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Review Article

Recommended dietary allowances, ICMR 2020 guidelines: A practical guide for bedside and community dietary assessment – A review

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ABSTRACT

Assessment of diet bedside and in the community is crucial for the management and prevention of various ailments. Recommended dietary allowances and nutritional requirements of humans is a growing science that keeps changing, hence medical fraternity needs to be updated. ICMR-NIN are the nodal agencies in India for refining and reformulating dietary needs as per the nutritional transition occurring globally. They have published Nutrient Requirements for Indians: Recommended Dietary Allowances and Estimated Average Requirements - A Report of the Expert Group 2020, consisting of vital changes which are developed to satisfy the needs of the healthy population, keeping in view the reduction of disease risk and maintaining optimal health of the population. Most textbooks of community medicine have not yet adopted the newer recommendations and it is crucial that current students follow the paradigm shift which has happened in nutritional needs. The twenty-four-hour (24 hr) semi-quantitative dietary recall method is the preferred dietary assessment method at the bedside and community due to its less administration time and usability even on illiterates. It is considered the best method when there is no patience or motivation to answer food-related questions. Here is an attempt to compile and simplify all required information for dietary assessment from reliable sources in one place which empowers healthcare professionals to perform a dietary assessment.

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1. Introduction

The objective of dietary assessment is to recognize suitable and actionable changes in a person's diet to advance their health and well-being. India is a socially and ethnically diverse country with diverse dietary practices linked to its exclusive religious and socioeconomic heterogeneity.¹

Food is an important part of human health as Hippocrates rightly mentions 'Let food be thy medicine and medicine be thy food' and 'All diseases begin in the gut'. It is necessary to assess nutrition at the primary care setting level. There are various methods of dietary assessment,

but the 24-hr semi-quantitative dietary recall method can capture comprehensively the regional, ethnic, religious, and socio-economic heterogeneity of dietary habits within India.

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Table 1: Energy and protein content of commonly used Indian food items^{2,3}

S. No.	Food Items	Quantity in number	Energy (Kcal)	Protein (gms)
Breakfast Items				
1	Phulka	1	80	3.2
2	Bread	2 slices	170	7
3	Dosa	1	125	2.8
4	Paratha	1	150	2.8
5	Idli	2 No's	120	4.6
6	Vada	1	140	4.2
7	Chutney (coconut)	2 Tbsp	120	2.5
8	Upma	1 cup	270	5
9	Kesari bath	$\frac{1}{2}$ cup	320	7.1
10	Poori	1	100	2
11	Roti/chapati	1	110	2.9
12	Pongal/khichidi	1 cup	200	8.1
13	Poha	1 cup	200	5.3
14	Cereal flakes with milk	1 cup	220	5.1
15	Porridge	1 cup	220	3.5
16	Boiled egg	1	90	5.3
17	Omelette	1	160	3.7
Lunch and Dinner Items				
1	Rice	1 cup	170	4.3
2	Veg fried rice	1 cup	200	3.8
3	Ragi Ball (Medium size)	1	140	2.7
4	Sambar	1 cup	115	3.6
5	Plain Dal	$\frac{1}{2}$ cup	100	4.4
6	Vegetable gravy	1 cup	170	3
7	Vegetable dry	1 cup	150	3
8	Curd	$\frac{1}{2}$ cup	60	3.5
9	Buttermilk	1 cup	30	1.7
10	Mutton curry	$\frac{1}{2}$ cup	170	10.4
11	Chicken curry	$\frac{1}{2}$ cup	160	9.3
12	Fish fried	2 big pieces	220	14
13	Prawn curry	$\frac{1}{2}$ cup	145	7.4
Dairy Products				
1	Cow's Milk + 2Tbsp sugar	1 cup	180	8.7
2	Buffalo Milk + 2Tbsp sugar	1 cup	320	9.2
3	Coffee + 2Tbsp sugar	1 cup	110	3.6
4	Tea + 2Tbsp sugar	1 cup	75	2
5	Lassi + 2Tbsp sugar	1 glass (200 ml)	110	6.8
Beverages				
1	Squash	1 glass (200 ml)	75	1
2	Fresh lime juice	1 glass (200 ml)	60	0.7
3	Cold drinks	1 bottle (200 ml)	150	0
Fruits				
1	Apple	1 Medium	65	0.3
2	Orange/mosambi	1 Medium	40	0.7
3	Banana	1 Medium	90	1.3

Continued on next page

Table 1 continued

4	Grapes	30 No's	70	0.6
5	Guava	1 Medium	50	2.5
6	Mango	1 Medium	180	2
7	Papaya	1 large piece	80	1.5
8	Pineapple	1 large piece	50	0.6
9	Sapota	1 Medium	80	0.9
10	Custard apple	1 Medium	130	2.3
11	Watermelon/ musk melon	1 big slice	15	0.5
Snacks				
1	Bhajji/pakora	1 no	35	1
2	Chat	1 no	220	5
3	Masala Vada	1 no	75	2.5
4	Kachori	1	190	2.7
5	Samosa	1	200	2.8
6	Biscuit	2 pieces	90	1.4
3	Veg Sandwich	2 pieces	200	9.2
4	Veg Burger	1	245	6.3
5	Non veg Burger	1	250	8.4
6	Pizza	1 piece	205	9
Raw foods				
1	Sugar	2 tsp	35	0
2	Oil	1 tsp	45	0
3	Ghee	1 tsp	45	0
Alcoholic beverages				
1	Beer	1 glass (300 ml)	90	0
2	Whisky/Rum	1 peg (60 ml)	170	0
Sweets and Desserts				
1	Plain cake	1 slice	172	3.1
2	Chocolate cake	1 slice	195	2.5
3	Fruit cake	1 slice	270	5
4	Besan barfi	1 piece	200	5.5
5	Chikki	1 piece	145	3
6	Rice puttu	1/2 cup	280	3.5
7	Kesar halwa	1/2 cup	320	7.1
8	Jelly/jam	1 Tbsp	20	0
9	Custard (caramel)	1/2 cup	160	3
10	Srikhand	1/2 cup	380	8
11	Milk chocolate	25 gms	140	0
12	Ice cream	1/2 cup	200	3.5
Nuts				
1	Almonds	10 No's	85	2.5
2	Cashew	10 No's	95	3
3	Peanuts	50 No's	90	3

However, many textbooks have not yet adopted the changes recommended by the committee; with medical students still learning and using the old guidelines. Here we have attempted to simplify dietary assessment and recommendation at the bedside and community level for physiological conditions without special nutritional needs.

24 hr semi-quantitative dietary recall method: The 24-hr dietary recall is an open-ended method intended to report detailed information about all foods and beverages consumed by a respondent, in the preceding 24 h or over the previous day. The interview can be pen-paper based or computer-assisted making it suitable to administer at the bedside or in a community setting. The method relies on short memories and allows the quantification of all the foods and beverages consumed over the period concerned.⁴ This is a preferred method when the time to administer is brief, respondents are illiterate, or when there is no patience or motivation to answer food-related questions.⁵ We list the various food items consumed in the past 24 hours and note their portion on consumption in each meal (Figure 1). Looking at the chart containing their calorie value and protein content we add the total calories and proteins consumed by that person per day. (Table 1) Here is an attempt to compile and simplify all required information for dietary assessment from reliable sources in one place which empowers healthcare professionals to perform dietary assessment bedside and in community.



Fig. 1: Commonly used food measurement in India²

2. Dietary Assessment and Recommendation for an Individual

Note the age and gender of the person for whom we are performing the dietary assessment. We need to classify them as heavy workers, moderate workers, and sedentary workers based on their daily work schedules as seen in Table 2. Recommended Daily allowances requirement as per ICMR 2020 guidelines is given in Table 3. Considering the Calorie requirement of an adult sedentary reference male (19-39 yrs) of 2110 Kcal as one consumption unit, the corresponding consumption unit is calculated for other categories.

The calorie and protein difference in the person's diet is measured by comparing it with the Recommended daily standards. Comparing the contents of food as a proportion with that of various food groups consumed in the balanced diet recommended will help us understand the diet qualitatively and give recommendations accordingly. (See annexure 1 for illustration)

3. Dietary Recommendation for a Family

List the total number of persons, their age, gender, and the type of work/ physical activity they are involved. Based on these criteria, looking at Table 3, calculate the total consumption units required for the family. Considering the Balanced diet chart for one consumption unit (Table 4), calculate the balanced diet required for the family by multiplying it with the total consumption units required for the family. (See annexure 2 for illustration)

Table 4: Balanced diet for 1 consumption unit =2110 Kcal sedentary worker male, ICMR 2020 guidelines⁷

Food groups	Foods to be consumed (g/day)
Cereals including millets	275
Pulses/ Flesh foods	80
Milk/ curd (ml)	300
Green Leafy Vegetable	100
Other Vegetables	200
Roots and Tubers (excluding potato)	100
Fruits [#]	1150
Nuts & Seeds	30
Fats & Oils ^{\$}	25
Spices	10

For cereals and millets, its recommended to consume 50% as whole grains
 * Non-vegetarians can substitute every 30 grams of pulses with 50 grams of Eggs/ fish/ meat (2)

+ Prescribed quantity of vegetables (excluding potato) may be consumed either in cooked form/ salad

[#] Prefer fresh fruits (avoid juices)

^{\$} Use different varieties of cooking oils

Table 2: Classification based on the work and activity⁶

Type MET* spent What does it mean	Heavy work/ activity <3.0 These people engage regularly in strenuous work or in strenuous leisure activities for several hours	Moderate work/ activity 3.0-6.0 These people have occupations that are not strenuous in terms of energy demands but involve more energy expenditure than that described for sedentary lifestyles. Alternatively, they can be people with sedentary occupations who regularly spend a certain amount of time in moderate to vigorous physical activities, during either the obligatory or the discretionary part of their daily routine.	Sedentary work/ activity >6.0 These people have occupations that do not demand much physical effort, are not required to walk long distances, generally use motor vehicles for transportation, do not exercise or participate in sports regularly, and spend most of their leisure time sitting or standing, with little body displacement
Examples	Heavy lifting Digging Heavy construction work Chopping wood Shoveling Hiking Jogging at 6 Kmph Carrying heavy loads Bicycling fast (14-16 kmph) Basketball game Soccer game Tennis singles Swimming (freestyle laps) Aerobics Weight lifting (heavy weights)	Carrying light loads Sweeping Raking in the garden or yard Walking very briskly (4 kmph) Cleaning heavy (washing windows, vacuuming, mopping) Bicycling light effort (10-12 mph) Bad Minton recreational Tennis doubles walking briskly (about 5-6 KM in an hour), Dancing Walking short distances Weight training (a general light workout), Yogasanas, and Pranayama Playing with children	Walking slowly Sitting using computer Standing light work (cooking, washing dishes) Fishing sitting Playing most instruments

*MET -Metabolic Equivalents- One metabolic equivalent (MET) is defined as the amount of oxygen consumed while sitting at rest and is equal to 3.5 ml O₂ per kg body weight x min

Table 3: Recommended daily allowances requirement as per ICMR 2020 guidelines⁷

Age group*	Category	Energy requirement (kcal/day)	Consumption unit (CU)	Protein requirement (g/ day)
Adult men (19-39 years)	Sedentary work	2110	1.0	42.9
	Moderate work	2710	1.3	
	Heavy work	3470	1.6	
	Sedentary work	1660	0.8	36.3
Adult women (19-39 years)	Moderate work	2130	1.0	
	Heavy work	2720	1.3	
	Pregnant (Trimester)	II +350	-	+ 7.6
	Lactating (Months)	0-6 +600	-	+ 17.6
Infants	6 - 12 months	7-12 +520	-	+ 13.6
	1 - 3 years	670	0.3	+ 10.6
Children	4 - 6 years	1010	0.5	8.8
	7 - 9 years	1360	0.6	9.2
	10 - 12 y	1700	0.8	12.8
Boys	10 - 12 y	2220	1.1	19.0
Girls	10 - 12 y	2060	1.0	26.2
Boys	13 - 15 y	2860	1.4	26.6
Girls	13 - 15 y	2400	1.1	36.4
Boys	16 - 18 y	3320	1.6	34.4
Girls	16 - 18 y	2500	1.2	45.1
				37.3

* After the age of 40 years, requirements should be reduced by 5 percent per each decade until the age of 60 years, and 10 percent for each decade thereafter.⁸

Table 5: Additional allowance during pregnancy and lactation²

Food Item	During Pregnancy (grams)	During lactation (grams)
Cereals	35	60
Pulses	15	30
Milk	100	100
Nuts & Seeds	10	10
Fats & Oils ^{\$}	5	10

4. Discussion

4.1. Annexure 1

The 24-hr semiquantitative dietary recall of a 32-year-old Mr. Raju, working as a construction labourer, is as follows. Coffee 1 cup, 2 idlis, 2 Tbsp of chutney for breakfast, 1 medium-sized ragi ball, 1 cup rice, 1 and a half cup sambar, half cup of vegetable dry, half cup curd, 1 bajji for lunch, 4 biscuits and a cup of tea for the evening and 1 cup of rice, 1 cup of sambar for the night. Assess the diet of this person.

Tabulate the calorie and protein content of individual food items as per Table 1.

Table 6:

Breakfast	Quantity	Cal	Protein
Coffee	1 cup	110	3.6
Idli	2 Nos	120	4.6
Chutney	2 tbsp	120	2.5
Lunch			
Ragi Ball	1 Medium	140	2.7
Sambar	1 1/2 cup	173	2.4
Vegetable Dry	1/2 cup		
Rice	1 cup	170	4.3
Curd	1/2 cup	60	3.5
Bajji	1 No	35	1
Evening Snacks			
Tea	1 cup	75	2
Biscuit	4 Nos	180	2.8
Dinner			
Rice	1 cup	170	4.3
Sambar	1 cup	115	1.6
Total		1468	35.3

Since Mr. Raju is a construction worker aged between 19-39, we consider values for adult male heavy workers. He must consume 3470 Kcal of energy and 42.9 grams of protein every day. However, on 24-hour semi-quantitative dietary recall, he is consuming 1468 Kcal and 35.3 grams per day. Mr. Raju's diet is deficient by 56% in energy requirement and 18% in protein requirement.

When the diet is assessed qualitatively

1. The proportion of cereals are more it should be limited to 25-30% of the diet
2. The proportion of pulses is less addition of a pulse side dish/egg/ flesh can be added

3. Consumption of milk and milk products are inadequate
4. Proportion of vegetable, green leafy vegetables, roots, and tuber consumption is grossly inadequate
5. Fruit, nuts, and seeds need to be included in the daily diet

Table 7:

Family Member	Consumption Units
Father (Sedentary work)	1.0
Mother (Moderate work)	1.0
4-year child	0.6
1-year child	0.5
Total Consumption Units	3.1

1 Consumptionunit = 2110 Kcal

Totalconsumption units of this family = 3.1

Total Calories required by this family = 2110 x 3.1= 6541 Kcal/day

4.2. Annexure 2

Prescribe a balanced diet for a family consisting of a father, a 29-year-old software engineer, a mother aged 25 years (housewife), and children aged 4 and 1 year.

Table 8:

Food groups	Foods to be consumed (g/ day) – for 1 CU	For the family (3.1 CU)
Cereals including millets	275	852.5
Pulses/ Flesh foods	80	248
Milk/ curd (ml)	300	930
Green Leafy Vegetable	100	310
Other Vegetables	200	620
Roots and Tubers (excluding potato)	100	310
Fruits [#]	1150	3565
Nuts & Seeds	30	93
Fats & Oils ^{\$}	25	77.5
Spices	10	31

5. Source of Funding

None.

6. Conflict of Interest

None.

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