, there has been an alarming trend for health conscious consumers to use vitamin supplements above the recommended levels. The most serious problem with food faddism is the fact that the consumer is inclined to be his own diagnostician and physician (McBean & Speckman, 1974). Prominent nutritionists have pointed out that information published by some popular authors is not in accord with scientific knowledge (Darden, 1972). Many of these popular authors recommend extra-dietary supplements in doses of over five times the RDA levels (Davis, 1970).

It is well known that excessive intake of preformed vitamin A ingested over time can cause serious and potentially toxic effects. Ingestion of as little as 25,000 to 50,000 International Units (I.U.) of vitamin A per day for a period of 30 days can induce signs of increased intracranial pressure (American Academy of Pediatrics, 1971). The Federal Food and Drug Administration has limited the dosage of vitamin A preparations sold over the counter and do not recommend vitamin A supplementation over 6,000 I.U. per dose.

Because of its abundant availability, vitamin A deficiency is extremely rare in the United States unless a fat absorption problem exists (Fleishman & Finley, 1977). Excess amounts of vitamin A can cause acute toxicity with effects of hair loss, anorexia, irritability, severe headaches, diplopia, tinnitus, desquamation of the skin and increased intracranial pressure. Cases of increased intracranial pressure from vitamin A toxicity are well documented (Joseph, 1944; Marie & See, 1954; Braun, 1962; Pasquariello, Schut and Borns, 1973).

Large doses of vitamin D (10,000 to 20,000 I.U.) administered to children for prolonged periods can result in toxic symptoms related to hypercalcemia, such as, anorexia, vomiting, irritability, polyuria, polydipsia, diarrhea, headache, drowsiness and calcification of soft tissues (Burton, 1976).

There have been few reported cases of vitamin E deficiency in the general population (Mason & Horwitt, 1972). Despite claims made by health faddists, there is no scientific evidence that vitamin E in large doses is beneficial in the treatment of heart disease, cancer, sexual health, athletic ability or aging (Food and Nutrition Board, 1973). In a study of megavitamin supplementation of vitamin E in humans, it was concluded that cumulative toxic effects of these large doses of vitamin E are possible, but as yet no cases have been documented (Farrell & Bieri, 1975). In their study, Farrell and Bieri found that possible undesirable side-effects of megadoses include headaches, nausea, fatigue, dizziness, inflammation of the mouth, chapping of lips, gastrointestional disturbances and blurred vision. However, vitamin E has been beneficial in treating hemolytic anemia in newborns who have fat malabsorption problems.

Vitamin K deficiency is extremely rare after the immediate neonatal period. A prophylactic dose of 0.5 to 1.0 mg. is usually given parentally to infants at birth as a preventive measure until the many species of bacteria which synthesize vitamin K, become established in the gut.

Ascorbic acid supplements are almost never necessary despite the claims of health faddists. In the normal person it takes 3 to 4 months of vitamin deprivation to produce symptoms of scurvy (Bogart, 1966). Large doses of ascorbic acid have been popular among consumers as a prophylactic and therapeutic agent in the treatment of the common cold. Since World War II, several studies to evaluate this vitamin's effect upon the common cold have been conducted using a variety of experimental designs. Some of the studies show no effect from large doses in reducing the symptoms of colds (Ludvigsson, Hansson, & Tibbling, 1973; Taft & Fieldhouse, 1978; Charleston & Clegg, 1972; Coulehan, Beisinger, Rogers & Bradley, 1974), while a few claim therapeutic effects from megadoses of ascorbic acid (Regnier, 1968; Pauling, 1970). There is inconclusive evidence that megavitamin doses of ascorbic acid support claims of marked reduction in the incidence of colds (Hodges, 1980).

Other studies have shown that possible undesirable or toxic side effects may result from large doses of ascorbic acid. Large doses may cause diarrhea and acidification of the urine, leading to the precipitation of cystine or oxalate stones (Dipalma, 1978). The effect of moderately high doses of ascorbic acid increasing urinary oxalate is well known (Roth & Breitenfield, 1977). Other hazards associated with massive ascorbic acid intakes, such as the formation of renal calculi have been reported (Stein, Hasan & Fox, 1976). While megadoses of ascorbic acid probably do not affect long term iron balances, they could result in the absorption of excessive amounts of food iron in iron-replete individuals (Cook & Monsen, 1977).

Herbert (1975) discovered that pregnant women taking large doses of ascorbic acid expose their infants to the danger of rebound scurvy after birth. The habitual intake of large doses of ascorbic acid is not advantageous and poses risks of causing dependence on larger than normal amounts of ascorbic acid and the symptoms of deficiency if high levels are terminated (Rhead & Schrauzer, 1971).

Some researchers question the bioavailability of ascorbic acid. Very high doses of ascorbic acid may not be bioavailable because of a limited absorption capacity for ascorbic acid in the tissues (Nelson & Cerda, 1975).

In summary, claims that excess amounts of vitamin supplements will cure or prevent human ailments or induce "super" health are not supported by scientific fact. When infants and children are fed a diet adequate in proteins, calories, and quantity of milk, vitamin or megavitamin supplements are unnecessary except for the infant who is breast-fed or receiving regular commercial or evaporated milk formula. In children who have specific diseases or food intolerances, vitamin supplements may be indicated and prescribed by health care providers in recommended doses.

Recommendations for Vitamin Supplements in Pediatrics

Overt vitamin deficiencies are extremely rare in the United States (Dipalma, 1978). Many foods are fortified with vitamins. The addition of vitamin D to milk is required by law. Vitamins are added to many cereal products, some breads, fruit and fruit substitute drinks and many other commercially prepared convenience and snack foods. Because of the large amount of fortified foods consumed, nutritionists feel that some children may be consuming vitamins in amounts which may be unnecessary or harmful, if they are also taking additional vitamin supplements (Guthrie, 1979; Pipes, 1977).

The American Medical Association (1977) states that a well-balanced diet will supply all the nutrients needed by the normal individual. The American Academy of Pediatrics consistently states that normal children receiving a well-balanced diet do not need vitamin supplements (American Academy of Pediatrics, 1977). Instead of relying on vitamin pills, children should be taught good eating habits early in life and the value of nutritious snacks (Guthrie, 1979; National Dairy Council, 1972).

The literature supports the fact that most healthy children in the United States probably receive adequate nutrients in their diet and that daily vitamin supplementation is unnecessary. However, one recent study indicates the contrary. Cook and Payne (1979) evaluated the diets of 60 second and sixth grade pupils in Southern Illinois to consider the role of supplementary vitamins and minerals in meeting the RDA. The researchers found that 46% of the children received vitamin supplements and that intake of iron was low. The low iron intake corresponds with the findings in other national nutrition studies. However, contrary to other research, Cook and Payne reported that the majority of children were not receiving the recommended dietary allowances for nutrients without supplementation. Also, a significant number of children receiving vitamin supplements did not meet the RDA. In contrast to the findings of the nation-wide surveys, these authors concluded that many children were not receiving adequate nutrients.

In making recommendations from their study, the researchers did not suggest providing children with vitamin and mineral supplements. Instead, they recommended that emphasis be placed on obtaining the needed nutrients from the diet alone. This could be accomplished by increasing nutritional knowledge and emphasizing personal responsibility for nutrition in the school curriculum. The authors would prefer to see vitamin and mineral supplements used only when other methods fail.

In the preschool age group, food likes and dislikes are common and can cause problems between parent and child. Nutritionists suggest that vitamin supplements may be used temporarily when difficult conflicts over eating habits arise between parents and children (Pipes, 1977; Mayer, 1972).

Health Practices and Beliefs

A large national survey was conducted for the Food and Drug Administration by National Analysts, Inc. to determine the public's susceptibility to misinformation and erroneous beliefs about health foods (A Study of Health Practices and Opinions, 1972). The data provided information relating to the susceptibility of the public to misinformation regarding the effectiveness of diet, special foods and vitamins in self medication and other data on health opinions. The results showed that the majority of the sample believed that taking extra vitamins and minerals provides more pep and energy, helps prevent colds, helps people stay healthy, and reduces the chances of getting sick. Smaller proportions of the sample endorsed claims that arthritis and cancer are partly caused by vitamin deficiency. Researchers also found that large numbers of people used vitamin supplements without a physician's advice expecting observable results. Women are more likely than men to be large users of vitamin supplements.

Another study found that mothers from various ethnic groups had differing expectations of vitamin supplements. Johnston (1977) examined the influence of differing ethnic backgrounds upon the mothers' expectations of the effectiveness of vitamin supplements for their children. The sample of 200 mothers represented four ethnic groups. She found significant differences between the groups. The majority of mothers expressed a great belief in vitamin efficacy in general. Mothers of female children expressed increased magical expectations from vitamin supplements than mothers of male children.

An earlier study supports previous findings that the public often seeks health information from sources other than professionals.
In a study of the marketing practices of mothers of preschoolers, the

mothers were asked to rank order the sources of nutrition information which influenced their dietary practices. Past experience and education was ranked first, followed by printed materials, and professional help usually from a pediatrician, was listed last (Matheny et al., 1962).

Mothers' Health Beliefs and Practices

Becker, Nathanson, Drachman and Kirscht (1977) have conducted research on the effect of mothers' health beliefs on frequency of children's clinic visits. They found that mothers with an active, interventionist orientation towards health care and mothers who attributed good health and low illness susceptibility to their children were high users of preventive services and had fewer illness/accident visits. Conversely, more passive mothers, and mothers who perceived their children to be in poor health and susceptible to illness, were responsible for fewer well-child and more illness/accident visits.

Other research has linked mother's health attitudes and compliance with pediatric medical regimes. Becker, Drachman and Kirscht, (1972) found that mothers who did not adhere to medical care recommendations regarding sick children, were more inclined to be poorly motivated toward health and had feelings of little control over health matters. They also had little faith in medical treatment.

The literature suggests that socio-psychological variables are important in explaining mothers' health attitudes and behaviors. Locus of control, a construct referring to individual differences from Rotter's social learning theory, has shown some promise in predicting and explaining health behavior (Rotter, 1966). Most of the early investigations in locus of control and health had to rely on Rotter's Internal-External (I-E) Scale which had been the standard instrument available for measuring generalized locus of control beliefs (Wallston, Wallston, & DeVellis, 1978). A new Multidimensional Health Locus of Control (MHLC) was constructed by Wallston, Wallston and DeVellis in 1978. The scale consists of three, 6-item Likert-type scales measuring beliefs in health "internality", "chance" and "powerful others". Studies have shown that internals (i.e. those who believe that reinforcement is contingent upon their own behavior) are more likely to engage in behaviors that facilitate physical well being.

Research has shown the importance of various physical, psychological and social variables to perceived locus of control. There have been frequent observations that occupation and socioeconomic status are important in explaining health locus of control beliefs. Kivett, Watson and Busch (1977) found that physical, psychological and social variables were related to locus of control orientation in middle age, and that education and occupation influence internality.

Research has also shown that the social variable of child rearing practices can affect the development of internal and external control orientations (MacDonald, 1973). Investigators have shown that Internals and Externals were exposed to differing childrearing practices (Davis & Phares, 1969; Katkovsky, Crandall & Good, 1967). Internals tend to have been raised in democratic, nurturing homes with predictable standards and principled discipline. Externals tended to have parents that were overprotective, used punishment more often and withheld priviledges. Limited research pertaining to parenting styles and health locus of control has been reported to date. More data obtained by direct observation of parent-child interactions are needed (MacDonald, 1973).

Several studies have shown that health education programs were more effective when they were planned around the individual's locus of control beliefs (MacDonald, 1970; Best & Stiffy, 1975). Williams (1972a) has found a relationship between internality and greater car seat belt use. He also found that internality was related to increased preventive dental care (Williams, 1972b).

The research completed to date provides initial evidence of a relationship between locus of control and health-related behaviors (Wallston, Wallston & DeVellis, 1978). No research was found examining the relationship between health locus of control and the health related behavior of self-prescribed vitamin supplement usage in adults or children.

Conceptual Framework

The following conceptual framework has been derived from the data in the review of the literature. It provides the rationale for investigating the relationship between mothers' vitamin giving behavior and health locus of control beliefs.

1. It has been shown from the data obtained in the nationwide nutritional surveys that nutrient intake meets or exceeds RDA levels in the majority of children.

2. A large percentage of preschool and school age children are given non-prescription vitamin supplements. Most of these non-prescription vitamin supplements do not contain iron and none contain calcium. These are the only two deficiencies consistently found.

3. When children are given vitamin supplements routinely "just for protection" and the child's diet contains fortified foods, typical of the American diet, there is a danger of reaching toxic levels of some vitamins.

4. The majority of health care professionals do not recommend vitamin supplements for healthy preschool and school aged children. Yet, the use of mother-prescribed vitamin supplements are prevalent.

5. It has been shown that Wallston and Wallston's Multidimensional Health Locus of Control Scale is relevant to the prediction of health behaviors.

6. It has also been shown that health education programs are more effective if tailored to the individual's health locus of control beliefs.

7. There is suggestive evidence of a relationship between parenting styles and locus of control beliefs.

Therefore, locus of control could provide direction for health and nutritional education programs concerning diet and the use of self-prescribed vitamin supplements. Because the use of vitamin supplements is costly, contributes to a reliance on "pills" for good health and nutrition, and may expose children to undesirable effects of large doses of vitamins, it is important for the professional to examine this health behavior.

This study will attempt to discover if, in fact, self-prescribed vitamin supplements are being given to children when health care professionals do not recommend this practice. Considering that the research has not examined locus of control and its relation to vitamin supplement usage, this researcher desired to discover if there was a relationship between mothers' health locus of control and their use of self-prescribed vitamin supplements for preschool and school aged children. The present study also examines the family's socioeconomic status, and the mother's perception of the child to see if any of these factors have an effect on vitamin giving behavior. In addition, several other variables that have not been clearly identified as affecting vitamin practice in the literature are examined.

Purpose of the Study

The purpose of this study is to examine the vitamin giving behavior of mothers of preschool and school age children and the factors that may influence them to give non-prescription vitamin supplements. This information will be useful in structuring future health teaching and nutritional counseling in the pediatric outpatient setting.

It is well known that lipid-soluble vitamins ingested in excessive amounts may result in serious and potentially toxic effects; also, the possibility of toxicity exists from large doses of some water-soluble vitamins. It was the intent of this researcher to determine the frequency with which mothers routinely give non-prescription vitamin supplements, or give excessive amounts of supplements, and to identify factors related to the practice.

This research also assessed the relationship of health locus of control to mothers non-prescription vitamin giving behavior and health locus of control to socioeconomic status.

To accomplish the above, two hypotheses were tested.

1. Mothers who give non-prescriptive vitamin supplements will score higher on "internality", as measured by the Multidimensional Health Locus of Control Scale (MHLC), than mothers who do not give vitamin supplements.
2. Mothers from higher socioeconomic groups will score higher on "internality" than mothers from lower socioeconomic groups, as measured by the MHLC scale.

The relationship of other factors to vitamin giving practice were examined: marital and employment status of the mother; mothers' perception of their child's health, development, activity level and adequacy of nutrient intake; mothers' education and family yearly income; sex of the child; number of children in the family and placement of the child within the family; mothers' interpretation of medical advice concerning vitamin supplements; major influences on mothers' vitamin giving behavior and lastly, the purpose for which pediatric outpatient clinic visits were made.

CHAPTER II

METHODS

Setting

The study was conducted in two pediatric outpatient clinics which offer services to children 0-18 years of age and are staffed by pediatricians and pediatric nurse practitioners. Both clinics are located in metropolitan areas and offer services 5-6 days a week. The Multiservice Center Access Clinic located in Portland, Oregon provides services to low socioeconomic population, while the Island Park Pediatric Association Clinic, Springfield, Oregon offers services to middle income clients.

The clinics were selected to assure that subjects from both lower and middle socioeconomic levels were included. In addition, the personnel in both clinics informed mothers that vitamin supplements were unnecessary for healthy preschool and school aged children receiving a well-balanced diet.

Subjects

A sample of convenience was drawn including 20 mothers of preschool and school aged children attending each pediatric outpatient clinic. The total sample consisted of 40 mothers. The following criteria were used in the selection:

1. The subjects were mothers of preschool and school aged children, 2 through 12 years of age who were attending the pediatric clinics. Mothers of infants and adolescents were excluded.
2. Only mothers who provided the majority of child care activities were included.

3. All subjects had prescheduled appointments for well-child or minor illness care.
4. The children were "normal", healthy individuals with minor illnesses or were being seen for minor accidents or injuries. Children with chronic or long term illnesses were excluded.
5. The questions asked pertained to the child attending the clinic and not the siblings.
6. The child must have been receiving care at the clinic on a regular basis for at least six months.

Data Collection Instruments

Measurement of Independent Variables

The major independent variable in this research is maternal locus of control beliefs. Locus of control is operationalized as the kind and extent of control a person thinks he has over his own state of health.

Health Locus of Control

Internal-external locus of control, representing a psychological trait, measures the extent to which the person believes events in their life are influenced by their own actions (internal) or are the results of forces outside themselves (external). The Multidimensional Health Locus of Control (MHLC), Form A, developed by Wallston and Wallston (1978) was used for this study (Appendix C). The MHLC consists of three scales measuring beliefs in health "internality", "chance", and "powerful others". Each scale consists of six items, and each uses a 6-point Likert format, ranging from strongly disagree (1), to strongly agree (6). The score on each scale can range from 6 to 36. The higher the score for each scale, the more the person exhibits that psychological trait of internality, belief in control by chance, or belief in control by powerful others.

"Internality" represents the extent to which a person feels they have control over their health. The scales consist of the following six items:

1. If I get sick, it is my own behavior which determines how soon I get well again.
2. I am in control of my health.
3. When I get sick I am to blame.
4. The main thing which affects my health is what I myself do.
5. If I take care of myself, I can avoid illness.
6. If I take the right actions, I can stay healthy.

"Powerful others" refers to the psychological belief that other people have the control over one's health. This scale consists of the following six items:

1. Having regular contact with my physician is the best way for me to avoid illness.
2. Whenever I don't feel well, I should consult a medically trained professional.
3. My family has alot to do with my becoming sick or staying healthy.
4. Health professionals control my health.
5. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.
6. Regarding my health, I can only do what my doctor tells me to do.

"Chance" refers to the belief that a person has no control over his health and is controlled by fate. The scale consists of the following six items:

1. No matter what I do, if I am going to get sick, I will get sick.
2. Most things that affect my health happen to me by accident.

3. Luck plays a big part in determining how soon I will recover from an illness.

4. My good health is largely a matter of good fortune.

5. No matter what I do, I'm likely to get sick.

6. If it's meant to be, I will stay healthy.

The alpha reliabilities for the MHLC three scales ranged from .673 to .767. The Wallstons (1978) claimed some initial construct validity for the MHLC because of positive correlations of the MHLC scales with the corresponding subdimensions of internal-external locus of control identified by Levenson (1974) for her measures of internality (I), chance (C), and powerful others (P). The correlations between the two sets of scales were .57, .80, and .28.

Correlations in the predictive direction of the MHLC scales with health behaviors provides some evidence of predictive validity. Though some evidence of the validity and reliability of the scale has been presented, the Wallstons report that the extent of validity and reliability of the locus of control instrument will not be known fully until the MHLC scale is used in several other studies (Wallston, Wallston & DeVellis, 1978).

Additional Independent Variables

The additional independent variables of socioeconomic status and mothers' perception of their child were examined. This information was collected by means of the "Vitamin Supplement Questionnaire" developed by the researcher (Appendix B). Socioeconomic status was assessed by determining number of years of formal education completed by the mother, and the family yearly income. Mothers' socioeconomic level was determined by items 1 and 2. Mothers' perception of their child's state of health, appetite, activity, development and sex of their child was included in item 7 and 10-14.

Measurement of the Dependent Variables

The dependent variable in this research was the administration or non-administration of nonprescription vitamin supplements to healthy children. Items 15, 16, 20 and 21 were included to assess whether vitamins were given and if so, how often, what kind or kinds were given, were they given regularly or only at certain times of the year and were extra amounts given when the child was sick or not feeling well (Appendix B).

The possibility of vitamin toxicity was assessed by placing the kinds and amounts of vitamins given every day in four categories: 1) pediatric multiple vitamin supplement, 2) pediatric multiple vitamin supplement with iron, 3) pediatric vitamin supplement with extra ascorbic acid and 4) additional vitamin supplements, adult supplements or preparations.

Additional Data

Demographic information was collected by means of the "Vitamin Supplement Questionnaire". The mothers' employment status and marital status were assessed to permit a description of the sample and the relationship of these characteristics to vitamin usage (items 3 and 4). Item 5 was included to determine if the subjects met the criteria for the sample selection; while item 6 was included to determine type of clinic usage as an indicator of mothers' preventive health practices.

Items 8 and 9 were included to determine if there was a relationship between vitamin supplement usage and number of children and the placement of the individual child within the family. To determine if the child was receiving well-balanced meals and nutritious snacks, items 23 and 25 were included. Items 17-19 and 22 were included to ascertain if health professionals discussed vitamins with the mothers, what the mothers perceived the health professionals told them about vitamin supplements, and who or what influences mothers' vitamin giving behavior.

Data Collection Procedures

Clinic pediatricians and pediatric nurse practitioners were contacted to determine if they recommended that vitamin supplements were unnecessary for healthy preschool and school aged children. The directors of the medical clinics were contacted for oral permission to conduct the study. A pilot study to pretest the "Vitamin Supplement Questionnaire" in terms of adequacy of instructions and comprehension of terminology was undertaken. Five mothers of preschool and school age children participated.

Clients were included in the study if they met the previously mentioned criteria. Formal consent to participate in the research was obtained from the subjects. If the mothers agreed to participate, the vitamin supplement questionnaire and the locus of control instrument were administered. Both verbal and written instructions for completion of the questionnaires were given. The researcher was available to each mother during administration of the questionnaires. Every effort was made to give impartial assistance and not to influence the subjects' responses.

Analysis of Data

In this ex post facto study, correlational and descriptive statistical procedures were used. Frequency distributions were calculated on the variables.

Although this was not a random sample, a t-test of the difference of the mean "internality" scores of the vitamin givers and non-vitamin givers was used for heuristic purposes. Other variables were cross tabulated by vitamin giving and by clinic. The Pearson r correlation coefficient was calculated to determine the strength of the relationship between internality and socioeconomic status.

CHAPTER III

RESULTS AND DISCUSSION

Description of Sample

Subjects meeting the criteria for inclusion in this study were selected during a one day period from mothers attending a private pediatric outpatient clinic (n=20) and over a two day period from mothers attending a county pediatric outpatient clinic (n=20). In all, 43 mothers were approached, only 3 mothers refused to participate, yielding a total sample size of 40 mothers.

Selected characteristics of the participants are presented in Table 1. The majority (62.5%) of mothers were married. Almost half of the mothers worked full-time (41.0%) away from home. Although race was not requested in the questionnaire, it was noted by the researcher that all mothers from the private clinic were Caucasian. Mothers from the county clinic were approximately one-half Caucasian and one-half Black, with one Mexican-American.

The majority of mothers (97.5%) had at least partial high school education while approximately 45.0% reported some education beyond high school. With respect to family income, the range was from the poverty level to relative affluence. The sample may be described as comprised predominantly of families from lower-middle to middle-class backgrounds.

TABLE 1

Selected Characteristics of Sample Mothers

From Two Pediatric Outpatient Clinics (n=40)

Mothers Characteristics	Value Number	Percent
Mother's Education		
Grade School	1	2.5
High School	9	22.5
High School Graduate	12	30.0
College	8	20.0
College Graduate	7	17.5
Vocational School (also high school graduates)	2	5.0
Postgraduate	1	2.5
Median Education . . . . . . 12 years		
Family Yearly Income[a]		
$5,000-$14,999	20	51.3
15,000-30,000 or more	19	48.7
Median Income $15,000		
Marital Status		
Single	3	7.5
Divorced	11	27.5
Married	25	62.5
Widow	1	2.5
Employment[a]		
Unemployed	12	30.8
Employed part-time	11	28.2
Employed full-time	16	41.0

[a] one mother failed to respond to this question

Since this was not a random sample, statistical inferences to the general population cannot be made. However, on measures of education, income and employment status, the demographic data showed that the sample was similar to the general population. In 1975, the median educational level achieved by women was 12.3 years (Statistical Abstract of the United States, 1976). This compares favorably to the median educational level of this sample (Table 1). The median yearly family income reported was $15,000, this is roughly equivalent to the median reported for the average American family (Statistical Abstract of the United States, 1977). Furthermore, the number of mothers reporting full-time employment (41.0%) coincides with the current estimate that approximately 40% of American women are employed (Whitbeck, 1980).

Descriptive Findings Regarding Major Variables

Characteristics of Clinic Use

The majority of the mothers (97.5%) reported that the clinic they were attending was the main source of health care for their child and that they used the clinic for both health checkups and injury or illness care (Appendix F, Table A).

Characteristics of the Mother-Child Dyad

The majority of mothers had more than one child (80.0%) and most of the children attending the clinic were the youngest child in the family (46.2%). A larger number of the children (62.5%) attending the clinics were females rather than males (Appendix F, Table B).

Mothers' Perception of the Child's Health

The majority of mothers (97.5%) perceived their child to be healthy, eating well most of the time (100.0%) and eating almost all foods (90.0%).

Most mothers reported that their child usually ate a well-balanced diet consisting of foods from the meat group, milk group, cereals/bread group, and vegetable/fruit group (70.0%). When listing their child's snack foods, the majority of mothers listed nutritious snacks (75.7%) rather than non-nutritious snacks. They also described their child's activity level as normal (72.5%) and perceived the child's development as normal (62.5%) (Appendix F, Table C).

Non-prescription Vitamin Usage

A larger number of mothers (57.5%) reported using non-prescription vitamin supplements than those who did not use them (Table 2). This finding is nearly equivalent to that obtained in the Preschool Nutritional Survey where 53.8% of preschool children were given supplements (Owen et al., 1974). Similar findings were also reported in the study of Illinois school children (Cook & Payne, 1979). They reported that 46.7% of school children in their study were given supplements.

TABLE 2

MOTHERS' VITAMIN GIVING BEHAVIORS FROM

TWO PEDIATRIC OUTPATIENT CLINICS (n=40)

Characteristics	Values	
	Number	Percent
Mothers give vitamins		
Yes	23	57.5
No	17	42.5
Frequency Vitamins Given		
Everyday	15	37.5
Winter and spring	3	7.5
Occasionally	5	12.5
No data	17	42.5
Extra Amounts Given During Illness		
Do give extra amounts	9	22.5
Do not give extra amounts	14	35.0
No data	17	42.5

Of the mothers who gave vitamins, the majority (37.5%) gave them everyday throughout the year. Most mothers (35.0%) reported they did not give extra amounts when their child was ill or not feeling well. Mothers made their own decision to give vitamin supplements or followed the advice of someone other than health professionals, as seen in Table 3. Only a small number (10.0%) of mothers reported that medical personnel had recommended vitamins for their child. Of interest is the fact that the majority of all mothers (67.5%) reported that doctors and nurses had discussed vitamins with them at some time. Of those mothers who received advice, more reported they were told that vitamin pills were not necessary for their child (30.0%). However, 5.0% of the mothers reported they did not remember what the doctors and nurses had told them about vitamins.

When asked who or what influenced them to give or not give vitamin supplements, the majority of mothers (75.0%) listed sources of influence other than professionals (Table 4).

TABLE 3

PROFESSIONAL INFLUENCES ON MOTHERS' VITAMIN GIVING
(n=40)

Characteristic	Values					
Vitamins Recommended by:[a]	Yes		No		No Data	
	Number	Percent	Number	Percent	Number	Percent
Doctors or nurses	4	10.0	19	47.5	17	42.5
Family member	4	10.0	19	47.5	17	42.5
Self	12	30.0	11	27.5	17	42.5
Others	12	30.0	11	27.5	17	42.5

a Nine mothers reported more than one recommendation

Characteristic	Values	
	Number	Percent
Clinic Staff Discussed Vitamins		
Yes	27	67.5
No	13	32.5
Clinic Advice[a]		
Should receive vitamins	2	5.0
It doesn't matter	9	22.5
Too many vitamins could be harmful	5	12.5
Vitamin pills are not necessary	12	30.0
Don't know	2	5.0
Missing data	10	25.0

[a]Three mothers reported they received clinic advice but did not report the clinic staff had discussed vitamins with them.

TABLE 4

OTHER INFLUENCES ON MOTHERS' VITAMIN GIVING (n=40)

Characteristic	Values			
Influences Vitamin Usage	Vitamin Givers	Non-vitamin givers	Total	
			Number	Percent
Doctors or nurses	0	10	10	25.0
Friends	5	2	7	17.5
Family	6	3	9	22.5
Television	1	0	1	2.5
Brochures	0	1	1	2.5
Books	3	0	3	7.5
Articles in women's magazines	8	1	9	22.5
	23	17	40	100

More mothers (43.5%) reported that the vitamin supplements they gave their child did not contain iron than those who gave supplements containing iron (30.4%). Owen et al. (1974) reported in the Preschool Nutrition Survey that approximately 71.9% of the children receiving vitamin supplements were not receiving iron supplements. Several factors may contribute to the difference in iron supplementation identified by these two studies. A period of ten to twelve years separates the time of data collection for the Preschool Nutrition Survey and the present study. It is possible that vitamin manufacturers have utilized the findings of the national studies and added iron to their vitamin supplements. On the other hand, mothers who elect to give vitamin supplements may be more conscious of the need for iron supplements. However, the latter contention does not coincide with the almost equal number of mothers who did not know if the vitamin supplements they gave their child contained iron or not. Mothers from both clinics reported this fact (Table 5).

TABLE 5

DESCRIPTION OF VITAMINS USED BY MOTHERS
(n=23)

Description	Value	
	Number	Percent
Vitamins Contain Iron		
Yes	7	30.4
No	10	43.5
Don't know	6	26.1
Type of Vitamin Supplement Used		
Pediatric Multiple Vitamin	10	43.5
Pediatric Multiple Vitamin plus Iron	5	21.7
Pediatric Multiple Vitamin plus Ascorbic Acid	4	17.4
Extra kinds or amounts of vitamins and/or adult vitamin preparations	3	13.1
Don't know	1	4.3

The majority of mothers reported that they gave a pediatric multiple vitamin supplement without iron (43.5%), while a smaller number reported they gave a pediatric multiple vitamin with iron or ascorbic acid. A small number of mothers (13.1%) reported that they routinely gave extra kinds and amounts of vitamins and/or adult preparations to their child. Only one mother reported that she did not know the name of the vitamin supplement(s) she gave her child. Although these findings on the amount and kinds of vitamin supplements seem to be within an acceptable range, conclusions cannot be drawn regarding the potential danger of vitamin overdosage since data on exact vitamin quantities were not requested from the mothers.

Health Locus of Control

The Wallstons' Multidimensional Health Locus of Control scale (MHLC) was used to assess the mother's internality. The tool consisted of three dimensions: "internality", "powerful others" and "chance", with a possible range of 6-36. "Internality" measures the extent to which a person feels she/he has control over their health. As seen in Table 6, there was a broad range of internality scores (17-32).

The second dimension is "powerful others" which refers to the psychological belief that other people have control over one's health. The range for powerful others was 8-27. The third dimension is "chance" and refers to the belief that a person has no control over his health and is controlled by fate. The range for chance was 7-26. The majority of subjects showed a low belief in chance.

TABLE 6

A COMPARISON OF MEAN SCORES ON HEALTH LOCUS OF CONTROL SUBSCALES BETWEEN STUDY SUBJECTS AND WALLSTONS' SAMPLE

Variable	Mean	Range	Mean
Internality	23.78	17-32	25.1
Powerful Others	19.30	8-27	19.99
Chance	16.82	7-26	15.57

The mean score on internality for all mothers was 23.78. This was slightly lower than the mean scores previously reported by Wallston, Wallston and DeVellis (1978). The mean score for powerful others in the present study was 19.30 which is very similar to the mean score for this dimension reported by the Wallstons and DeVellis. The mean score for chance was 16.82 which was slightly higher than the mean score reported by the Wallstons and DeVellis (Table 6). It is possible that differences in scores reported in this study and those of Wallstons and DeVellis were due to the differences in the sample studied. The subjects in the current study were women of childrearing age attending a private and county pediatric outpatient clinic. Subjects in the Wallstons and DeVellis study consisted of males and females, over 16 years of age who were waiting at gates of a metropolitan airport. For a complete list of means on the multidimensional health locus of control subscales and vitamin giving behavior see Appendix F, Table D.

The correlations between the multidimensional health locus of control subscales are displayed in Table 7. In this study, power and chance are negatively related to internality (-.688 and -.537). The Wallstons and DeVellis reported correlations in of .154 and -.343 (1978). Thus, the correlations in this study do not correspond to those found by the researchers for these two subscales. In contrast, power and chance were positively correlated (.462), whereas Wallstons and DeVellis reported no correlation between these two subscales.

The differences between the findings of the current study and those of the Wallstons and DeVellis may be caused by dissimilarities in the populations studied. The subjects in the current study were a homogeneous group of mothers involved in their child's health maintenance or treatment of minor illness, whereas the Wallstons' and DeVellis sample lacked this homogeneity and common health focus. These different findings support the Wallstons' conclusions that the multidimensional health locus of control tool requires further investigation among health researchers to increase understanding of the variance in health behavior.

TABLE 7

CORRELATION MATRIX:

MHLC SUBSCALES (n=40)

	INTERNAL	POWER	CHANCE
INTERNAL	1.0000	-.688	-.537
POWER		1.0000	.462
CHANCE			1.0000

Findings Related to Hypotheses

Hypotheses 1, Mothers who give non-prescription vitamin supplements will score higher on "internality", as measured by the Multidimensional Health Locus of Control Scale (MHLC), than mothers who do not give vitamin supplements.

This hypothesis was advanced because of the research literature which suggests individuals who hold internal opposed to external expectancies are more likely to assume responsibility for health. Previous studies have demonstrated a relationship between locus of control and such preventive health behaviors as contraceptive use, use of seat belts, and preventive dental health. Internals have been shown to attempt to guard against accidents and illness to a greater degree, and to maintain their physical health to a greater extent than externals (Strickland, 1978).

To test the hypothesis it was restated in the null form: Mothers who give vitamins will have scores on internality equal to mothers who do not give vitamins. As seen in Table 8, the mean score on internality was 24.60 for mothers who gave vitamins and 22.94 for mothers who did not give vitamins. Although the sample was not random, a t-test of the difference of the means was performed for heuristic purposes. The difference was not found to be significant with $t=1.28$ and $p=.105$. Therefore, the null hypothesis could not be rejected. Although the difference in means was in the expected direction, the difference was not statistically significant with significance set at $p \leq .05$ and the original hypothesis was not supported.

TABLE 8

MEAN MATERNAL INTERNALITY (MHLC) SCORES

BY VITAMIN GIVING BEHAVIOR (n=40)

Variable	Number	Mean	S.D.	t Value	Degrees of Freedom	1-tail Prob.
Vitamin Givers	23	24.60	3.474	1.28	38	p=.105
Non-vitamin Givers	17	22.94	4.789			

No studies were found in the literature specifically examining health locus of control and its relationship to non-prescription vitamin giving. Other preventive health behaviors and "internality" have been shown to be correlated in the literature. Although internality scores did differ by vitamin giving behavior, in the expected direction, the results were not significant. It would seem logical that factors such as small sample size and the use of clinic populations could explain the discrepancy between findings from the current study and those from past studies examining differing health behaviors.

Hypothesis 2, Mothers from higher socioeconomic groups will score higher on "internality" than mothers from lower socioeconomic groups, as measured by the MHLC scale.

As seen in Table 9, the mean score for internality was 22.8 for the lower socioeconomic group and 24.89 for the higher socioeconomic group. The socioeconomic groups were divided by determining the median family yearly income of all mothers. The lower socioeconomic group had incomes below the median income, while the higher socioeconomic group had incomes above. For means on the other two subscales, see Appendix F, Table E.

TABLE 9

MEAN INTERNALITY SCORES BY INCOME
(n=40)

Variable	Mean
Low income	22.80
Higher income	24.89

Income (r=.29) and education (r=.35) were positively related to internality (Table 10). Even though a random sample was not used, the statistical significance of income and education were calculated for heuristic purposes. The probabilities were found to be significant for income (p=.04) and education (p=.012) with significance set at a level of $p \leq .05$. Therefore, hypothesis 2 is supported. However, because a random sample was not used, these findings cannot be generalized.

TABLE 10

THE RELATIONSHIP BETWEEN INTERNALITY AND TWO INDICATORS

OF SOCIOECONOMIC STATUS: INCOME AND MOTHER'S EDUCATION
(n=40)

Correlation Coefficients

	Internality
Income	r = .29 p = .04
Mother's Education	r = .35 p = .012

The investigator wished to examine the relationship of income to vitamin giving since it seemed reasonable that mothers from the higher income group might be better able to provide this extra health benefit. Income was found to be related to vitamin giving (Table 11). The results (p=.015) were found to be statistically significant with $p \leq .05$. These findings correspond to those of the Preschool Nutritional Survey that found the percentage of children receiving supplements tended to increase with socioeconomic status (Owen et al., 1974).

TABLE 11

RELATION OF INCOME AND VITAMIN GIVING

Variables	Vitamin Giving Yes	Vitamin Giving No	Total	Chi-Square Value
Income [a]				
$5,000-14,999	7	13	20	5.971
$15,000-30,000	15	4	19	p=.015

[a] One mother failed to respond to this question

TABLE 12

RELATIONSHIP OF ADDITIONAL MINOR VARIABLES WITH

MOTHER'S VITAMIN GIVING BEHAVIOR (n=40)

Variables	Vitamin Giving Yes	Vitamin Giving No	Total	Chi-Square Value
Clinic				
Private	16	4	20	6.547
County	7	13	20	p=.0105
Mother's Education				
Grade School	0	1	1	
High School	11	12	23	4.511
College	11	4	15	p=.2113
Post-graduate	1	0	1	
Child's Diet				
Rarely eats balanced diet	1	0	1	
Usually eats balanced diet	18	10	28	3.277
Always eats balanced diet	4	7	11	p=.1942
Sex				
Boy	9	6	15	0
Girl	14	11	25	p=1.000
Vitamin Giving Advice				
Should receive vitamins	2	0	2	7.685
Doesn't matter	7	2	9	p=.1038
Extra amounts could be harmful	1	4	5	
Vitamins not necessary	6	6	12	
Don't know	2	0	2	
Missing data			10	
Factors Influencing Vitamin Giving Behavior				
Professionals	1	11	12	23.107
Family and Friends	11	4	15	p=.0008
Printed Materials and advertising	11	1	12	
Missing data		1	1	

Relationship of additional minor variables to mothers' vitamin giving practices.

Several minor variables were examined in this research to determine if they were related to mothers' vitamin giving practices. These variables were 1) use of the health clinic; 2) marital and employment status of the mother; 3) mother's perception of the child's activity, 4) development, and 5) health; 6) discussion with health professionals; 7) placement of child within the family and 8) snacks usually eaten by the child. However, there was little variation in responses to these questions therefore, these variables were not subjected to any further statistical analysis.

Since the majority of mothers perceived their child to be healthy, active, and eating well, it is reasonable to assume that the mothers who are giving vitamin supplements are giving them to their child even though they believe he is healthy.

There is a relationship between what influences vitamin giving behavior and vitamin giving. Mothers who give vitamins reported that family and friends and printed materials influenced them in their vitamin giving behavior. Whereas mothers who did not give vitamins reported that professionals influenced them more.

The findings of mothers who gave vitamin supplements suggests a similarity with the study of marketing practices of mothers of preschoolers (Matheny et al., 1962). They found that mothers consulted professionals lastly for nutrition information and relied on experience and printed materials more often. In contrast, this study found the non-vitamin givers had listened to professional advice regarding vitamins.

TABLE 13

RELATIONSHIP OF ADDITIONAL VARIABLES WITH

PRIVATE AND COUNTY CLINIC
(n=40)

Variables	Clinic Private	County	Total	Chi-Square Value
Mother's Education				
Grade School	0	1	1	
High School	8	15	23	7.397
College	11	4	15	p=.0603
Post-graduate	1	0	1	
Income				
$5,000-14,999	1	19	20	27.916
$15,000-30,000	18	1	19	p=.000
Missing data	1		1	
Vitamin Giving Advice				
Should receive vitamins	2	0	2	4.531 p=.3389
Doesn't matter	5	4	9	
Extra amounts could be harmful	2	3	5	
Vitamins not necessary	5	7	12	
Don't know	2	0	2	
Missing data			10	
What Influences Vitamin Giving Behaviors				
Professionals	4	8	12	
Family and Friends	9	6	15	
Printed materials and advertising	7	5	12	7.098 p=.3119
Missing data		1	1	

There does not seem to be any relationship between the sex of the child and the mothers' vitamin giving behavior (Table 12). However, there is a relationship between vitamin giving behavior and clinic, which reflects the difference in socioeconomic status of the clientele. It is interesting to note that the vitamin giving advice did not differ between clinics as seen in Table 13.

There is a significant relationship between the variable of mothers' education and clinic (Table 13). Mothers who attended the private clinic tended to have completed more years of formal education than mothers from the county clinic (p=.06). However, there did not seem to be a relationship between vitamin giving advice and factors which influence vitamin giving behavior between the county and private clinic. This finding lends support to the importance of health teaching irrespective of clinical setting.

In conclusion, findings from this study provide supporting evidence that mothers give non-prescription vitamin supplements without health professionals' recommendations, and that most health care professionals discuss vitamin supplements with mothers and explain that for healthy children, supplements are unnecessary. The socioeconomic status of the mother, reflected in income and education was the strongest variable influencing mothers' vitamin giving behavior. Mothers in the county clinic tended to have lower incomes, lower scores on internality and less frequently gave non-prescription vitamins. In contrast, mothers from the private clinic tended to have higher incomes, higher scores on internality and more frequently gave non-prescription vitamin supplements.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Vitamin deficiencies continue to be rare in the United States. The nationwide nutritional surveys have indicated that the majority of children in the United States receive an adequate nutrient intake, with the exception of iron. It is known that pediatric health professionals advise mothers of healthy children that vitamin supplements are unnecessary if the child receives a well-balanced diet. Further, it is known that the possibility of reaching toxic levels of some vitamins exists if children are given vitamin supplements in addition to the typical American diet which contains many vitamin fortified foods.

Not described in the literature is the relationship between maternal health locus of control and maternal vitamin giving behavior. However, literature has described health locus of control to be relevant to the prediction of health behaviors and to socioeconomic status. The present study was undertaken to further explore the relationship of these two variables to maternal non-prescription vitamin giving behavior. Specific questions raised included the following: (a) Can it be assumed that mothers who give non-prescription vitamin supplements believe events in their life are influenced by their own actions (are internally oriented)? (b) Are mothers from higher socioeconomic groups more internally oriented than mothers from lower socioeconomic groups? (c) Do other variables influence mothers to give or not give vitamin supplements? (d) Are mothers of preschool and school aged children giving non-prescription vitamin supplements? (e) If mothers are giving non-prescription vitamin supplements, is there a significant danger of vitamin overdosage?

The study subjects included 40 mothers attending a private and county pediatric outpatient clinic. The majority of mothers were married, had completed at least some high school education and were employed outside of the home part-time or full-time.

Data were obtained via questionnaires administered to the mothers in the outpatient clinics. The instrument used to measure the maternal health locus of control was the Multidimensional Health Locus of Control (MHLC), Form A, developed by Wallston and Wallston. Variables pertaining to vitamin use and vitamin giving behavior, and demographic data were obtained by the "vitamin supplement questionnaire" developed by the researcher.

Hypothesis 1, which stated that mothers who give non-perscription vitamin supplements will score higher on "internality", as measured by the MHLC scale, than mothers who do not give vitamin supplements, was not supported. The relationship between maternal locus of control and vitamin giving was not found to be statistically significant, although the vitamin giving mothers tended to be more internally oriented.

Hypothesis 2, which stated that mothers from higher socioeconomic groups will score higher on "internality" than mothers from lower socioeconomic groups, as measured by the MHLC scale, was supported. Internality and socioeconomic status, as measured by the mothers' education and income were positively related and the findings were statistically significant. Mothers from the higher socioeconomic group tended to give non-prescription vitamin supplements more often than mothers from the lower socioeconomic group.

The additional variables of type of health clinic used, marital and employment status of mother, mother's perception of her child, placement of child within the family and number of children were not found to be significantly related to mothers' non-prescription vitamin giving behavior. There was not a significant relationship between health professionals' vitamin giving advice and mothers' vitamin giving behavior.

A significant relationship was found between certain other influences upon vitamin giving behavior and whether or not mothers administered vitamins to their child. Of the mothers who gave vitamins, they listed sources other than professionals as influencing their vitamin giving. Mothers who did not give vitamins listed professionals as influencing them the most.

The findings and problems encountered during the course of the investigation suggest a number of possibilities and improvements for future research. First, information regarding vitamin giving advice from professionals was obtained by reported data. Thus, it was difficult to determine what vitamin giving advice was given in each individual situation. It would be advisable for health care providers to use standardized printed information regarding recommendations for vitamin usage to strenghten future research. A second advantage of using printed instructions is that mothers are able to validate verbal instructions with printed materials.

Secondly, further investigation is needed to determine if vitamin giving practices are influenced by the type of pediatric health care provider. Researchers in the future should compare vitamin giving practices of mothers who have pediatric nurse practitioners as main health care providers for their well-child care as opposed to pediatricians.

Thirdly, determination of whether danger of potential vitamin overdosage exists was not evaluated because mothers were not asked to identify vitamin supplements given. In future research it is recommended that a mailed questionnaire or phone call be used to enable recording the dosages of vitamins given from the label on the container.

Fourthly, since maternal vitamin giving behavior differed with socioeconomic status, with mothers from the higher socioeconomic groups tending to give vitamins more frequently, future investigations should determine if mothers from lower socioeconomic groups would give non-prescription vitamins if they had the financial ability. Also, future studies should evaluate the relationship of vitamin giving to mothers' employment status in a larger, random sample.

Lastly, future studies should evaluate maternal locus of control and non-prescription vitamin giving practices of a larger, random sample to compare the results with the findings of locus of control and preventive health behaviors as reported in the literature and the findings from this study.

Implications for Practice

The general public is keenly interested in nutrition and health. Nutritional misinformation and fads are believed and practiced by many individuals. Nurses in the pediatric outpatient setting need to be aware of current nutritional practices of families and children. Pediatric nurse practitioners need to be particularly aware of current information and facts regarding childhood nutrition to help counteract fallacies.

Many mothers are employed outside of the home. With the added tasks of child care and home duties, these mothers may feel guilt or anxiety about not being at home with their children. To insure that their children are receiving good care, these mothers may be supplementing their children's diets with vitamins even when dietary values might be sufficient.

The pediatric nurse practitioner is in an excellent position to emphasize to mothers that by encouraging adequate nutrient intake from diet alone, they can influence and encourage good nutritional practices and lifelong dietary habits. Therefore, these mothers can impart significant influence and control over their child's health and daily practices. These practices may decrease a lifelong dependency on "pills" and reduce unnecessary family expenses. Nurse practitioners need to emphasize good nutrition and take clinical time to discuss this important topic with mothers.

Other areas such as parenting classes and schools are excellent arenas in which nurses may teach positive nutrition and increase the child's awareness of good diet, eating habits and the reduction of food wastage. Anticipatory guidance for parents in prenatal classes might be another area for nursing intervention.

In summary, because pediatric nurse practitioners are involved with more children in the preschool and school aged years, they must evaluate the child's vitamin supplement usage and the parents' nutritional knowledge. Further, they must set aside adequate clinical time for counseling of parents regarding these important areas.

Limitations of Study

Because data were not collected on whether the mothers from lower income groups would have given vitamins if they had been financially able, it was not possible to evaluate the relationship between the affordability factor and the attitudinal factor as related to vitamin giving practices.

The findings from the study are not generalizable because of the sample size and lack of randomization. A large random sample involving several clinics representing a variety of geographic areas is indicated.

The scope of this study did not allow for obtaining accurate nutritional, developmental and health data on each child. In addition, dosages and actual amounts of each vitamin given were not obtained, thus it was not possible to assess potential vitamin overdosage. Trends and tendencies in behaviors have been identified, as well as areas for futher investigation, although broad generalization from this sample is not possible.

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APPENDICES

APPENDIX A

Consent Form for Human Research

UNIVERSITY OF OREGON

HEALTH SCIENCES CENTER

GRADUATE STUDIES DEPARTMENT
SCHOOL OF NURSING

Area Code 503 225-7838

3181 S.W. Sam Jackson Park Road

Portland, Oregon 97201

INFORMED CONSENT FORM

I, ____
(First Name) (Middle Name) (Last Name)

herewith agree to serve as a subject in the investigation, Vitamin Supplements Given to Children by Janice Gossler, R.N. under the supervision of Wilma Peterson, Ph.D. The investigation aims at exploring the use of vitamin supplements given to children by mothers.

It is my understanding that I will be asked to answer questions related to my views on health and use of vitamins for my child. All information that I give will be handled confidentially. My name will not appear on the questionnaire. The answer sheets will be identified by code numbers only.

I may not receive any direct benefit from participating in this study, but understanding that my contribution may help increase knowledge about mothers use of vitamin supplements for children.

Janice Gossler, R.N. has offered to answer any questions I might have about my participation in this study.

I understand I am free to refuse to participate or withdraw from this study at any time without this decision otherwise affecting my medical treatment at the Island Park Pediatric Association Clinic.

"It is not the policy of the Department of Health, Education and Welfare, or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The University of Oregon Health Sciences Center, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occured through the fault of the Center, its officers or employees. If you have further questions, please contact Dr. Michael Baird, M.D., at (503) 225-8014."

I have read the foregoing and agree to participate in this study.

____
(Date)

____
(Subject's Signature)

____
(Witness's Signature)

GRADUATE STUDIES DEPARTMENT
SCHOOL OF NURSING

Area Code 503 225-7838

3181 S.W. Sam Jackson Park Road

Portland, Oregon 97201

UNIVERSITY OF OREGON

HEALTH SCIENCES CENTER

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Janice Gossler, R.N. has offered to answer any questions I might have about my participation in this study.

I understand I am free to refuse to participate or withdraw from this study at any time without this decision otherwise affecting my medical treatment at the Multi-service Center Access Clinic.

"It is not the policy of the Department of Health, Education and Welfare, or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The University of Oregon Health Sciences Center, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occured through the fault of the Center, its officers or employees. If you have further questions, please call Dr. Michael Baird, M.D., at (503) 225-8014."

____
(Date)

____
(Subject's Signature)

____
(Witness's Signature)

APPENDIX B

Vitamin Questionnaire

mother code# ___ ___ 1 2

clinic # ___ 3

VITAMIN QUESTIONNAIRE

1. Mother's education--circle highest level completed ___ ___ 4 5

   Grade school - - 1 2 3 4 5 6 7 8
   High School - - 1 2 3 4
   College - - 1 2 3 4 Degree:____________
   Vocational school - - type: ____________
   Postgraduate - - 1 2 3

   Note: Please answer the following questions by putting an "X" in front of your answer.

2. Family yearly income: ___ 6

   ___under $5,000
   ___5,000-9,999
   ___10,000-14,999
   ___15,,000-19,999
   ___20,000-24,999
   ___25,000-29,999
   ___30,000 or more

3. Are you: ___ 7

   ___Single ___Divorced ___Married ___Widow

4. Do you: ___ 8

   ___Not work away from home
   ___Work part-time away from home
   ___Work full-time away from home

5. Is this clinic the main source of health care for your child? ___ 9

   ___Yes ___No

6. Do you bring your child to this clinic more often for:

   Health check-ups and illness care ___Yes ___No ___ 10
   Illness and injuries only ___Yes ___No ___ 11

7. Is your child at clinic today a: ___ 12

   ___Boy ___Girl

8. How many children do you have? ___ ___ 13

9. Is your child at clinic today the: ___ 14

   ___Oldest Child
   ___Middle Child
   ___Youngest Child
   ___Only child

10. Do you feel your child is usually healthy?

__Yes ___No 15

11. Does your child eat well most of the time?

___Yes ___No 16

12. Are there many foods your child can't take?

___Yes ___No 17

13. Describe your child's activity level: 18

___Not very active
___Normal
___Too active

14. Would you describe your child's development as: 19

___Slow or lagging
___Normal
___Above average

15. Does your child take vitamins?

___Yes ___No 20

16. If you give your child vitamins, do they have iron in them?

___Yes ___No ___Don't know ___Not applicable 21

17. If you give your child vitamins, were they recommended by: 22

___Doctors or nurses
___Family members
___Yourself
___Others
___Not applicable

18. Have the doctors or nurses at this clinic discussed vitamins for your child with you?

___Yes ___No 23

19. If the doctors or nurses have discussed vitamins for your child with you, which statement best describes what they told you: 24

___Your child should receive vitamin pills.
___It doesn't matter if your child receives vitamin pills.

___Your child receives vitamins from foods and taking extra vitamins from pills could be giving your child too many vitamins which could be harmful.
___Your child receives enough vitamins from foods-vitamin pills are not necessary for your child.

20. If you give your child vitamins, how often do you give them? 25

___Everyday during the year
___Everyday during the winter or spring months
___Occasionally, not every day
___Not applicable

21. If you give your child vitamins, do you give extra amounts when your child is sick or not feeling well? 26

___Yes ___No ___Not applicable

22. Who or what influences you the most to give or not give your child vitamins? 27

___doctors and nurses
___family members
___friends
___television
___brochures from doctor
___books
___articles in women's magazines

23. An average recommended daily diet for a pre-school or school age child consists of small servings from the 4 food groups: (Meat-fish group), (Milk-cheese group), (Fruit-vegetable group), and (Bread-cereal group). 28

On a usual day, does your child eat foods from the Meat-fish-egg group, Milk-cheese group, Bread-cereal group and Fruit-vegetable group:

___Rarely eat these foods
___Usually eat these foods
___Always eat these foods

Note: Please write in your answer for the following questions.

24. If your child takes vitamins, please write the kind or kinds he takes: (vitamins not prescribed by a physician or nurse) 29

____

____

__Not applicable

25. What foods does your child usually snack on?

____

____

$\overline{30}$

APPENDIX C

Multidimensional Health Locus of Control

(Wallston & Wallston, 1978)

Multidimensional Health Locus of Control (MHLC) Scale

This is a questionnaire designed to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, then the lower will be the number you circle. Please make sure that you answer each item and that you circle only one number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

Please answer these items carefully, but do not spend too much time on any one item. As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree	
1. If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6	31
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6	32
3. Having regular contact with my physician is the best way for me to avoid illness	1	2	3	4	5	6	33
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6	34
5. Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6	35

	Item	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree	
6.	I am in control of my health.	1	2	3	4	5	6	36
7.	My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6	37
8.	When I get sick I am to blame.	1	2	3	4	5	6	38
9.	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6	39
10.	Health professionals control my health.	1	2	3	4	5	6	40
11.	My good health is largely a matter of good fortune.	1	2	3	4	5	5	41
12.	The main thing which affects my health is what I myself do.	1	2	3	4	5	6	42
13.	If I take care of myself, I can avoid illness.	1	2	3	4	5	6	43
14.	When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6	44
15.	No matter what I do, I'm likely to get sick.	1	2	3	4	5	6	45
16.	If it's meant to be, I will stay healthy.	1	2	3	4	5	6	46
17.	If I take the right actions, I can stay healthy.	1	2	3	4	5	6	47
18.	Regarding my health, I can do only what my doctor tells me to do.	1	2	3	4	5	6	48

APPENDIX D

Vitamins

Name	Characteristics	Biochemical Action	Effects of Deficiency	Effects of Excess	Daily Requirement	Food Sources
Vitamin A (retinol)one I.U. = 0.3 ug retinol	Fat soluble, heat stable; bile necessary for absorption specific binding protein in plasma; stored in liver	Component of visual purple; integrity of epithelial tissues, bone cell function	Night blindness, xerophthalmia, keratomalacia, poor growth, impaired resistance to infection	Hyperostosis, hepatomegaly, alopecia, increased CSF pressure	Infants-300ug; adolescents-750ug; lactation-1200 ug	Milk fat, egg, liver
Provitamin A: B-carotene 1/6 activity of retinol	Converted to retinol in liver, intestinal mucosa			Carotenemia		Dark green vegtables yellow fruits and vegtables tomato
Biotin	Water soluble;synthesized by intestinal bacteria;deficiency only with large intake of egg white	Coenzyme	Dermatitis, anorexia, muscle pain, pallor	Unknown	Unknown	Liver, egg yolk, peanuts
Cobalamin Vitamin B_{12}	Slightly soluble in water, heat stable only at neutral pH, light sensative; absorption (ileum) dependent on gastric intrinsic factor; Co a part of the molecule	Coenzyme component; rbc maturation, CNS metabolism	Penicious anemia; neurologic deterioration	Unknown	1-2 ug	Animal foods only: meat, milk, egg
Folacin group of compounds containing pteridine ring, p-aminobenzoic and glutamic acids	Slightly soluble in water, light sensitive, heat stable; some production by intestinal bacteria; ascorbic acid involved in interconversions; interference from oral contraceptives, anticonvulsants	Tetrahydrofolic acid the active form; synthesis of purines, pyrimidines, methylation reactions	Megaloblastic anemia	Only in patients with pernicious anemia not receiving cobalamin	Infants-60 ug, adolescents-200 ug; pregnancy-400ug	Liver, green vegetables, cereals, orange
Niacin(nicotinic acid,amide)	Water soluble, heat and light stable; availablity from corn enhanced by alkali;synthesized in the body from tryptophan (60:1), some by intestinal bacteria	Component of coenzymes I and II (NAD, NADP), many enzymatic reactions	Pellagra: dermatitis, diarrhea, dementia	Nicotinic acid (not the amide): flushing, pruritus	6.6 mg/1000 calories	Meat, fish, whole grains, green vegetables
Pantothenic acid	Water soluble, heat stable	Component of coenzyme A; many enzymatic reactions	Observed only with use of antagonists depression, hypotension, muscle weakness, abdominal pain	Unknown	Unknown-estimated at 5-10 mg	Most foods

*In R. Hoekelman (Ed.) Principles of Pediatrics, Health Care of the Young.

Vitamins

Name	Characteristics	Biochemical Action	Effects of Deficiency	Effects of Excess	Daily Requirements	Food Sources
Pyridoxine (vitamin B_6) also pyridoxal, pyridoxamine	Water soluble, heat and light labile, interference from isoniazid; pyridoxal is the active form	Cofactor for many enzymes	Dermatitis, glossitis, cheilosis, peripheral neuritis. Infants-irratability, convulsions, anemia	Unknown	Infants - 0.2-0.3 mg; adults-1-2mg	Liver, meat whole grains corn, soybeans
Riboflavin	Water soluble, light labile, heat stable; ? synthesis by intestinal bacteria	Cofactor for many enzymes	Photophobia,cheilosis, glossitis, corneal vascularization, poor growth	Unknown	0.6 mg/1000 calories	Meat, milk, egg, green vegetables whole grains
Thiamine(vitamin B_1)	Heat labile;absorption impaired by alcohol, requirements a function of CHO intake; synthesis by intestinal bacteria	Coenzyme for decarboxylation, other reactions	Beriberi: neuritis, edema, cardiac failure; hoarseness, anorexia, restlessness, aphonia	Unknown	0.4 mb/1000 calories	Liver, meat, milk, whole grains, legumes
Ascorbic Acid (Vitamin C)	Easily oxidized, especially in presence of Cu, Fe, High pH. Absorption by simple diffusion	Exact mechanism unknown: functions in folacin metabolism, collagen biosynthesis, Fe absorption and transport, tyrosine metabolism	Scurvy	Massive doses may lead to temporary increase in requirement	Infants-10-20 mg; adolescents-30mg	Citrus fruits, tomatoes, cabbage, potato, human milk
Vitamin D (D_2-activated calciferol; D_3-activated dehydrocholesterol) one I.U. = 0.025 ug	D_2 from diet, D_3 from action of ultraviolet on skin; hydroxylated sequentially in liver and kidney to form 1,25-dihydrocycholecalciferol, the active compound, regulated by dietary Ca, PTH; now called a hormone; anti-convulsant drugs interfere with metabolism	Formation of Ca transport protein in duodenal mucosa, facilitates bone resporption, P absorption	Rickers, osteomalacia	Hypercalcemia, poor growth, vomiting, nephrocalcinosis	Infants-10 ug (400 I.U.); others-2.5-10u.g. (100-400 I.U.)	Fortified milk, fish liver, salmon, sardines, mackerel, egg yolk, sunlight
Vitamin E (one I.U.= 1 mg -tocopherol acetate)	Stores in adipose tissue, transported with B-lipoproteins; absorption dependent on pancreatic juice and bile (Fe may interfere); requirement increased by large amounts of polyunsaturated fats	Antioxidant, ? role in rbc fragility	Hemolytic anemia in premature infants; otherwise, no clear-cut deficiency syndrome in man	Unknown	Infants-4 mg; adolescents-15 mg	Cereal seed oils, peanuts, soybean milk fat, turnip greens
Vitamin K (naphthoquinones)	Fat soluble, bile necessary for absorption, synthesis by intestinal bacteria	Blood coagulation: factors II, VII, IX, X	Hemorrhagic manifestations	Water soluble analogs only; hyperbilirubinemia	Newborn-single dose of 1 mg, thereafter 5 ug/day; older infants, children-un known	Cow's milk, green leafy vegetables pork liver

APPENDIX E

FOOD AND NUTRITION BOARD, NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL
RECOMMENDED DAILY DIETARY ALLOWANCES, Revised 1974 [a]

Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

								Fat-Soluble Vitamins				Water-Soluble Vitamins							
	Age (years)	Weight (kg)	Weight (lbs)	Height (cm)	Height (in)	Energy (kcal)	Protein (g)	Vitamin A Activity (RE)	Vitamin A Activity (IU)	Vitamin D (IU)	Vitamin E Activity (IU)	Ascorbic Acid (mg)	Folacin' (ug)	Niacin' (mg)	Riboflavin (mg)	Thiamin (mg)	Vitamin B_6 (mg)	Vitamin B_{12} (ug)
Infants	0.0-0.5	6	14	60	24	kgX177	kgX2.2	420	1,400	400	4	35	50	5	0.4	0.3	0.3	0.3
	0.5-1.0	9	20	71	28	kgX108	kgX2.0	400	2,000	400	5	35	50	8	0.6	0.5	0.4	0.3
Children	1-3	13	28	86	34	1,300	23	400	2,000	400	7	40	100	9	0.8	0.7	0.6	1.0
	4-6	20	44	110	44	1,800	30	500	2,500	400	9	40	200	12	1.1	0.9	0.9	1.5
	7-10	30	66	135	54	2,400	36	700	3,300	400	10	40	300	16	1.2	1.2	1.2	2.0

[a] (1979 in press)

APPENDIX F

TABLE A

SELECTED CHARACTERISTICS OF CLINIC USE
(n=40)

Characteristic	Value Number	Value Percent
Source of Health Care		
Main Source	39	97.5
Not main source	1	2.5
Use of Clinic		
Health checkups, illnesses	31	77.5
Illness and injuries only	9	22.5

TABLE B

SELECTED CHARACTERISTICS OF THE CHILD
(n=40)

Characteristic	Value Number	Value Percent
Sex of child		
Male	15	37.5
Female	25	62.5
Number of Children		
One	8	20.0
Two	14	35.0
Three	9	22.5
Four	8	20.0
Five	1	2.5
Placement of child in family [a]		
Oldest	6	15.4
Middle	7	17.9
Youngest	18	46.2
Only	8	20.5

[a] One mother failed to respond to this question

TABLE C

MOTHERS' PERCEPTION OF THEIR CHILD

FROM TWO PEDIATRIC OUTPATIENT CLINICS
(n=40)

Mother's Perception	Values Number	Values Percent
Child's Health		
Usually healthy	39	97.5
Not usually healthy	1	2.5
Child's Eating Habits		
Eats well	40	100.0
Does not eat well	0	
Child's Food Intake		
Can't take many foods	4	10.0
Can take many foods	36	90.0
Child's Diet		
Rarely eat balanced diet	1	2.5
Usually eat balanced diet	28	70.0
Always eat balanced diet	11	27.5
Child's Snacks [a]		
Nutritious	28	75.7
Non-nutritious	9	24.3
Child's Development		
Slow or lagging	0	
Normal	25	62.5
Above average	15	37.5
Child's Activity Level		
Not very active	1	2.5
Normal	29	72.5
Too active	10	25.0

[a] Three mothers failed to respond to this question

TABLE D

MEAN SCORES OF MATERNAL HEALTH LOCUS OF CONTROL

BY VITAMIN GIVING BEHAVIOR (n=40)

Variable	Number	Mean	S.D.	t Value	Degrees of Freedom	1-tail Prob.
Internal						
Group 1	23	24.60	3.474	1.28	38	p=.105
Group 2	17	22.94	4.789			
Power						
Group 1	23	16.83	3.651	-3.96	38	p=.000
Group 2	17	21.76	4.221			
Chance						
Group 1	23	16.87	3.181	.08	38	p=.470
Group 2	17	16.76	5.574			

Group 1 = Mothers that give vitamins

Group 2 = Mothers that do not give vitamins

TABLE E

MEAN SCORES OF HEALTH LOCUS OF CONTROL BY INCOME
(n=40)

Variable	Number[a]	Mean	S.D.	t Value	Degrees of Freedom	1-tail Prob.
Internal						
Group 1	20	22.80	4.432	-1.61	37	.058
Group 2	19	24.89	3.604			
Power						
Group 1	20	21.30	3.799	3.59	37	.0005
Group 2	19	16.79	4.049			
Chance						
Group 1	20	17.55	4.696	1.08	37	.145
Group 2	19	16.05	3.937			

Group 1 = Family yearly income $5,000-$14,999

Group 2 = Family yearly income of $15,000-$30,000 or more

[a] Data on family income was missing for one subject

AN ABSTRACT OF THE THESIS OF

JANICE LOGAN GOSSLER

for the Master of Nursing

Date Receiving this Degree: June 8, 1980

Title: A STUDY OF THE NON-PRESCRIPTION VITAMIN GIVING BEHAVIORS OF MOTHERS OF PRESCHOOL AND SCHOOL AGED CHILDREN

Approved: ______________________________

Many children in the United States receive non-prescription vitamin supplements even though pediatric health professionals advise parents that they are usually unnecessary for healthy preschool and school aged children. Vitamin deficiencies are rare in the United States and the major national nutritional surveys indicate that the majority of children receive an adequate nutrient intake. The American diet contains many vitamin fortified foods and the possibility exists of vitamin toxicity in some children if extra or large amounts of vitamin supplements are given.

The purpose of this study was to examine the vitamin giving behaviors of mothers' of preschool and school age children and the various factors that may influence them to give non-prescription vitamin supplements. The knowledge gained will be useful for nurses structuring and planning health teaching and nutritional and vitamin counseling in the pediatric outpatient setting.

A sample of convenience was drawn consisting of 40 mothers of preschool and school aged children attending two pediatric outpatient clinics. Half of the mothers attended a clinic serving a low socioeconomic group and half the mothers attended a clinic serving a middle income group.

Each mother completed a questionnaire consisting of the researchers "Vitamin Supplement Questionnaire" and the Multidimensional Health Locus of Control scale (MHLC).

Most mothers reported that health professionals did not recommend vitamin supplements for their child. However, the majority of mothers gave non-prescription vitamin supplements routinely. Mothers who gave vitamins listed sources other than professionals as influencing their vitamin giving, while mothers who did not give vitamins listed professionals as influencing them more. Mothers who gave non-prescription vitamin supplements tended to be more "internally" oriented than mothers who did not give vitamins, although the relationship was not found to be statistically significant. "Internality" and socioeconomic status were positively related and the findings were statistically significant. Also, the percentage of children receiving vitamin supplements tended to increase with socioeconomic status. A significant relationship was not found between mothers' vitamin giving and other additional variables examined.

Some problems with the evaluation tools were noted by the researcher. Conclusions were drawn and recommendations for further study were made.