SEMINAR

GENERAL METHODS OF DIETARY ASSESSMENT

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- ***Food :*** ***Food is a substance eaten or drunk to maintain life and growth***

- ***Nutrients :*** ***The nutrients are chemical substances that are present in the food we eat.***
- ***The important nutrients are proteins, fats, carbohydrates, vitamins and minerals.***

DIET is defined as the kinds of food on which a person or a group lives.

- ***Nutrition:*** ***Nutrition may be defined as the science of food and its relationship to health.***
  - ***It is concerned primarily with the part played by nutrients in body growth, development and maintenance***

Nutritional status ***is the current body status, of a person or a population group, related to their state of nourishment (the consumption and utilization of nutrients).***

Dietetics : ***It is practical application of principles of nutrition.***

- ***NUTRIENT INTAKE :*** ***depends on actual food consumption which is influenced by factors such as economic situation, eating behaviour, emotional climate, cultural influences, effects of disease states on appetite and the ability to absorb nutrients***

- ***NUTRIENT REQUIREMENTS :*** ***are determined and influenced by age, sex, BMR, physiological status, activity patterns, physiologic stressors (infection, disease)***

Functions of food :

- ***a) Food builds body tissues : The structural materials of food, proteins, minerals, vitamins and water are needed for growth and development.***

- ***b) Food regulates body processes :***

- ***c) Food supplies energy :***

The Major Food Groups

There are innumerable food items that constitute human diet. The major foodstuffs can be broadly classified into ten major groups.

Box - 1 : Ten major food groups
Cereals and millets
Pulses and legumes
Vegetables, roots and tubers
Fruits and nuts
Animal foods • Meat/Poultry • Milk and milk products • Eggs
Oilseeds
Sugar, jaggery, salt
Non - Alcoholic beverages
Alcoholic beverages
Spices and condiments

- ***Balanced diet :*** ***A balanced diet is defined as one which contains a variety of foods in such quantities and proportions that the need for energy, amino acids, vitamins, minerals, fat, carbohydrate and other nutrients is adequately met for maintaining health, vitality and general well being and also makes a small provision for extra nutrients to withstand short duration of leanness .***

PRUDENT DIET

The dietary goals ("Prudent diet") recommended by the various expert committees of WHO are as below:

Dietary fat	- <15-30%
saturated fat	- <10%
unsaturated	- 15-20%
Carbohydrates	- 50-70%
fibre	- 40g/day
Proteins	- <10-15%
Salt	- <15g/day

- ***Nutritional Surveillance :*** ***It has been defined as "keeping watch over nutrition, in order to make decisions that will lead to improvement in nutrition in population"***

- ***Nutritional monitoring:*** ***nutritional monitoring is defined as collection and analysis of patient data to prevent or minimize malnourishment .***

- ***Dietary Survey*** ***mean what people eat and how much they eat, what are their likes and dislikes and dietary beliefs as also dietary practices.***
- ***A nutritional survey is never complete without a diet survey.***
- ***A diet survey objectively defines importance of diet in various health state and disease.***

- ***Diet survey*** ***is nothing but the scientific assessment of food consumption,*** ***and using this data for various purposes including assessment of nutritional status.***

- ***NUTRITIONAL ASSESSMENT :*** ***more comprehensive and includes determining nutritional status by analyzing the individual's brief socio economic background, medical history, dietary, anthropometric, biochemical, clinical data and drug – nutrient interactions.***

- ***A DIETARY ASSESMENT*** : ***comprehensive evaluation of a persons food intake.***
- ***It is one of the established methods of nutritional assessment.***
- ***Dietary assessment techniques range from food records to questionnaires and biological markers.***

Aims of Assessment of Nutritional Status

- To map out distribution and geography of nutritional disorders
- To identify high risk groups with respect to nutritional vulnerability
- To assess various epidemiological factors for nutritional deficiencies
- Make recommendations to rectify shortcomings leading to nutritional deficiencies
- To project for financial allocations and budget for food materials at a large administrative level e.g. at the national level.

Purpose of Dietary assessment

- ***To improve the diet of people at household level particularly to improve diets or feedings of young children, pregnant and lactating women.***

- ***For planning of national food strategies especially in food crisis.***

- ***As a research purpose to asses the effect of nutrition education programme .***

- ***Periodic dietary surveys done at time intervals provide information on trends of food consumption.***

- ***The surveys also help to know the special preference for a food and foods avoided or disliked and alternate foods consumed during the special conditions like droughts and in tribal areas.***

- ***When designing specific programme on nutrition, dietary surveys are needed to have evidence based data.***

Dietary Assessment Principles

Adequacy; a diet that provides enough energy and nutrients to meet the needs according to the recommended dietary intakes/ allowances

Balance : a diet that provides enough, but not too much of each type of food (adequacy of basic 6 food groups)

Variety; a diet that includes a wide selection of foods within each food group

Nutrient Density : a diet that includes foods that provide the most nutrients for the least number of calories (nutrient dense foods)

Moderation : A diet that limits intake of foods high in sugar and fat (nutrient intake guidelines)

Methods of nutritional assessment

- Various methods are available for the assessment of nutritional status.
- ***ABCD… of Nutritional Status Assessment***
- **Anthropometry**
- **Biochemical & lab methods**
- **Clinical assessment**
- ***Diet survey/assessment***
- **Ecological studies**
- **Functional assessment**
- **Vital statistics**

- ***Ecology of malnutrition :*** ***Jelliffe (1966) listed the ecological factors related to malnutrition as follows***
- ***Conditioning influences,***
- ***cultural influences,***
- ***socio economic factors,***
- ***food production and***
- ***health and other services.***

TYPES OF DIET SURVEY

Qualitative

Food items consumed, their frequency of consumption, food preferred or food avoided.

Opinion and attitude towards food and cultural significance of any food.

Can have focused attention on dietary practices during infancy, young children, pregnancy and lactational period.

Quantitative

Exact amount of foods consumed in terms of grams or liters and their nutrient content assessed

Comparison with RDA for adequacy/inadequacy.

Dietary assessment is the process of evaluating what people eat by using one or several intake indicators.

- *for identifying nutritional status of groups of interest.*
- *to identify food patterns and preferences.*
- *To elucidate relationship of nutrient intake with deficiency & degenerative diseases.*

What is dietary assessments

- A **dietary assessments are** comprehensive evaluation to **assess food consumption at national level, house hold level and a person's food intake level.**
- It is one of the tool for nutritional status assessment.
- **Dietary assessment includes;**
- **food supply**
- **production at the national level,**
- **food purchases at the household level,**
- **food consumption at the individual level.**

Methods of dietary assessment

The choice of appropriate method for dietary assessment will depends on

- *the purpose for which it is needed*
- *level of information*

  individual, family, community, country
- *availability of time*
- *availability of Resources*

  trained manpower

  equipment

  transport facility

Methods of dietary assessment

- ***Methods of dietary assessment***
- ***1. Food balance sheet method.***
- ***2. Inventory method.***
- ***3.Weighment method .***
- ***4. 24 hr Recall method .(Questionnaire method)***
- ***5.Dietary Score method .***
- ***6.Food Frequency Questionnaire method .(FFQ Method)***
- ***7.Dupliate Sample/ Chemical analysis method .***
- ***8.Expenditure pattern method .***
- ***9.Diet History .***
- ***10.Recording method.***

Dietary Assessment Methods Commonly Used in Different Study Designs

adapted from;Martin Eastwood. **Principles of Human Nutrition;** *Second edition* 2003 by Blackwell Science Ltd, a Blackwell Publishing Company

Study design	Methods
Cross-sectional	24-Hour recall, FFQ, brief instruments
Case—control (retrospective)	FFQ, diet history
Cohort (prospective)	FFQ, diet history, 24-hour recall, dietary record
Intervention	FFQ, brief instruments, 24-hour

Dietary Assessment Methods

Method employed for collecting National Level Data

FOOD BALANCE SHEET

INDIVIDUAL LEVEL

Retrospective Methods

- 24-hour recall
- Telephone recall
- Dietary history
- Food frequency and semi quantitative food frequency questionnaire

Prospective Methods

- Weighed food record
- Food diary
- Duplicate portion analysis

FOOD BALANCE SHEET METHOD

- *This method is used when information regarding availability and consumption of food is required at a macro level like at the global, national, region or state levels .*

- ***Maintained by each country.***
- ***Indicates the total food available in the country along with buffer stocks.***
- ***FAO – monitors at international level since 1949.***
- ***Gives the estimate of available food in the country per person per year or per day.***

- ***The total food supplies available and used up at a given level are taken into account in this method.***

- ***Effectively the difference between receipt (of food various sources) and expenditure over a given period of time gives the food consumed by population.***

The consumption per capita/day is worked out as

$$\frac{\text{Food consumed by population}}{\text{Mid yr pop x 365}}$$

- *These figures are used for various types of planning and budgeting, namely plans for agriculture, fertilizers, productions, imports and Public Distribution System (PDS).*

Advantages :

- *Gives idea about food available with the country*
- *Helps national planners to take appropriate decisions to avert "food crisis"*

Disadvantages :

- *Does not take into account the wastage of food and discarding of non edible portion of food*
- *Does not give idea about food intake by an individual*
- *It is a gross method.*
- *The consumption of rich and poor is equated and averaged out .*
- *It gives the consumption pattern but doesn't include purchasing power of the individual.*

INVENTORY METHOD

- ***The inventory method is carried out at an institutional level, on a homogenous group as present in a hostel, jail, mess, army barrack, orphanage etc.***
- ***It is essentially done from books.***
- ***Log book method /food list method***
- ***Actual amount of food stuffs issued by the in charge of institute are taken into account for consumption .***

- ***Method : 2 visits by an investigators***
- ***One at the beginning of survey-checklist of food stocks is prepared and handed over to housewife / incharge***
- ***Other at the end of a week***
- ***Purchased /discarded food is taken into account***

- Average intake of food/person/day = (stock at beginning of week - stock at the end of week) / (total inmates participating in meal x no of days of survey)

- ***Advantage :*** ***Covers large area in short time .***

- ***it is fast, much easier, less cumbersome and faster than the weighment methods.***
- ***It is also fairly accurate. It may not indicate an accurate individual food consumption but is fairly satisfactory for the purposes of planning.***

- ***Disadvantage :*** ***Gives the estimate of food available rather than food consumed .***
- ***it doesn't account for wastage.***
- ***it gives only the mean individual consumption but actual individual consumption is not reflected.***

WEIGHMENT METHOD

- ***In this method the foods are actually weighed using a grocer's balance.***
- ***Both raw and cooked food are weighed.***
- ***In community surveys (at a family level), the raw food is weighed rather than the cooked food, since weighing cooked food is not acceptable to the families.***
- ***In an institution however, the cooked food can also be weighed, since cooking is carried out at a central kitchen.***

- **While using weighment method at a family level the following points are important :**
- ***1. Convince the housewife of the need of the survey for the benefit of the family .***
- ***2. Avoid holidays/fares/festivals/feasts as the dietary practice of these days does not reflect the actual dietary practices.***
- ***3. It should be carried out for 3 to 7 days consecutively.***
- ***4. At least two visits a day for lunch and dinner have to be made.***
- ***5. Two investigators should be available - one talks and weighs and the other records observations.***
- ***6. Any pets, breast fed children, guests etc. should be considered.***

- ***Advantages- More accurate than 24 hr recall***

  Good to estimate caloric intake.

- ***It accounts for the non edible parts of food as well. The wastage is also taken into account.***

- ***This method is more accurate than the inventory method.***

- ***Disadvantage- Time consuming***

  Uncooperation from family

  Aplicability to other nutrients like proteins, vitamins is limited

- ***Can be adopted in institutions/hospitals***

24 HOURS RECALL METHOD

a. 24 Hours Dietary Recall

- A trained interviewer asks the subject to recall all food & drinks taken in the previous 24 hours.
- It is quick, easy & depends on short-term memory, but may not be truly representative of the person's usual intake

- ***Enlist all the family members who partook the meals yesterday***
- ***Their completed age(in years for adults, in months for infants and young children)***
- ***Their physiological status(pregnancy, lactation)***
- ***Occupation- sedentary, moderate, heavy***
- ***Economic status***
- ***This helps to arrive adult consumption units***

- ***Housewife/individual is asked which food and what amounts were consumed on previous day or yesterday***

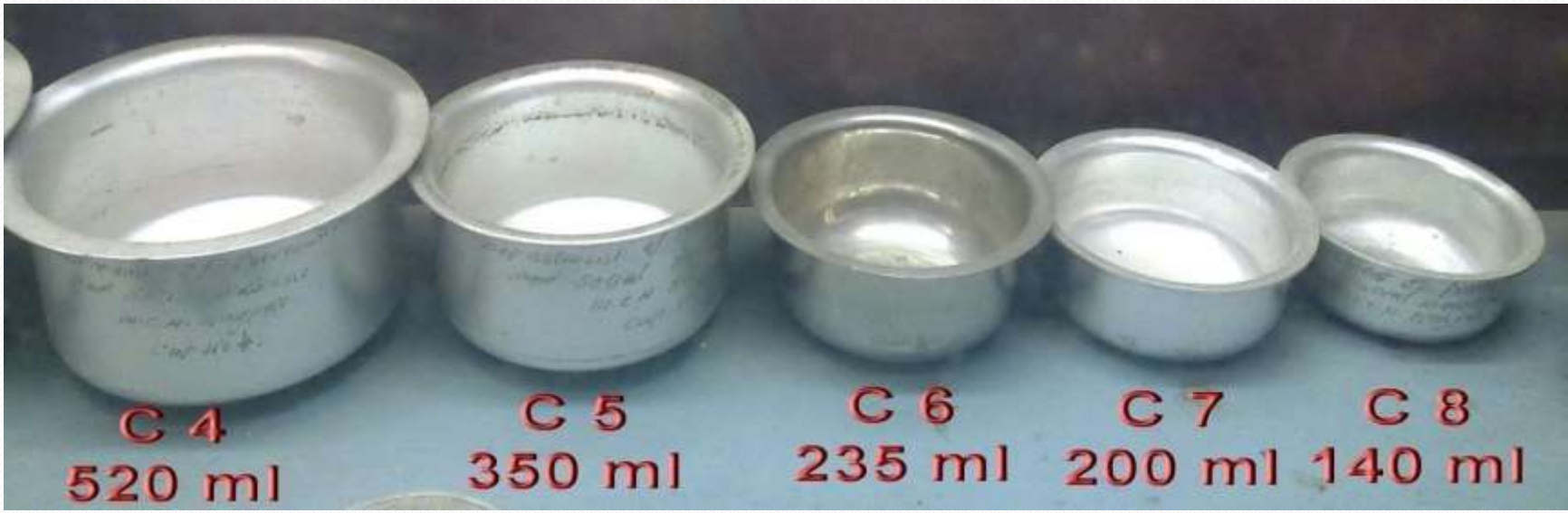
- ***Avoid 3 F –***
  - ***Festival***
  - ***Fast***
  - ***Feast days***

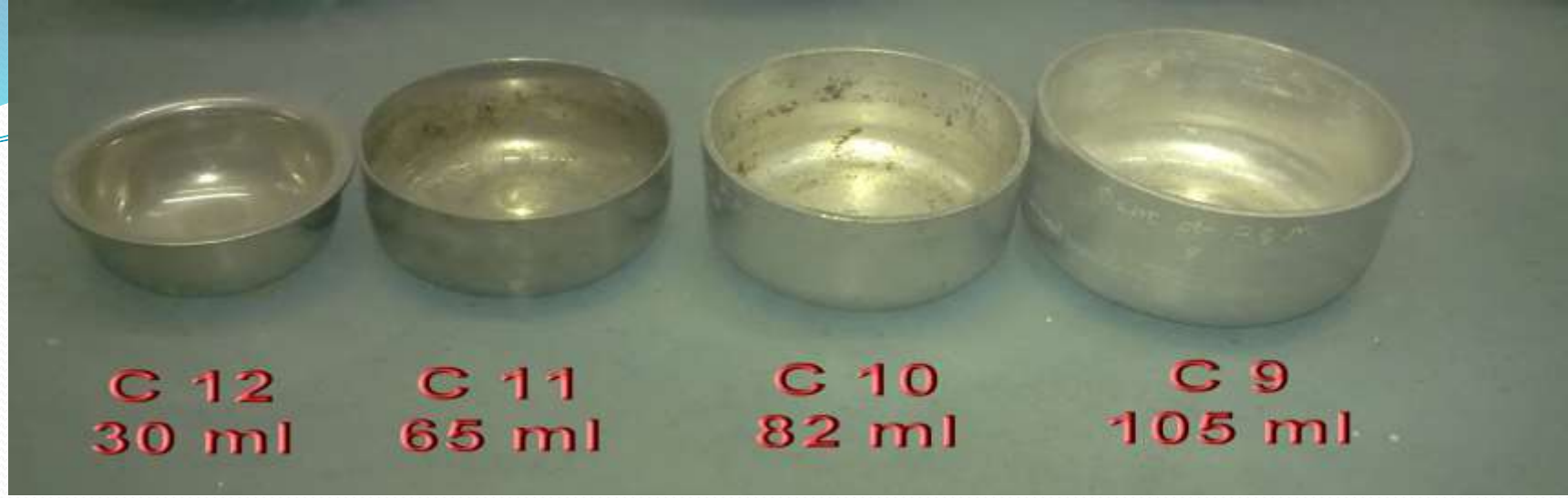
- ***An account of row ingredients used for each of the preparations is obtained with help of grocer's balance***

- ***Information on total cooked amount of each preparation is noted in terms of standardized cups(s).***

Grocer’s balance


C 1
1400 ml
C 2
1035 ml
C 3
750 ml


C 4
520 ml
C 5
350 ml
C 6
235 ml
C 7
200 ml
C 8
140 ml


C 12
30 ml
C 11
65 ml
C 10
82 ml
C 9
105 ml


5 ml
15 ml

Example

- ***Preparation: mixed curry prepared from potato, tomato, onion,etc***
- ***Get detail of ingredients with their approximate weight in raw form***
- ***Get total cooked amount with help of standardized cups***

Raw food ingredients used in curry		Total cooked volume	Individual intake
Potato	250 gm	C4 520 ml	C8 140 ml
Onion	100 gm		
Tomato	100 gm		
Salt	1 tsp		
Chili powder	½ tsp		
Oil	2 tbsp		

- ***Thus potatoes consumed by the individual***

  $= \frac{250}{520} \times 140 = 67.3$ gm

- ***Likewise tomato consumed will be***

  $= \frac{100}{520} \times 140 = 26.92$ gm

24-hour recall

Advantages:

- *low respondent burden*
- *easy in administration*
- *minimization of biases associated with altering food intake because of knowledge that one is being observed.*

Limitations:

- *forgetting*
- *deliberate misreporting*
- *need for a trained observer to administer*
- *costs associated with computerized analysis of records*
- *need for several days of intakes to obtain estimate of usual diet*

DIETARY SCORE Method

- ***Assign arbitrary score to the foods(under consideration) on the basis of its nutrient content.***

- ***Consumption of the particular food is estimated through frequency method***

- ***Frequency of consumption of foods, the total score and percentage are calculated.***

- ***Better value if combined with quantitative methods***

Food Frquency Questionnarie method

- ***Food frequency questionnaire (FFQ) method is based on the principle as to how frequently an item is consumed over a period of time.***
- ***FF is a retrospective review of intake frequency– that is food consumed per day, week, per 15days, per month.***
- ***Report usual frequency of consumption of each food item from a list of food items in reference to a specified period (past wk/mo/yr)***

- ***organizes foods into groups that have common nutrients .***
- ***Face to face interview, telephone or by self administration .***
- ***Describes dietary patterns or food habits not nutrient intake .***
- ***Semi quantified tools can obtain information on portion size using household measures .***

Example; Food Frequency Questionnaire

Food item	> 1/d	1/d	3-6 times/wk	1-2/wk	2/mth or less	Never
Beef						
Fish						
Liver						
Poultry						
Eggs						
Dried beans						
Green leafy vegetables						
Enter other foods not listed that are eaten regularly						
1.----------						
2.----------						

Food Frequency Questionnaire

FRUIT	HOW OFTEN								HOW MUCH			
	Never or less than once per month	1 per mon.	2–3 per mon.	1 per week	2 per week	3–4 per week	5–6 per week	Every day	MEDIUM SERVING	YOUR SERVING SIZE		
										S	M	L
EXAMPLE: Bananas	○	○	○	●	○	○	○	○	1 medium	○ ½	● 1	○ 2
Bananas	○	○	○	○	○	○	○	○	1 medium	○ ½	○ 1	○ 2
Apples, applesauce	○	○	○	○	○	○	○	○	1 medium or ½ cup	○ ½	○ 1	○ 2
Oranges (not including juice)	○	○	○	○	○	○	○	○	1 medium	○ ½	○ 1	○ 2
Grapefruit (not including juice)	○	○	○	○	○	○	○	○	½ medium	○ ¼	○ ½	○ 1
Cantaloupe	○	○	○	○	○	○	○	○	¼ medium	○ ⅛	○ ¼	○ ½
Peaches, apricots (fresh, in season)	○	○	○	○	○	○	○	○	1 medium	○ ½	○ 1	○ 2
Peaches, apricots (canned or dried)	○	○	○	○	○	○	○	○	1 medium or ½ cup	○ ½	○ 1	○ 2
Prunes, or prune juice	○	○	○	○	○	○	○	○	½ cup	○ ¼	○ ½	○ 1
Watermelon (in season)	○	○	○	○	○	○	○	○	1 slice	○ ½	○ 1	○ 2
Strawberries, other berries (in season)	○	○	○	○	○	○	○	○	½ cup	○ ¼	○ ½	○ 1
Any other fruit, including kiwi, fruit cocktail, grapes, raisins, mangoes	○	○	○	○	○	○	○	○	½ cup	○ ¼	○ ½	○ 1

Limitation of Food Frequency Questionnaire

- ***Relies on memory;***
- ***requires complex calculations to estimate frequencies;***
- ***requires literacy,***
- ***does not quantify intake.***

DUPLICATE SAMPLES Method

- *An observer takes duplicate portions of all foods consumed by the individual and weighs or measures them .*

- *in some cases, these may also be chemically analyzed .*

- ***Chemical analysis***
- ***What is consumed in the family, the same amount of each food item is kept separately per day as a duplicate sample***
- ***These samples can be weighed***
- ***Can be sent to lab for analysis of nutrients.***

- ***Advantages: Most accurate method***

- ***Disadvantages: Costly method***

  Needs good laboratory support

EXPENDITURE PATTERN METHOD

- ***Determine the money spent on food and non food items by questionnaire and compare the two .***
- ***Reference period is fixed (eg previous month/previous week) .***
- ***Indirect method .***

DIET HISTORY Method

Respondent reports all foods and beverages consumed on a usual day to a trained interviewer.

The interviewer then probes further on the frequency amount and portion size consumed.

Diet diaries are sometimes used to assist respondents in recalling their intakes.

- ***Assess qualitative intake of food items and their frequency of intake***

- ***Similar to diet history taken in personal history of a patient***

- ***Used to study :***
  - ***Meal patterns***
  - ***Dietary habits***
  - ***Peoples food preferences and avoidances during special physiological conditions .***

Dietary History

Advantages:

- *respondent burden is low*
- *complete intakes are provided*

Limitations:

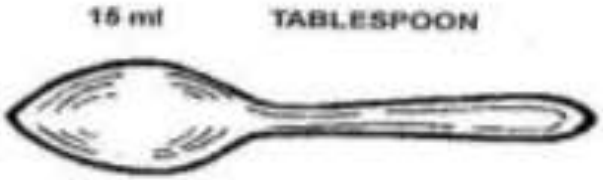
- *time consuming*
- *need for trained interviewers*
- *lack of standardization*

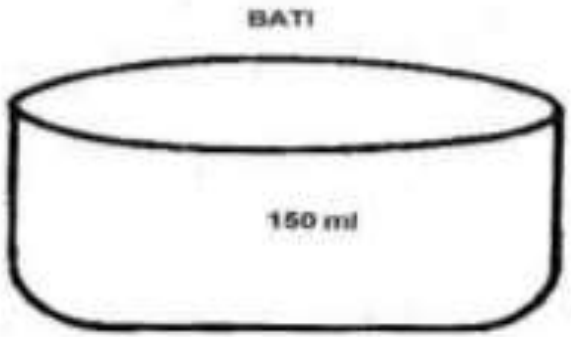
RECORDING METHOD

- ***Record of all items of food eaten by a family/individual is maintained by weighing of quantities eaten .***
- ***Advantages: If followed with proper instructions a large sample can be covered in short time***
- ***Mailed questionnaire can also be used for it***
- ***Disadvantage: validity not established***

Easy way to count your calories *(Measures providing 100 kcal*

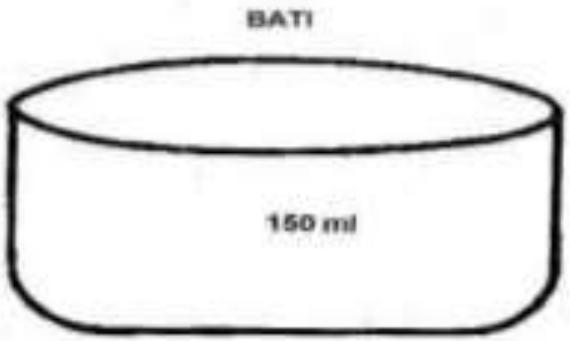
Cereals : 30 g (1/5 cup)
Bread : 40 g (2 slices)
Pulses : 30 (2 Tbsp)
Leafy vegetables (sak): 250 g (2 small bunches)
Other vegetables : 400 g (4 cups)
Potato : 100 (1 cup)
Nuts/oilseeds : 20 g (handful)
Fruit : 150 g/ 1-2 fruits
Milk/Curd :150 ml (1 cup)
Butter milk : 670 ml (4 cups)
Channa/paneer/cheese : 30 g (1





Easy way to count your calories *(Measures providing 100 kcal*

- Egg : 60 g (1 medium size)
- Chicken : 90 g (3 small piec
- Mutton (animal protein): 8
- Fish (lean) 100 g
- Fish (fatty) 60 g
- Shrimp : 30 g
- Prawn : 100 g
- Sugar : 25 g (5 tsp)
- spice : 40 g (6 tsp)
- Oil/ghee : 10 g (2 tsp)
- Butter : 15 g (1 Tbsp



Problems in dietary survey

Problem in data collection

- *Area of survey(interior/ unapproachable)*
- *Distance*
- *Lack of rapport with respondent/community*
- *Duration and inconvenient timings of survey*

Problem in analysis

- *Lack of trained personnel*
- *Delay in analysis due to improper tabulation*

National Agencies

- ***National Nutrition Monitoring Bureau (NNMB)***
- ***India Nutrition Profile (INP) Survey***
- ***National Family Health Survey (NFHS)***
- ***Micronutrients Surveys***

National Nutrition Monitoring Bureau

- ***Established in 1972***
- ***Aegis of ICMR at the National Institute of Nutrition (NIN), Hyderabad.***
- ***Central Reference Laboratory located at National Institute of Nutrition is responsible for preparation of the survey protocol, sampling, and training of the field staff, quality control, data analysis and report writing.***

Objectives of NNMB

- ***To collect, on a continuous basis, on diet and nutritional status of the communities in the urban, rural and tribal areas using a standard and uniform methodology by adopting statistically valid study design and sample size, and***
- ***To periodically evaluate the ongoing National Nutrition Programmes to identify their strengths and weaknesses, and to recommend appropriate corrective measures.***

summary

- *Dietary assessment is a necessary component of nutritional status assessment of individuals, and also is useful for other purposes.*
- *It can be done using a variety of methods, each of which has advantages and limitations.*
- *Intake from all sources (food, fortified food, beverages, and nutrient supplements) must be included.*

- *Sufficient numbers of days to represent usual intakes must be obtained.*
- *Complete food and supplement composition tables must be employed.*
- *Appropriate reference standards and statistical procedures for assessing intakes must be used.*
- *Dietary assessment methods work best in combination with other methods for the assessment of nutritional status.*

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Particulars		Prevalence
Infants and Preschool children (%)		
Low birth weight		22
# Kwashiorkor/Marasmus		<1
# Bitot's spots		0.8-1.0
Iron deficiency anaemia (6 -59 months)		70.0
# Underweight (weight for age)* (<5 years)		42.6
# Stunting (height for age)* (<5 years)		48.0
# Wasting (weight for height)*		20.0
Childhood Overweight/ Obesity		6-30
Adults (%)		
Chronic Energy Deficiency *(BMI <18.5) among*		
# Rural Adults	*Men*	33.2
	Women	36.0
* Tribal Adults	*Men*	40.0
	Women	49.0
Anaemia (%)		
# Women (NPNL)		75.2
# Pregnant women		74.6
Iodine deficiency disorders (IDD)		
Goitre (millions)		54
Cretinism (millions)		2.2
Still births due to IDD (includes neo natal deaths)		90,000

Prevalence of chronic diseases *Over weight/obesity[4] (BMI>25) (%)*		
# Rural Adults	*Men*	7.8
	Women	10.9
* Tribal Adults	*Men*	2.4
	Women	3.2
Urban Adults	*Men*	36.0
	Women	40.0
Hypertension		
Urban		35.0
# Rural		25.0
Men		25.0
Women		24.0
* Tribal		24.0
Men		25.0
Women		23.0
Diabetes Mellitus *(%) (year 2006)*		
Urban		16.0
# Rural		5.0
Coronary Heart Disease[9] *(%)*		
Urban		7-9
# Rural		3-5
Cancer incidence Rate[10] *(Per 100,000)*		
Men		113
Women		123

*<Median -2SD of WHO Child Growth Standards
NNMB Rural Survey - 2005-06
* NNMB Tribal Survey - 2008-09

MAJOR NUTRIENTS		OTHER NUTRIENTS
ENERGY RICH FOODS	**Carbohydrates & fats**	
	Whole grain cereals, millets	Protein, fibre, minerals, calcium, iron & B-complex vitamins
	Vegetable oils, ghee, butter	Fat soluble vitamins, essential fatty acids
	Nuts and oilseeds	Proteins, vitamins, minerals
	Sugars	Nil
BODY BUILDING FOODS	**Proteins**	
	Pulses, nuts and oilseeds	B-complex vitamins, invisible fat, fibre
	Milk and Milk products	Calcium, vitamin A, riboflavin, vitamin B_{12}
	Meat, fish, poultry	B-complex vitamins, iron, iodine, fat
PROTECTIVE FOODS	**Vitamins and Minerals**	
	Green leafy vegetables	Antioxidants, fibre and other carotenoids
	Other vegetables and fruits	Fibre, sugar and antioxidants
	Eggs, milk and milk products and flesh foods	Protein and fat

Recommended Dietary Allowances for Indians (Macronutrients and Minerals)

Group	Particulars	Body weight kg	Net Energy Kcal/d	Protein g/d	Visible Fat g/day	Calcium mg/d	Iron mg/d
Man	Sedentary work	60	2320	60	25	600	17
	Moderate work		2730		30		
	Heavy work		3490		40		
Woman	Sedentary work	55	1900	55	20	600	21
	Moderate work		2230		25		
	Heavy work		2850		30		
	Pregnant woman		+350	+23	30	1200	35
	Lactation 0-6 months		+600	+19	30	1200	21
	6-12 months		+520	+13	30		
Infants	0-6 months	5.4	92 Kcal/kg/d	1.16 g/kg/d	–	500	46 µg/ kg/day
	6-12 months	8.4	80 Kcal/kg/d	1.69 g/kg/d	19		5
Children	1-3 years	12.9	1060	16.7	27	600	09
	4-6 years	18	1350	20.1	25		13
	7-9 years	25.1	1690	29.5	30		16
Boys	10-12 years	34.3	2190	39.9	35	800	21
Girls	10-12 years	35.0	2010	40.4	35	800	27
Boys	13-15 years	47.6	2750	54.3	45	800	32
Girls	13-15 years	46.6	2330	51.9	40	800	27
Boys	16-17 years	55.4	3020	61.5	50	800	28
Girls	16-17 years	52.1	2440	55.5	35	800	26

Approximate Calorific Value of Some Cooked Preparations

Preparation	Quantity for one serving	Calories (Kcal)
1. Cereal		
Rice	1 cup	170
Phulka	1 No.	80
Paratha	1 No.	150
Puri	1 No.	80
Bread	2 slices	170
Poha	1 cup	270
Upma	1 cup	270
Idli	2 Nos.	150
Dosa	1 No.	125
Kichidi	1 cup	200
Wheat porridge	1 cup	220
Semolina porridge	1 cup	220
Cereal flakes with milk (corn/wheat/rice)	1 cup	220
2. Pulse		
Plain dhal	½ cup	100
Sambar	1 cup	110
3. Vegetable		
With gravy	1 cup	170
Dry	1 cup	150
4. Non-Vegetarian		
Boiled egg	1 No.	90
Ommelette	1 No.	160
Fried egg	1 No.	160
Mutton curry	¾ cup	260
Chicken curry	¾ cup	240
Fish fried	2 big pieces	190
Fish cutlet	2 Nos.	190
Prawn curry	¾ cup	220
Keema kofta curry	¾ cup (6 small koftas)	240

Preparation	Quantity for one serving	Calories (Kcal)
5. Savoury snacks		
Bajji or pakora	8 Nos.	280
Besan ka pura	1 No.	220
Chat (Dahi-pakori)	5 pieces	220
Cheese balls	2 Nos.	250
Dahi vada	2 Nos.	180
Vada	2 Nos.	140
Masala vada	2 Nos.	150
Masala dosa	1 No.	200
Pea-kachori	2 Nos.	380
Potato bonda	2 Nos.	200
Sago vada	2 Nos.	210
Samosa	1 No.	200
Sandwiches (butter- 2tbsp)	2 Nos.	200
Vegetable puff	1 No.	200
Pizza (Cheese and tomato)	1 slice	200
6. Chutneys		
Coconut/groundnuts/til	2 tbsp	120
Tomato	1 tbsp	10
Tamarind (with jaggery)	1 tbsp	60
7. Sweets and Desserts		
Besan barfi	2 small pieces	400
Chikki	2 pieces	290
Fruit cake	1 piece	270
Rice puttu	½ cup	280
Sandesh	2 Nos.	140
Double ka meetha	½ cup	280
Halwa (kesari)	½ cup	320
Jelly/Jam	1 tbsp	20
Custard (caramel)	½ cup	160
Srikhand	½ cup	380
Milk chocolate	25 g	140
Ice-cream	½ cup	200