

METHODS FOR ASSESSMENT OF DIETARY INTAKE

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Dietary assessment is an integral part of community nutrition survey. It involves collection of information concerning food habits, food supply and procurement, preparation and distribution of food. Besides this, information on food wastage, adequacy and inadequacy of diet is also collected. These studies provide only baseline information, and cannot be used as absolute indicators to adequate nutrition(1).

Accurate and reliable methods for assessing dietary intake of a free living population are needed to answer important

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questions regarding association between dietary factors and physiological processes involved in the etiology of disease(2).

The overall objectives of dietary studies are:

- (i) To determine dietary or nutrient intake of one or more individuals and to assess the need for an appropriate intervention programme.
- (ii) To determine the need of community nutrition programme for various population groups.
- (iii) To evaluate the ongoing programme and/or compare dietary status of groups within a given geographic area or with similar groups from other areas.
- (iv) To determine the method of food procurement and distribution, actual amounts of foods consumed, loss or waste of individual foods.
- (v) To provide a basis for dietary modification and counselling.
- (vi) To generate information regarding the economic and social factors influencing food production and consumption.

Although various dietary assessment tools are available, none is universally appropriate for all research purposes. Inappropriate selection of dietary methodology and failure to recognize limitations in data collected by various methods contribute to possible misrepresentation of findings from dietary studies(1).

The selection of dietary assessment methodology depends primarily on the

objectives of the study, alongwith the sample size, availability of trained personnel and resource constraints(3).

Dietary Data Collection Methods

Various classifications have been devised and suggested for collection of dietary data. However, these are two major categories of methods. The first method involves recording of food intake of families of groups, based on estimates of food purchases and disposal. The second method is based on dietary intake of individuals. This is determined by record or recall of all foods consumed over a specified period of time.

1. Group Methods 1.1

Food balance sheet

On the basis of food availability 'Food balance sheet' for the entire population is prepared. The mean annual amount per person is obtained by dividing the total amount of different foods with the total population of the area. Calculations of the mean intake of different nutrients is an essential part of 'Food balance sheets'.

Advantages

- (i) The food balance sheet gives a view of the total food supplies of a country. It indicates whether food consumed by the population is inadequate, adequate or large.
- (ii) It serves as a basis for formulation of food programmes and for emergency rationing of food.
- (iii) Valuable in inferring general food habits of the people.

Disadvantages

- (i) The reliability of such data depends on the statistics used for calculation

and level of development of the country.

- (ii) The data shows the total amount of food available and not the actual amounts consumed.
- (iii) Individual differences in food consumption are not reflected from mean total consumption data of the whole population(4).

1.2 Food Accounts

This method of dietary assessment is commonly used for subjects living in institutions, families or groups. This method involves detailed recording of the amount of food consumed over a period of time. This is accompanied by an inventory of food supplies both at the start and end of the survey. All the food stuffs purchased for the whole family, produced at home or elsewhere are recorded on weight basis or as gross weights or 'as purchased' weight. Additional information on the amount of different foods consumed, number of meals eaten at home or outside, helps to obtain actual mean daily food consumption per person during the survey period.

This method provides accurate information on food consumption(10).

Advantages

- (i) Larger samples can be obtained and food consumption data for a longer period of time can be collected.
- (ii) As seasonal variations are taken into account, the method provides excellent information on the annual mean food consumption.
- (iii) This method is relatively cheap and does not alter the diets of the subjects to a great extent.

Disadvantages

- (i) Families or households are not always representative of the whole population.
- (ii) It can be used only with a literate population.
- (iii) Precision may decrease after few days.
- (iv) The records may not always reveal how much food was actually consumed or thrown away due to spoilage or plate wastage.
- (v) Food distribution within the family is not known.

2. Individual Dietary Intakes

Dietary data on individuals is collected to obtain a more precise measurement of the average nutrient intake and to determine dietary inadequacies, if any. Assessment of food intake of individuals range from a qualitative type of inquiry to those of a more quantitative nature.

2.1 Weighing Method

It is one of the most accurate methods available and is also referred to as 'Precise and Weighed Individual Inventory Method'. An inventory of the food supply both at the beginning and end of the survey is made. As more food is acquired it is weighed and recorded. Weights and records of food consumption at home as well as outside and food wastage are maintained. By using the standard food tables nutritive value of dishes are calculated. At the end of the study, the amount of food wasted is added to the amount of left over food to obtain total wastage.

If all the family members are adults, dividing the total food consumed by the number of adults gives the average daily

food weight consumption per person. Additional information like weighing the portions of food served to each member of the family before consumption can also be gathered.

Food item consumed can be calculated as: (Initial inventory + issues or purchase) — (Final inventory and waste)

Food item consumed per person per day can be calculated as: Total weight of food item consumed ÷ (Days of surveys X number of persons fed daily).

Advantages

- (i) This method can be carried out by the subjects themselves with minimal supervision by the investigators.
- (ii) The amounts consumed can be recorded accurately.

Disadvantages

- (i) The sample size is often not representative, as the volunteers are selected and thus results cannot be generalized.
- (ii) It is a relatively costly method and requires trained personnel.
- (iii) This method has been claimed to change the diet of the respondents so much that it does not represent normal consumption pattern(4,5).

2.2 Interview Method

Food consumption data can also be collected by 'Interview Method'. This method has two techniques: (i) Diet recall and (ii) Diet history.

(i) Diet Recall

This is a frequently used method to obtain current dietary intake information from individuals. This is based on the principle that, food consumption for a specified period of time prior to the survey can be recalled as accurately as possible. It is often referred to as the '24 hours recall' method. The respondent recalls what and how much food was consumed and when it was consumed. The ingredients recalled are recorded in household standardized volumetric measures. The volume of cooked food is also recorded. Standardized vessels are used mainly to aid in recapitulating the amount of food stuffs used and distribution of food to family members. From the raw weight of foodstuffs, their nutritive value is calculated(5).

$$\frac{\text{Individual intake (in volume)}}{\text{Total cooked quantity}} \times \text{raw amounts} = x$$

Advantages

- (i) Useful method in quick recapitulation of one's habitual diet.
- (ii) It is helpful in revealing extreme daily variations in the diet.

Disadvantages

- (i) A day's intake may not be representative of usual intake.
- (ii) Estimation becomes difficult when diet has a lot of variety.
- (iii) Subjects reporting may not be entirely truthful.

3. Diet History

In epidemiological studies it is often

more important to obtain information on the general dietary patterns of individual rather than their current diet. The normal daily dietaries are first recorded along with the timings of each meal, their composition, snacking etc. Quality and quantity of food stuffs are calculated from the number of servings and their portion size. Seasonal variation is taken into account by conducting a year round survey(7).

Diet history provides a more comprehensive assessment of diet and it permits investigation of lesser known or unidentified dietary factors that can be retrieved for future examination(11).

Advantages

- (i) The representative and large sample size permits random sampling for collection of data.
- (ii) The technique is relatively inexpensive and is convenient to use.

Disadvantages

- (i) This technique demands greater requirement on personal characteristics of the investigator.
- (ii) Does not give precise data on individual food consumption.
- (iii) Diet histories obtained are subject to problems of recall.
- (iv) By this technique nutrient intake tends to be overestimated especially for trace elements.

Diet history along with food records is generally satisfactory and quantitative diet history gives reasonably accurate estimate of the usual dietary intake(10).

3. Food Frequency Method

Usual intake in terms of frequency with

which various food items are consumed is recorded. When estimation of calories and other nutrients are to be made it is essential to record the amounts of foods that are eaten. The frequency data may be of a higher order of accuracy, although more limited than quantitative data obtained by other methods(8). There is a current trend of using abbreviated food frequencies, as they can be altered to suit specific needs of the study population(13).

Advantages

- (i) Useful when specific information about food patterns is needed.
- (ii) This method can provide information where evidence is sought of an association with diet in general rather than specific nutrients(4,6).

4. Questionnaire Method

In principle, this method is identical to diet history. The difference is that no interviewer is needed. Questionnaires are sent to the respondents who fill in and return them. The respondents record their usual food intake for a period of time. Frequency of most commonly consumed foods is estimated(8).

Advantage

- (i) it is possible to collect data on large samples within a small budget.

Disadvantages

- (ii) Information generated need not be authentic.
- (ii) Random sampling cannot be used as this requires cooperation from subjects.

5. Food Composite Analysis for Laboratory Estimate

This method involves sampling of each

item served during meals with subsequent blending of representative samples and analysis for the various nutrients. A representative sample consists of 10% by weight of the foods consumed by a single individual. All the food items are mixed and blended for chemical analysis.

At the same time the weight of prepared food is obtained as it leaves the kitchen and the weight of any left-over prepared food or plate waste is determined.

This method is purely for research purposes where facilities for chemical analysis are available(5).

Conclusion

Various methods available for dietary assessment, have their own advantages and disadvantages. The choice of techniques is dependent on the objectives of the study designed and a judicious combination of methods is often needed to achieve the objectives.

In accordance with the above information available the National Nutrition Monitoring Bureau and the Indian Council of Medical Research has laid down standardized procedures and techniques for assessment of dietary status of target population(9).

The methods stated for diet surveys include weighing method and oral questionnaire method (recall of last 24 hours). These methods are to be used in conjunction with each other to yield accurate dietary assessment data. These methodologies would help in generating information in dietary habits and food availability of different segments of the population in India. This, in turn would provide guidelines not only for the food policies of the country but would also help to assess the

impact of nutrition programmes currently in progress and provide useful information for future planning.

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