

NUTRITION EDUCATION FOR PREGNANT WOMEN

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INTRODUCTION

The application of good nutrition in preventive health care for mother and child is especially important during the crucial prenatal growth period. One way to improve the diets of pregnant women is to provide nutrition education, although increased knowledge alone cannot guarantee change. Many factors influence a person's eating habits and nutritionists must learn to understand those factors before they can begin to promote changes. The process of change itself is complex and is another factor to consider. Nutritionists can take advantage of a pregnant woman's concern for her baby to promote dietary improvements.

The purposes of this paper are to: 1) discuss the relationship of nutrition during pregnancy to the health of the infant; 2) discuss the philosophy and application of nutrition education; and 3) review nutrition education programs developed for pregnant women.

MATERNAL NUTRITION AND PREGNANCY OUTCOME

Some of the health problems of newborn infants are related to maternal nutrition during pregnancy. The effects of maternal nutrition on the outcome of pregnancy are reflected by several measures of infant health.

Measures of Health

Infant mortality and morbidity. According to Vermeersch (1), infant mortality rate, a measure of deaths occurring during the first year of life, remains high in the United States as compared to several other developed countries. The U.S. ranks thirteenth, with a rate of 16.5 deaths

per 1000 live births in 1974. The largest number of infants die during the first 28 days of life. These neonatal deaths usually are related to prenatal factors, including immaturity. Immaturity can be caused by being born preterm or being born small-for-date. Perinatal mortality varies more directly with birth weight than with actual length of gestation.

Birth weight. Immaturity is reflected in a low birth weight (LBW) of less than 2500 g. Neonatal deaths occur thirty times more often in LBW infants than in normal weight infants. In addition to the higher death rates, Vermeersch (1) cited the high incidence of handicapping conditions which afflict LBW babies, such as cerebral palsy, epilepsy, mental retardation, illnesses, visual and hearing disabilities, behavioral disorders, and learning problems in school. According to the Committee on Maternal Nutrition of the National Research Council (2), the birth weight of the baby is dependent on several factors, including the height and prepregnancy weight of the mother. These factors reflect the nutritional status of the mother; they are based on lifetime dietary habits. A strong positive relationship also exists between the weight gain of the mother during pregnancy and the birth weight of the infant.

Effects of Malnutrition During Pregnancy

Animals. Vermeersch (3) reviewed the use of dietary restrictions of animals during pregnancy to determine the negative effects of malnutrition. The general finding was that maternal malnutrition can be the cause of growth failure and LBW babies. Growth failure was seen on the organ and cellular level as reductions in the number and size of cells in the placenta, in the number of brain cells and head size, and in the size of other organs. The effects of maternal malnutrition on the fetus depend on the timing, severity, and duration of the reduced nutrient intake.

Women. For ethical reasons, only natural nutritional deprivation can be studied in human beings. Wartime situations often impose food restrictions, as in the 1942 seige of Leningrad in Russia (4) and the 1944-45 winter in Holland (5). Studies of pregnancy outcome during these periods indicated that poor nutrition during the early months of pregnancy hindered the development of the embryo and its capacity to survive, while poor nutrition during the last half of pregnancy affected fetal growth by restricting cell size, but not number.

Target Population for Nutrition Education

All pregnant women are considered "high risks" nutritionally. The primary risk of pregnancy is compounded by other factors in a woman's life such as age, race, socio-economic class, height, and prepregnancy weight. While many of those factors remain fixed and cannot be changed with dietary counseling, the amount of weight gained during pregnancy and nutritional intake can be improved with nutrition education. Cross and Walsh (6) defined the categories of women that require particular attention to their nutrient needs during pregnancy. Women less than 17 years old are still biologically immature, so pregnancy is an added stress on their bodies and competes for nutrients necessary for their own growth. Mothers who have experienced a rapid succession of pregnancies are often depleted of nutrient stores. Women with a low prepregnancy weight for height experience a greater incidence of toxemia and premature delivery of the infant. Mothers with a limited weight gain during pregnancy may deliver low birth weight infants. Overweight expectant mothers present a risk not necessarily because of their weight, but because food selections are more likely to emphasize high fat, high carbohydrate foods that are low in proteins, minerals, and vitamins. Low-income mothers generally have a history of poor diet and health plus an inability to purchase

adequate foods during pregnancy; those factors lead to high rates of maternal mortality and infant mortality and prematurity. Some mothers are at special risk because they have limited their food intake to certain groups of foods for religious or other reasons, i.e., vegetarian diets, macrobiotic diets, and fruitarian diets. Even "healthy" mothers need guidance in selecting a high quality diet in order to counter the confusing, conflicting and misleading nutrition information they receive from many different sources.

NUTRITION EDUCATION

Nutrition education has been defined as the "process by which beliefs, attitudes, environmental influences, and understandings about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food resources. ... The fundamental philosophy of nutrition education is that efforts should focus on the establishment and protection of nutritional health rather than on crisis intervention" (7).

Approaches to Nutrition Education

Nutrition education is more than an isolated presentation of facts and information; it also involves an attempt to improve dietary habits. The challenge to nutritionists and dietitians is to find mechanisms by which information is processed and translated into behavioral change, and to determine techniques that motivate and reinforce improved food habits (8).

Rational empirical model. There are many approaches to nutrition education, but some are considered more successful than others. The rational empirical model is based on the assumptions that man is guided by reason and logic and that man acts in his own self interest (9) and possesses a self-responsibility for his own health (10). According to

this model, a direct relationship exists between knowledge and behavior, so all that is needed for a positive change is the proper information provided by the nutrition educator. Evans and Hall (11) described the attitude that "if enough information is communicated and the individual finally believes that certain health practices are harmful, these practices will be changed" as a myth of health education. A program based on this model is easy to design, but is of limited effectiveness since this relationship is actually a rare occurrence. According to Tonon (9), information alone will lead to change only in a few situations:

1. When the client has a need but lacks information on how to get to his/her goal; the program then supplies the necessary information.
2. The client has accessibility of means to reach his/her goal.
3. The information is presented in a culturally acceptable manner which does not conflict with existing beliefs and customs.

A nutritionist must do more than impart information; the focus of the program must be on specific behaviors involved. An emphasis on behavior change is important since the assumption that "attitude change will lead to behavior change" is rarely true. More likely, a change in behavior will cause a change in attitude (11).

Zifferblatt and Wilbur (12) discussed attempts at nutrition education that they did not consider effective. They described the "quick change illusion" as the idea that lasting dietary changes require only a few, highly structured interviews during which the nutritionist explains the rationale for the diet and prescribes changes. This seldom brings about any lasting change in behavior. The "group-therapy illusion" takes the approach that patients can be successfully counseled in groups. Successful change is more likely, however, when nutritional programs can be tailored to individual needs. This one-to-one approach is especially

applicable to pregnancy since women are counseled at various stages of pregnancy and each woman has her own unique problems and concerns.

Behavior modification. Zifferblatt and Wilbur (12) also consider the concept of behavior modification as a panacea to be an illusion. Even though behavioral techniques can help people begin to change long-standing habits, they have not been shown to be useful for long-term change. They conceded that "while certain basic behavioral procedures can improve the chances of a successful counseling outcome, it is an illusion to believe they contain a powerful magic that transforms patients into nutritionally healthy persons." Attempts to control behavior and shape desired responses were termed "social manipulation" by Caliendo (10). This approach is concerned more with behavior response patterns than with how the individual reaches those patterns.

Normative reeducative model. The normative reeducative model is an approach considered appropriate when the response is expected to be negative or when behavior is an integral or habitual part of a cultural subsystem which is not changed easily (9). This model assumes a multiple causality of human behavior and assumes man is inherently active and continually in search of need satisfaction. The rationale for this model suggests that cognitive change is supportive of behavioral change but is unable to produce that change by itself. The program for the normative reeducative model has several unique features:

1. Recognition of natural determinants of change and the inherent motivation of the target population.
2. Involvement of the target in the planning process and in the design of the program.
3. A holistic view of health.

The planning and design of a nutrition education program based on the normative reeducative model can be organized according to the "systems approach," which is defined by Caliendo (10) as a flow of steps needed to achieve the desired objective. The approach consists of input, process, and output. Input involves the managerial elements of the program, such as needs assessment and identification of problems, study of available resources and alternative strategies for intervention, determination of objectives and goals, assignment of resources to implement the program, and staff development to implement the program. A firm organizational base and administrative and budgetary support are crucial for the program. Output consists of evaluation of the process, monitoring the effectiveness of the program, and using feedback for revision and modification.

Input

Assessment. The crucial first step of program planning is assessment of the community, the target population, and at the appropriate time, the individual clients. Adequate counseling is not possible without adequate assessment. This assessment aids the nutritionist in awareness of the aforementioned "beliefs, attitudes, environmental influences, understandings about food, needs, and resources" (7).

Assessment of the community begins with a determination of the need for nutrition education, particularly for the target population. For the population of pregnant women, needs could be assessed by gathering demographic data on the prevalence of LBW babies, infant and maternal morbidity and mortality, patterns of maternal weight gain, and information about the availability of existing nutritional services. Once a need has been established, Lackey (13) stated that the community as a whole should be assessed for social, economic, political, educational, religious, cultural and ethnic characteristics. She also recommended that the community should

be assessed in regard to influential organizations and individuals in the community, the community power structure, mass media and transportation facilities, sources of food supply, sanitation conditions, and climate. Available resources and existing programs should be studied to see where a nutrition education program could be added. Caliendo (10) stated that most successful nutrition education programs have been able to feed into existing networks in a "piggyback" arrangement. Nutrition education thus becomes only one component of a total community health improvement effort.

Assessment of the target population, pregnant women, can be accomplished through review of the demographic data used for needs assessment. Such information gives a general idea of the makeup of a group. Additional information may include where pregnant women are getting their health care, leadership structure in the neighborhoods (opinion leaders), and the successes and drawbacks of similar programs (14). If possible, surveys could be conducted to determine the women's use of existing resources; their attitudes, knowledge, levels of awareness and concern; current nutrition practices; their perception of the accuracy, usefulness, and reliability of current nutrition information; and the type of education to which they would be most receptive (10). All of this information can help to establish the mechanics of where and when the counseling or nutrition education should take place.

Assessment of individual clients occurs after the program has begun, as the counselor meets with each woman. Since an individual's perspective and values are the primary determinants of food habit changes, this step is crucial in adapting a variety of strategies and techniques to meet individual characteristics of the clients (10). Examples of information to determine on an individual basis include: number of previous pregnancies and experiences with them, knowledge of nutrition, motivations

and interests, food shopping and preparation practices and facilities, and education level (14). The counselor should attempt to assess the "felt needs" of the client in order to shape the program by linking goals with these felt needs (9). Also, the patient's expectations are important. Evans and Hall (11) described the self-fulfilling effects of a patient's expectancies. The success of a program will be affected if a client expects dietary changes to be "easy, impossible, uncomfortable, difficult, or expensive." Zifferblatt and Wilbur (12) suggested that the counselor can assess a client's commitment to the effort to change by giving her a simple task to complete, such as completing a food diary. If she is unable to complete this task, she probably will have no commitment to dietary change.

Giffet et al. (14) listed the advantages of adequate assessment and adequate prior information. These include prevention of an inappropriate approach, identification of needs not previously recognized or assumed needs that do not really exist, determination of the most important needs, identification of leverage points (reasonably easy or highly motivated changes) to begin with, identification of barriers to communication, and provision of a base for realistic, clear, sequential objectives and for subsequent evaluation.

Goals and objectives. After completing the needs assessment, identification of problems, and study of available resources and alternative strategies for intervention, the next step is to determine goals and specific objectives (10). Based on the overall goal of improving nutrition during pregnancy, objectives applicable to this group are to: 1) increase nutrition knowledge for pregnant women; 2) motivate change of eating behavior where necessary; 3) improve nutritional status of mother and fetus (as measured by maternal weight gain); 4) decrease the incidence of

LBW babies; and 5) decrease maternal and infant morbidity and mortality. The objectives then can be used to design the content of a nutrition education program.

Process

Before implementing the program, a good nutrition educator should have a knowledge of nutritional principles related to pregnancy, basic interviewing and interpersonal skills, concern for the clients and a sensitivity to their needs, and perhaps most importantly, a knowledge of behavioral and social principles (15). These principles are important in choosing a general model to follow in assessing individual clients and adjusting the program so it is relevant for each woman.

Assessment of client. Before any sequence of communication begins, the counselor should learn as much as possible about the person in relation to the program. The client can be interviewed for relevant information, attitudinal and behavioral data (11). Relevant information could be obtained through an informal discussion during the first session, including such things as dietary patterns, nutrition knowledge, weight gain during the pregnancy, number of previous pregnancies and any difficulties, whether or not she wants this baby, family support of the pregnancy (how does her spouse feel about it?), economic situation (money available for food purchases), and educational level. Giffit et al. (14) suggested three basic principles to follow in this fact-finding process. First, ask questions, but carefully choose the questions so they are not easily answered by a "yes" or "no" reply. Second, listen for meaning behind the answers. Third, be willing to adjust to the answers, even if they do not fit expectations.

The information gathered by the type of questions mentioned can be used not only to adjust the program for individual needs, but also to

determine the client's motivation and the probability of change based on socioeconomic variables and family support. Giffet et al. stressed that all of this preparation is important for a successful program, especially since educational programs often concentrate principally on the message and too little on the message receiver (14).

Involvement of client. Involvement of the client in all stages of the program, not just the assessment stage, is of major importance. The person's involvement in determining her own goals, finding her own method for meeting those goals, and evaluating her own progress will greatly increase the probability of success of the nutrition education efforts. Involvement of the client prevents passive participation and encourages her to be in control of behavioral changes. Tonon (9) suggested that the most effective and efficient way to guarantee desired input may be through "consumer participation," particularly if an extensive analysis of the social system surrounding the target population is not practical or possible. The normative reeducative strategy she referred to incorporates a strong component of client participation. The program thus becomes a "joint enterprise" between the client and professional. This "cooperative venture," as Mahoney and Caggiula (16) referred to it, encourages the client to take responsibility for her own contribution to change, helps her learn a problem-solving approach to nutritional care, and prevents dependence on the health professional. Smiciklas-Wright and Krondl (15) considered such dependency inappropriate in prevention programs and emphasized that the counselor should be seen as a consultant, not a miracle worker.

Locus of control. Evans and Hall (11) referred to this joint effort of the client and counselor working together to maintain good health as a "therapeutic alliance." Thus, the dietary program does not consist of

a counselor giving orders for the client to follow, but rather requires the client to make choices and decisions since she is the one carrying out the dietary program. This approach works better with people having an internal "locus of control," or people who function best when in control of a situation themselves. Kanfer and Karoly (17) defined this characteristic as "beta-regulation," or the process by which persons are able to maintain or alter behaviors in the absence of immediate external supports. The opposite behavior is "alpha-regulation," which responds to direct influences of the external environment.

A person who has more of an external "locus of control" may, in the short term, respond better to the "medical model" of health care that fosters a dependence on the health professional. This approach suggests to the client that the job cannot be done without the health professional, requires only that she follow instructions, and rewards or reprimands come externally from the professional. The client is not encouraged to develop the self-sufficiency which can lead to a true change in behavior (11).

While an understanding of a person's locus of control may offer some perspective to nutritionists, Evans and Hall (11) commented that this trait does not warrant too much serious consideration since it often does not relate across situations. Regardless of a person's need for external control, the medical model of dependency should not be considered useful for effective long-term change. The psychology of learning suggests that any information or behavior to be learned should not be imposed just by the counselor, but rather, a more likely long-term change in behavior will occur if the client is an active participant at every stage of the dietary modification program. Vargas (18) supported this premise, and stated that "the most efficient way to change

behavior is to get the student or patient to do something." That "something" involves working with the nutrition educator to develop goals, objectives, and activities and resources to meet these goals, based on the nutrition information provided by the educator.

The nutrition message can be communicated at appropriate points during the counseling sessions. In order to involve the client, the counselor should not simply provide all the information for her, but should ask the client questions that make her think about her diet. For example, in going over the client's dietary patterns, the nutritionist could go through the four food groups and ask her how many servings of each she eats per day, and where she thinks increases need to be made and why. The nutritionist can ask the client how much weight she expects to gain and then correct her answer, if necessary. The nutritionist can emphasize the importance of eating more during pregnancy, and the need to gain weight for proper growth and health of the baby. The client could be asked to list the sources of the extra weight, in addition to the baby. The nutritionist can then expand on the client's answers and explain the importance of the extra tissues for a healthy baby.

Evans and Hall (11) suggested analyzing communication of nutrition education in terms of the client's attention, comprehension, retention, and yield. Attention can be checked by asking questions about the content of the message. If the client is involved, attention should not be a problem. Comprehension is determined by obtaining feedback to make sure that the counselor is using an understandable language level and that the message is understood. Retention also can be checked with feedback. Yield is measured by the degree to which the client gives up existing behaviors or beliefs and replaces them with different ones.

Motivation. Once the client comprehends the need for dietary changes, the nutritionist can help her devise a plan for implementing change. The learner's motivation is a key factor in her willingness to learn about nutrition and to change dietary behavior (14). Operant psychology holds that behavior is maintained by consequences immediately following it. Motivation for change can be increased by building immediate positive consequences for the desired behavior (18). Although Tonon (9) stated that "most health-related behavior is motivated by factors other than a conscious concern for health," the circumstances may be different during pregnancy. Giffet et al. (14) conceded that health alone is not a powerful stimulus, "except at periods in life when these concerns are high." Pregnancy is considered a time of high motivation (8), but additional understanding of motivation is important.

Success in following the dietary program is one consequence which can in itself encourage further effort (18). A person's satisfaction in handling the situation must be a central reinforcer, in order to prevent dependence on the counselor. The client is thus not merely pleasing the nutrition educator by following the diet, but is doing something good for herself (11). The long-range reinforcer, of course, will be the birth of the baby. The knowledge that good dietary practices during pregnancy will increase the chances of having a healthy, normal baby hopefully will provide a continuous source of motivation. The counselor should emphasize that good nutrition cannot guarantee a perfect baby, but certainly improves its chances for a good start in life.

Fear of prematurity or other negative results of the pregnancy also may be a motivator, although use of the fear tactic is of questionable value. Guthrie (8) stated that fear of the health consequences of nutritional behavior is a more potent motivating factor than "extensive

knowledge of nutritional need and food composition." Evans and Hall (11) referred to the use of fear as a motivator in a program to improve dental hygiene. They indicated that a moderate fear appeal with general instructions was a more effective motivator than a strong fear appeal. They stated that highly specific instructions with no emotional appeal was the most effective motivator; while general instructions plus a positive appeal (emphasis on the good, favorable results for the individual) also was effective.

Change. Eating behavior is a part of a person's lifestyle, shaped from early development by physiological, psychological, socioeconomic, educational, and cultural factors. Pregnancy is a state that is subject to additional influences on eating behavior, such as cultural advice and cravings (pica). A person's food habits are also a part of self-image and are a form of self-expression (19). Attempts to change such behavior can be difficult without recognition of this interaction (7). Initiation of change due to high motivation does not guarantee long-term change; the new eating pattern must become an automatic part of the client's lifestyle (11). While a nine-month pregnancy might not be considered a long-term change, the nutritionist can build on improved habits for longer term nutritional health that may affect the client's family also.

Social-psychologic insights into the development of food behaviors can be helpful to nutritionists as they develop strategies for nutrition education. As much as possible, the nutritionist should attempt to build on the current eating practices to affirm positive behavior (6). With this approach, there is less chance of overstepping cultural bounds or offending the client, thus creating a block to communication.

Phases of change. Planned behavioral change involves several phases. The first phase, awareness, encompasses the client's identification

of the problem, interpretation of facts, and identification of a course of action. The second phase, development of a receptive framework for learning, requires the establishment of the credibility of the nutrition educator, assessment of prior perceptions about food and nutrition, and a listing of desirable changes with an assessment of their feasibility. The third phase, the trial or experimentation stage, involves a testing of techniques or programs until acceptable ones are identified. The fourth stage, reinforcement, consists of strengthening the learning gained during the experimentation phase. The final phase, adoption of change, is a guiding of the decision to accept the change and put it into practice (7, 14). Smiciklas-Wright and Krondl (15) referred to the stages of change as the "innovation-decision process," listed as knowledge, persuasion, decision, and confirmation. The phases of change parallel the outline for planning a program (assessment, objectives, process).

As stated earlier, successful long-term change requires active client involvement in the planning, execution and evaluation of the nutritional program (12). The nutrition educator guides the client in forming her own goals and objectives, based on nutrition information communicated as an integral part of the counseling sessions. These goals should begin with small realistic steps in order to increase the likelihood of success (18).

Output

A process that should not be overlooked in any nutrition education program is evaluation, which is necessary to monitor the effectiveness of the program (10). Evaluation of improved nutrition knowledge and attitudes is not usually a reliable index of behavioral change. If possible, a more realistic evaluation can be obtained by measuring actual alteration of eating behavior (11). In evaluating a nutrition education program for

pregnant women, the client and counselor could go over dietary recalls together to discuss changes in eating habits, and the client's weight gain could be charted to visually display her progress. The counselor could record birth weights of the babies as an additional evaluation of the program.

NUTRITION EDUCATION PROGRAMS

Location and Administration of Programs

Prenatal clinics. Prenatal clinics, which often serve the indigent population, have been used as sites to contact mothers for nutrition education (20, 21, 22, 23). Usually a nutritionist or dietitian counseled the women at the time of their regular clinic visits (20, 22, 23), a time that was convenient for both parties. In fact, Hunt et al. (20) found that the women would not come to nutrition classes offered at times other than their clinic appointments. Attendance rates were so low that their program was limited to five one-hour classes, with the average attendance being three classes. In two prenatal clinics studied by Nobmann and Adams (21), the doctors provided nutrition information during clinic visits, but this instruction varied in accuracy, adequacy, and consistency. Jones (22) observed that clinic visits met a non-nutritional need for the women, since the presence of other women in the waiting room made it a social occasion. This escape from routines at home increased patients' willingness to come to the clinic. The women who made regular visits were more willing to make changes, perhaps due to the continued support and encouragement of the nutritionist, who suggested rates of change that were not too drastic.

A nutrition education program in East Harlem (23) was administered by a nutritionist in a prenatal clinic; 24-hour dietary recalls were used

as guides for individual counseling. The teaching was reinforced with home visits by Expanded Food and Nutrition Education Program (EFNEP) aides. The nutritionist spoke with the women at their first clinic visit, and then at the second visit about one to four months later, usually during the third trimester of pregnancy. In addition to this counseling, many of the women also received the assistance of an EFNEP aide who visited them an average of five to six times during the pregnancy.

Physicians' offices. A unique approach was used in a recent Arizona program to provide nutrition education for pregnant women in private physicians' offices (24). Since funds were not available for the program, and since neither the patients nor their physicians were willing to pay for the service, the Arizona Dairy Council nutritionist worked in conjunction with several senior dietetics students from Arizona State University. The students were engaged as nutrition counselors in doctors' offices to provide a learning experience for them and a free service for the patients. The counseling sessions were scheduled concurrently with the patients' regular monthly prenatal check-up, and each patient was seen at least three times (by the same student).

Physicians themselves are often the main source of nutrition information for pregnant women. In 1975 Schwartz and Barr (25) conducted a survey in Canada to determine the results of physicians' nutritional instruction. The physicians generally conveyed a positive attitude about the importance of nutrition in pregnancy, but approximately one-third of them still believed salt-restricted diets were necessary for the majority of pregnant women. Even though physicians were considered the primary source of nutrition information, women who attended prenatal classes (almost half of the women surveyed) scored higher on tests of nutrition attitudes than women who named their physician as a primary source of

information. The prenatal classes were a free service of the Vancouver City Health Department, and included information on nutrition during pregnancy and lactation.

Prenatal nutrition classes. Halliday (26) looked more specifically at prenatal nutrition classes and their effect on pregnancy outcome. As a part of a series of prenatal classes held at a hospital in Canada, one two-hour nutrition class was conducted for the women and their husbands. Positive changes in nutritional habits did occur, and nutritional adequacy of the mother's diet and her weight gain during pregnancy did have a positive effect on birth weight. Having both parents attend the classes was a way to improve the nutritional habits of both and thus hopefully positively affect the nutritional status of the family, since parents' attitudes and eating patterns influence those of their children.

Waiting rooms. Since a pregnant woman has periodic appointments with her doctor she may spend a considerable amount of time in waiting rooms. Seifrit (27) suggested that this time could be used by a nutritionist to present demonstrations discussing nutritious foods, their purchase and preparation, and to provide samples of the foods for the patients to taste.

Common Nutritional Deficiencies

Generally, evaluation of dietary patterns is based on the most current Recommended Dietary Allowances (RDA) available at the time of a study. An intake of a nutrient that is at least two-thirds of the RDA is generally considered adequate while lower intakes may be suboptimal (21, 23, 28).

In assessing individual clients, many nutritionists have emphasized the importance of being familiar with the background, beliefs, and customs of an individual before determining her nutritional status and subsequently giving constructive guidance (6, 22, 23, 25, 29). In a broad sense, the food habits of an individual tend to reflect those of her environment, so

it is important for nutritionists to be aware of regional, national, and religious food customs (29). People cannot be stereotyped according to their ethnic backgrounds, but an understanding of typical diets for particular cultures or geographical regions aids in evaluation of deficiencies of a population and allows flexibility in prescribing diets or writing menu plans for a client in order to fit her particular tastes.

Southeastern United States. An early study of low-income pregnant women's eating habits in the southeastern United States was done in the 1950's (22). The typical diets were low in protein, vitamin A, riboflavin and vitamin C due to low intakes of milk, meat, fresh fruits and vegetables, and a high carbohydrate intake.

Bartholomew and Poston (29) reported in 1970 that a group of pregnant women from the southern United States, primarily blacks, had low intakes of calcium, protein, iron, vitamin A and vitamin C. Many of these women expressed a dislike for milk and milk products. They also recounted a number of superstitions and bizarre food customs surrounding pregnancy. One of the bizarre food habits, known as pica, was a craving for laundry starch, clay, baking powder, and other substances. Pica is considered detrimental because it may interfere with absorption of nutrients or suppress the appetite.

New York Blacks and Puerto Ricans. A study of pregnant women done in the East Harlem area of New York in the 1970's gave some insight into dietary patterns of blacks and Puerto Ricans in the U.S. (23). Low intakes of energy, calcium, iron, vitamin A and vitamin C were frequently seen, due to low consumption of milk, milk products, fruits and vegetables. The black women generally had higher intakes of most nutrients except calcium, due to a higher consumption of fruits and vegetables but less milk than the Puerto Ricans.

Mexican Americans. Cardenas et al. (28) and Hunt et al. (20)

published studies in 1976 dealing with the diets of pregnant Mexican American women in California. The findings of Cardenas et al. (28) correlate with those of the Ten-State Nutrition Survey (30) and indicate that diets of many Mexican Americans are low in iron, vitamin A, and calcium. Mexican American food patterns do not include an abundance of meats, milk, or fruits and vegetables. Hunt et al. (20) also found low intakes of iron, vitamin A, and calcium, as well as low intakes of thiamin and calories for a large number of women. The women's diets in the study by Hunt et al. (20), however, did not fit the stereotype of a high-carbohydrate, high-fat diet, but were well balanced among the energy nutrients, with 50% of the calories from carbohydrates, 35% from fat, and 15% from protein. In another California study, pregnant women including some Mexican Americans ingested low intakes of iron and vitamin A (21).

Adolescents. Although not a cultural subgroup, the diets of pregnant adolescents also have some common deficiencies. In the Ten-State Nutrition Survey (30), adolescents aged 10 to 16 had the least satisfactory nutritional status of any age group studied. Weigley (31) reviewed nutritional research on pregnant adolescents done between 1969 and 1973 which indicated that suboptimal intakes were common. A study conducted in San Francisco (32) indicated that pregnant adolescents had inadequate intakes of calcium, iron, vitamin A, and energy. Pregnant 11 to 18 year olds were studied in Syracuse, New York (33), and the great majority had low intakes of iron, calcium, vitamin A, and protein.

Individual Assessment

While an understanding of common nutrient deficiencies seen in pregnancy provides a starting point for a nutritionist, nutrition counseling must still be tailored to each woman's individual circumstances

and dietary patterns. Various factors besides ethnic or geographical background that have been assessed include social and economic data, educational level, presence of other relatives in the home (22); season of the year, food habits of the family (27); age of the woman, number of pregnancies, and duration of residence in present location (23). Individual dietary patterns also should be assessed by use of a dietary history and a 24-hour dietary recall. Food models and food measuring devices can be used to assist the client.

Nutrition knowledge. A survey of nutrition knowledge and attitudes also is helpful in determining topics that need to be covered in a nutrition education program. Nutritional knowledge can be assessed with questions such as those used by Cardenas et al. (28). Patients were given an example of a nutrient (carbohydrate) and were asked to name another type or category of nutrient. When given a list of foods, the patients were asked which ones would be good sources of protein, iron, vitamin C, or calcium. From another list of foods, each woman was asked to select two foods she thought were most important to eat during pregnancy.

Nutritional attitudes. Nutritional attitudes that have particular relevance at present include whether a woman believes her eating habits affect the health of her baby (22, 25), how much weight a woman thinks she should gain during pregnancy (29), and whether she thinks she should restrict her sodium intake (25). The general recommendations of the National Research Council Committee on Maternal Nutrition (2), that intake of calories and sodium should not be restricted and that nutritional state of the mother is important for the health of the baby are slowly filtering down through obstetricians to their patients (25), but many pregnant women still have misconceptions about these subjects (25, 29). Thus, nutrition education efforts should concentrate on those issues, emphasizing

the relationship between a mother's diet and her baby's health, and conveying the fact that calories and sodium do not need to be limited in a normal pregnancy.

Nutrition Education Information

Source, function, and quantity of nutrients. Once a pregnant woman understands the importance of eating a nutritious diet, the nutritionist can teach her about good sources of important nutrients, emphasizing the ones commonly found to be inadequate (protein, calcium, vitamin A, vitamin C), their function, and the quantities of certain foods she should eat to get these nutrients. Cross and Walsh (6) recommended using food models to help explain portion sizes and menu plans to describe an adequate diet. These menu plans should be adapted to cultural differences, such as typical Mexican, Black, Oriental, American Indian, or vegetarian diets. If a woman does not like or cannot tolerate a particular food, substitutions should be discussed with her.

Weight gain. In discussing weight gain with a pregnant woman, models can be used to illustrate the individual components of weight gain. As an example, blocks could be used to illustrate the proportionate size of each component. Table I lists the components of average weight gained in a normal pregnancy.

While a total weight gain of 26 to 30 pounds is recommended, the pattern of weight gain is also important. Recommended rates suggest a gain of two to four pounds during the first trimester, with a gain of about one pound per week thereafter (35). Although maternal weight gain is positively related to birth weight, Cardenas et al. (28) pointed out that weight gain alone is not as important an indicator of birth weight as the quality of nutrition during pregnancy. They suggested that the focus of a health program should not be on weight gain but should be on

fetal and maternal health, with maternal weight being a product of that consideration.

TABLE 1
Components of weight gain during pregnancy (adapted from 2, 34)

Component	<u>Amount gained at 40 weeks</u>	
	grams	pounds
A. Total gain of body weight	12,500	24-28
Fetus	3,300	7.5
Placenta	650	1.0
Amniotic Fluid	800	2.0
Increase of:		
Uterus	900	2.5
Mammary Gland	405	3.0
Maternal Blood	1,250	4.0
B. Total (rounded)	7,300	
C. Weight not accounted for (A-B)	5,200	
D. Maternal Stores		4.0-8.0

Results of Nutrition Education

Success. In virtually all of the nutrition education programs reviewed positive changes were reported (20, 21, 23, 24, 26). Increased food intakes were apparent from comparisons of 24-hour dietary recalls administered before and after nutrition education. Some of the changes were short-term and made only for the duration of the pregnancy. For example, black women studied by Bowering et al. (23) decreased their consumption of milk products after delivery. In one survey (21), increased appetite was mentioned as the primary reason for increased food consumption, which most certainly enhanced positive short-term changes.

Many other variables influenced the degree of success of particular programs. Jones (22) listed several of the variables that increase a woman's degree of cooperation with a program. The fact that the women she studied were given a "special" diet prescription had a certain amount of "prestige value." Primiparas showed more interest in the birth of their babies and also were generally younger than other patients and thus perhaps less resistant to change. Interest in the course and outcome of the pregnancy motivated cooperation. The suggestions for inexpensive food items to supplement the diet increased the probability of change, as did ensuring that the "pregnancy diet" was compatible with present food habits. An awareness of the significance of dietary instructions, or an understanding of the relationship between her diet and the baby's health also increased a woman's motivation. A nutritionist who was old enough to have a "motherly" appeal also seemed to help, as did having a similar cultural background as the patients. A nutritionist who saw a client on several consecutive visits was able to offer support and affirmation for progress. Bowering et al. (23) found that the duration of residence at the present location affected a patient's cooperation; they found that women who had lived in an area longer had made more contacts in their community and were thus less dependent on and less receptive to help from EFNEP aides. Those women also tended to have better diets than the women who had lived in the community for a shorter period of time. Often the greatest dietary improvement was seen in the women who started with the poorest diets (20, 23). Throughout the nutrition counseling sessions, the counselor should heed the advice of Cross and Walsh (6), that "A thorough uncovering of the positive practices in a diet, re-enforcing these practices, and suggesting foods to further improve the diet will better motivate to change than will criticisms and anxiety producing prophecies of doom."

Failure. On the negative side, Jones (22) observed several factors that inhibited cooperation in a prenatal clinic nutrition program in North Carolina. Since food was an integral part of each woman's culture, an incompatibility between dietary instructions and current food practices did not bring successful change. If the woman lived with other relatives ✓ who dominated her or helped with meal planning and preparation, or if her husband controlled the money and bought groceries, little cooperation was seen. Limited incomes and poor money management also were problems. ✓ Some women were resistant to change or unwilling to try anything new. ✓ Some had physiological or idiosyncratic reasons for not eating certain foods, or they had special notions about certain foods (an example of such a "food magic" belief is that cabbage induces early labor). Some patients ✓ did not realize or accept the relationship between diet and outcome of pregnancy, so little cooperation could be expected. An unwanted pregnancy ✓ was also a negative factor in a woman's cooperation with dietary suggestions.

RECOMMENDATIONS

1. Since a pregnant woman's nutritional status is dependent on lifelong dietary habits, nutrition education should ideally begin as early as possible for all children, either in preschool or elementary school (2, 28).

2. In order to provide nutrition education for the special population of pregnant adolescents, a task force at the National Conference on Nutrition Education (36) recommended that nutrition education in junior and senior high school include nutritional aspects of preparation for pregnancy, and all programs for pregnant adolescents should be encouraged to include nutrition education.

3. Nutrition education aimed directly at pregnant women should be delivered at locations they frequent, such as prenatal care clinics and doctors' offices.

4. In order that doctors will have accurate and consistent information, the Committee on Maternal Nutrition (2) recommended that medical schools include more nutrition education in their curricula. In addition, doctors should be convinced of the merits of nutrition education and the importance of referring pregnant clients to professional nutrition counselors.

5. One suggestion made at the Conference on Nutrition Education (36) was that nutrition counseling as a component of prenatal care should be reimbursable through health insurance.

SUMMARY

Good maternal nutrition has a positive effect on pregnancy outcome. A mother's lifelong dietary habits affect her height and prepregnancy weight, which influence the birth weight of her baby. The quantity and quality of her intake during pregnancy determines her weight gain, which also influences birth weight. Women having a low prepregnancy weight for height or a limited weight gain during pregnancy may deliver low birth weight babies. Low birth weight babies have a greater risk of infant mortality and various handicapping conditions.

All women are at nutritional risk during pregnancy, but certain categories of women need special attention to their nutrient needs. Those categories include adolescents, multigravidas, women with a low prepregnancy weight for height or a limited weight gain, overweight women, low-income women, and women who have limited their food intake.

Nutrition education is more than disseminating relevant information; it also involves an attempt to improve food habits. Certain approaches to nutrition education are not very effective, such as the rational empirical model, attempts at "quick change," group therapy, and behavior modification. A more realistic approach is the normative reeducative model, which recognizes the multiple causality of human behavior and tries to work with those multiple factors. A nutrition education program can be organized according to the systems approach, with input, process, and output. Input involves the managerial elements of a program and includes assessment of needs and setting goals and objectives. Process involves implementation of the program, while output is the evaluation of the program.

Nutrition education programs have been set up in prenatal clinics, doctors' offices, and as part of prenatal classes. Dietary intake was assessed with diet histories and 24-hour recalls, while nutrition knowledge was assessed with questions about nutrients and their sources. Nutrition attitudes were assessed with questions about the relationship between nutrition and the outcome of pregnancy, expected amount of weight gain, and the need for sodium restriction. Diets of many of the pregnant women studied were low in protein, vitamin A, vitamin C, calcium, and iron due to low intakes of milk, fruits, and vegetables. The nutrition education programs that were offered dealt with dietary inadequacies, emphasizing deficient nutrients, their function, and their sources. They also involved improvement of attitudes about nutrition related to pregnancy.

Improved dietary intakes of pregnant women were recorded in all the nutrition education programs reviewed. Certain factors which increased the success of the programs included food suggestions compatible with the income and cultural preferences of the women, several visits with the

same nutritionist, and a woman's awareness of the relationship between nutrition and the health of her baby. The greatest improvement was seen in women who started with the poorest diets. Factors which had a negative influence on some women in the programs were dominating relatives in the home, low incomes and poor money management, a lack of understanding of the relationship between nutrition and pregnancy outcome, an unwanted pregnancy, or superstitious notions about certain foods.

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NUTRITION EDUCATION FOR PREGNANT WOMEN

by

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AN ABSTRACT OF A MASTER'S REPORT

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