USDA United States Department of Agriculture
Food and Nutrition Service

DIETARY RISK ASSESSMENT IN THE WIC PROGRAM

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Background

Dietary intake patterns of individuals are complex in nature. However, assessing these complex patterns has been fundamental to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) since its inception. The WIC program, which provides nutritious supplemental foods, nutrition education, and health referral services to low-income pregnant or postpartum women, infants, and children to age 5 years, requires applicants to meet one of several nutrition risk categories in order to be eligible for program services; dietary risk is one of these categories. Others include anthropometric risk (e.g., underweight, overweight), biochemical risk (e.g., low hematocrit), medical risk (e.g., diabetes mellitus), and other predisposing factors (e.g., homelessness). Since funds are not always available to meet the needs of the number of applicants determined to be eligible, a priority system is in place in which nutrition risk criteria are categorized based on severity of potential effect and outcome.

The role of dietary assessment in establishing eligibility for WIC is a crucial one, especially for postpartum women and children. As stated above, although eligibility may be based on many kinds of nutritional risks, substantial numbers of postpartum women and children currently are found to be eligible only on the basis of dietary risk. The practice of assessing dietary intake is widespread in part because, for those found to be at nutritional risk, the dietary data also influence the contents of the food package made available, nutrition education, and, sometimes, referrals. For this reason, even though many applicants are found to be at nutritional risk for a reason other than dietary risk, 86 percent of state agencies assess the dietary intake of all WIC participants. The practice consumes considerable time resources on the part of both WIC personnel and their clients.

In any venue, the assessment of dietary risk poses a challenge. Indeed, in an earlier report, the Institute of Medicine stated, “Research is urgently needed to develop practical and valid assessment tools for the identification of inadequate diets” (IOM, 1996). Moreover, a joint working group of the National Association of WIC Directors and of the Food and Nutrition Service of the U.S. Department of Agriculture did not find a sufficient scientific basis for developing standardized criteria for two major types of dietary risk: failure to meet Dietary Guidelines and inadequate diet. These are the two types of dietary risk that WIC personnel use extensively as the sole basis for determining that postpartum women and children are at nutritional risk.

Failure to meet Dietary Guidelines refers to the 10 guidelines in the Dietary Guidelines for Americans (USDA/HHS, 2000). These guidelines emphasize overall dietary and lifestyle patterns that can help to achieve favorable long-term health outcomes. Based on current knowledge about how dietary and physical activity patterns may reduce the risk of major chronic diseases and how a healthful diet may promote health, the 10 guidelines are designed to serve as the basis for federal policy and are used to guide nutrition information, education, and interventions for federal, state, and local agencies.

Embedded in the guidelines is the Food Guide Pyramid—one of the major tools used for consumer nutrition education in the United States. The Pyramid incorporates many of the Dietary Guidelines and gives concrete recommendations that promote moderation, balance, and variety in food intake.

The Task

Because of concern about the quality of dietary assessment methods and the resources in WIC required for using them to establish nutritional risk, the Food and Nutrition Service asked the Institute of Medicine (IOM) for assistance. In particular, it contracted with the IOM's Food and Nutrition Board to evaluate the use of various dietary assessment tools and to make recommendations for the assessment of inadequate or inappropriate dietary patterns, especially in the category failure to meet Dietary Guidelines. The Food and Nutrition Service asked that an expert committee propose a framework for assessing dietary risk among WIC applicants and identify and prioritize areas of greatest concern when the Dietary Guidelines are incorporated in WIC. In doing so, the committee was asked to focus on tools that could identify dietary risk of individuals accurately and thus be suitable for eligibility determination. The committee was also asked to recommend specific cut-off points for the criteria and to consider both food-based and behavior-based approaches. This report addresses those topics. However, since the Dietary Guidelines apply only to individuals ages 2 years and older, the focus is on pregnant and postpartum women and children.

Current Practices

Since standardized criteria have not yet been established for failure to meet Dietary Guidelines or inadequate diets, state WIC agencies currently select the method and cut-off points to be used by their agencies. The most commonly used methods are 24-hour diet recalls and food frequency questionnaires. WIC personnel generally compare dietary intake data obtained using one or both of these methods with specified numbers of servings from each of the five basic food groups of the Food Guide Pyramid. In most cases, the methods used appear not to have undergone studies of accuracy or reliability. Many state WIC agencies use the Food Guide Pyramid servings as a standard for children ages 12 to 24 months even though the Pyramid was designed for persons ages 2 years and older.

A Framework for Assessing Dietary Risk

In an interim report (IOM, 2000c), the Committee on Dietary Risk Assessment in the WIC Program proposed a framework that consists of eight characteristics essential to a food-based and/or behavior-based tool designed for eligibility determination. That framework has been modified slightly in this report. An optimal tool should:

- use specific criteria that are related to health or disease;
- be appropriate for age and physiological condition (e.g., pregnancy or lactation);
- serve three purposes: screening for eligibility, tailoring of food packages, and nutrition education;
- have acceptable performance characteristics (validity and reliability);
- be suitable for the culture and language of the population served;
- be responsive to operational constraints in the WIC setting;
- be standardized across states/agencies; and
- allow prioritization within the category of dietary risk.

The committee considered these characteristics as it examined possible methods for determining dietary risk.

Findings

Basing Risk Criteria on the Dietary Guidelines

Focusing on the single guideline Let the Pyramid Guide Your Food Choices was determined to be the most feasible, comprehensive, and objective approach to using the Dietary Guidelines for establishing dietary risk for those individuals 2 years of age and older. Based on review of the Dietary Guidelines and the scientific underpinnings of the Food Guide Pyramid, the committee determined that this approach should use the recommended number of servings based on energy needs as the cut-off point for each of the five basic food

groups. For example, the criterion for active, pregnant, adult women would be at least nine servings from the grains group. A majority of state WIC agencies already use some version of this approach as the basis for setting a criterion that addresses the dietary risk failure to meet Dietary Guidelines.

Finding 1. A dietary risk criterion that uses the WIC applicant's usual intake of the five basic Pyramid food groups as the indicator and the recommended numbers of servings based on energy needs as the cut-off points is consistent with failure to meet Dietary Guidelines.

Prevalence of Dietary Risk Based on the Food Guide Pyramid Recommendations

More than 96 percent of individuals in the United States, and an even higher percentage of low-income individuals (such as those served by WIC), do not usually consume the recommended number of servings specified by the Food Guide Pyramid (Krebs-Smith et al., 1997; Munoz et al., 1997). Thus, the identification of individuals who are not at dietary risk becomes highly problematic.

Finding 2. Nearly all U.S. women and children usually consume fewer than the recommended number of servings specified by the Food Guide Pyramid and, therefore, would be at dietary risk based on the criterion failure to meet Dietary Guidelines that is described in Finding 1.

Food-Based Assessment of Dietary Intake

Nutritional status and health are influenced by usual or long-term dietary intake. For this reason, dietary assessment for establishing WIC eligibility should be based on usual intake. Day-to-day variation in food and nutrient intake by individuals is so large in the United States that one or two 24-hour diet recalls or food records cannot provide accurate information about an individual's usual intake. In the WIC setting, it is impractical to obtain more than one or two recalls or records under standardized conditions that would promote accurate reporting. Moreover, most people make many errors when reporting their food intake because of the complex nature of the task. These errors increase the likelihood that eligibility status for WIC will be misclassified in the category of dietary risk.

Food frequency questionnaires (FFQs) are designed to assess usual intake and may be practical to administer to many WIC clients. However, they are subject to many types of errors, and their performance characteristics are unsatisfactory for determining individual eligibility. For example, when reported food or nutrient intakes from an FFQ are compared with the values obtained using a large number of research-quality diet recalls or food records, correlations generally range between 0.3 and 0.7. Although correlations in that range may be considered satisfactory for making inferences about intakes by groups of individuals in epidemiologic research, such data cannot accurately classify individuals as above or below set cut-off points—a serious problem when the goal is determining the eligibility of an individual. Shortening FFQs generally makes them more responsive to operational constraints, but further reduces their accuracy and utility.

Few practical methods have been developed or tested that compare food intakes with the Dietary Guidelines or Food Guide Pyramid recommendations. Such methods would require converting amounts of each type of food consumed to Pyramid portions to determine whether the Food Guide Pyramid recommendations had been met. This is a complex process, especially for mixed dishes, and does not lend itself to operational constraints in the WIC setting.

Finding 3. Even research-quality dietary assessment methods are not sufficiently accurate or precise to distinguish an individual's eligibility status using criteria based on the Food Guide Pyramid or on nutrient intake.

Physical Activity Assessment

Because the committee was asked to identify areas of concern when the Dietary Guidelines were incorporated into WIC and because the Guidelines include a quantitative recommendation for physical activity levels for

adults and for children 2 years of age and older, the committee considered physical activity assessment as a part of dietary risk assessment. Although a physical activity recommendation appears in the Dietary Guidelines, physical activity itself is not currently part of dietary risk assessment in WIC, nor is there a separate nutritional risk criterion in the WIC program related to physical activity. However, given that (1) WIC's mandate is to focus on primary prevention, including the primary prevention of overweight and obesity, (2) the increasing degree to which overweight and obesity are now major health concerns among those served by WIC, and (3) proper risk assessment for prevention or treatment must consider both diet and physical activity, it is likely that WIC may soon consider assessing physical activity, even if not for the purposes of eligibility determination.

Physical activity assessment relates to two of the Dietary Guidelines (Aim For A Healthy Weight and Be Physically Active Each Day) and thus could potentially be used as another way to define failure to meet Dietary Guidelines. The physical activity guideline specifies "Aim to accumulate at least 30 minutes (adults) or 60 minutes (children) of moderate physical activity most days of the week, preferably daily." These specifications could be used as WIC eligibility criteria under the dietary risk subgroup failure to meet Dietary Guidelines.

A review of the literature found no physical activity assessment instruments that meet the operational constraints of WIC and that also can accurately and reliably assess whether a woman or child is obtaining at least the specified amount of physical activity. Because of the inherent cognitive challenge of accurately recalling and characterizing the varied activity behaviors that together constitute an individual's physical activity level, it is unlikely that there could ever be a practical instrument to establish WIC eligibility accurately based on the physical activity recommendation in the Dietary Guidelines.

Finding 4. Physical activity assessment methods are not sufficiently accurate or reliable to distinguish individuals who are ineligible from those who are eligible for WIC services based on the physical activity component of the Dietary Guidelines.

Behavioral Indicators of Diet and Physical Activity

Because certain behaviors are correlated with dietary intake and physical activity, interest has arisen in the use of behavior-based assessment as a method of identifying those who usually fail to meet the Dietary Guidelines. Such assessment would require the identification of behavioral indicators that could distinguish individuals who meet the Dietary Guidelines from those who do not. The committee considered two types of behavioral indicators: surrogate and target. Surrogate behaviors are behaviors that are correlated with one or more aspects of diet or physical activity and could be used to make inferences about what children eat or how much activity they engage in. For example, the frequency of eating meals together as a family could indicate the adequacy of vegetable consumption. Target behaviors are behaviors that make good targets for change. Making changes in a target behavior would be expected to result in changes in dietary intake. Target behavioral indicators are not suitable for eligibility determination unless they also are surrogate indicators. Building on the example above, if families could be encouraged to eat meals together more frequently, and if family meals resulted in improved dietary intake, then frequency of eating meals as a family would be both a surrogate indicator and a potential target indicator for change. By analogy, if families could spend more time outdoors and if this change resulted in increased levels of physical activity, then time spent outdoors could be both a surrogate and target indicator for physical activity.

A review of the literature found few studies of behavioral correlates of diet or physical activity conducted among the groups served by WIC. No strong evidence was found that any examined behaviors would be both adequately reliable and accurate as surrogate or target behavioral indicators.

Finding 5. Behavioral indicators have weak relationships with dietary or physical activity outcomes of interest. As a result, they hold no promise of distinguishing individuals who are ineligible for WIC from those who are eligible in the category of dietary risk.

Recommendation

Based on the above findings, the following recommendation is made:

Presume that all women and children (ages 2 to 5 years) who meet the eligibility requirements of income, categorical, and residency status also meet the requirement of nutrition risk through the category of dietary risk based on failure to meet Dietary Guidelines, where failure to meet Dietary Guidelines is defined as consuming fewer than the recommended number of servings from one or more of the five basic food groups (grains, fruits, vegetables, milk products, and meat or beans) based on an individual's estimated energy needs.

Studies suggest that nearly all women in the childbearing years and children ages 2 years and older are at dietary risk because they fail to meet the Dietary Guidelines as translated by recommendations of the Food Guide Pyramid (Krebs-Smith et al., 1997; Munoz et al., 1997) Tools currently used for dietary risk assessment appear to have very high sensitivity in that they identify nearly everyone as failing to meet the Dietary Guidelines, but low specificity—poor ability to identify persons who are not at dietary risk. No known dietary or physical activity assessment methods or behavioral indicators of diet or physical activity hold promise of accurately identifying the small percentage of women and children who do meet the proposed criterion based on the Food Guide Pyramid or the physical activity recommendation. Even if the percentage of individuals who meet the criterion were to increase substantially, it remains unlikely that methods can be found or developed to differentiate risk among individuals.

When WIC was originally established in 1972, the categorical groups that WIC serves were selected because of their vulnerability to nutritional insults and WIC's potential for preventing nutrition-related problems. Nutritional status and dietary intake have both short- and long-term effects on the health of the woman and on the growth, development, and health of the fetus, infant, or child. The groups served by WIC also are at increased risk of morbidity and mortality from virtually every disorder listed among the leading causes of death in the United States (cardiovascular disease, cancer, diabetes, and digestive diseases). The high prevalence of overweight and obesity and of diets that are inconsistent with the Dietary Guidelines (e.g., low intakes of fruits and vegetables, high intakes of saturated fats) may contribute to these increased risks.

This recommendation is not intended to affect the current use of other nutritional risk criteria for eligibility determination. That is, information should continue to be collected for the identification of other nutrition risks (e.g., hemoglobin or hematocrit to identify risk of anemia, height and weight to identify anthropometric risk, and the presence of diabetes mellitus to identify medical risk). Such information is useful for nutrition education, and it is essential to implement the priority system. When funds are insufficient to enroll all those eligible for WIC, the priority system is used to determine those at greatest need. If dietary information is collected in the WIC setting for food package tailoring, nutrition education, and/or health referrals, the methods used should be approached with caution given the likelihood of error and misclassification.

Optimal Collection and Use of Dietary and Physical Activity Data

Although individual-level reporting errors greatly reduce the validity of data for assessing diet or physical activity levels in individuals, the errors are less serious in group assessments. Moreover, a variety of statistical procedures can adjust for known sources of error (IOM, 2000a; Traub, 1994) and thereby provide reasonable tests of relationships. Thus, while identified relationships may not be true for any specific individual, they would be true for the group. For

example, FFQs and diet recalls can be used to identify dietary patterns in a WIC population and patterns needing improvement. Repeated collection of dietary recalls or FFQs also may be used to monitor change over time at the group level or to assess effects of nutrition education interventions.

Findings from such analyses could be used to design nutrition education programs and monitor their effectiveness. For example, diet recalls can provide valid information on the average intakes of groups, assuming that a standardized data collection approach is used and an adequate sample size (50 or larger) is available. If more than one recall is collected on at least a subsample of the group and appropriate adjustments are made, one could determine the proportion of the group with usual nutrient intakes that are less than the Estimated Average Requirement (IOM, 2000a). Group dietary intake information for a WIC population (e.g., data from a recent national dietary survey such as the National Health and Nutrition Examination Survey or the Continuing Survey of Food Intakes by Individuals or data collected in a special WIC study) could be used to identify areas for targeted nutrition education services.

Likewise, physical activity assessment tools may be sufficiently valid to assess physical activity levels within groups. These data would be valuable for monitoring groups of individuals or "target populations" within WIC that may be at higher risk for low physical activity levels and/or that may benefit most from interventions within WIC to increase physical activity levels.

Group assessment data would best be collected by trained individuals on randomly selected subsamples of the WIC population. However, any tool used for this purpose must still be evaluated in terms of desired criteria (e.g., a tool would still need to be easy to administer, appropriate for the group, and reasonably accurate).

Conclusion

In summary, evidence exists to conclude that nearly all low-income women in the childbearing years and children ages 2 to 5 years are at dietary risk, are vulnerable to nutrition insults, and may benefit from WIC's services. Further, due to the complex nature of dietary patterns, it is unlikely that a tool will be developed to fulfill its intended purpose within WIC: to classify individuals accurately with respect to their true dietary risk. Thus, any tools adopted would result in misclassification of the eligibility status of some, potentially many, individuals. By presuming that all who meet the categorical and income eligibility requirements are at dietary risk, WIC retains its potential for preventing and correcting nutrition-related problems while avoiding serious misclassification errors that could lead to denial of services to eligible individuals.