

Module 7

Developing healthy eating habits and balanced meal plans

Module coverage



Topic	Sub-topics covered	Learning objectives
7) Developing healthy eating habits and balanced meal plans	• Nutrition-based approach to healthy food choices • Planning a balanced meal (Basic principles of dietary guidelines)	✓ Enable healthier lifestyle choices. Grasp the concept of balanced meal through sample meal plans.

Mastication and satiety

Oral processing refers to the combination of mastication (chewing), lubrication, and transport of food particles that results in bolus formation and swallowing.^[86]

The concept of "vanishing caloric density," often discussed in junk food science, refers to how quickly a food melts or disappears in the mouth, leading the brain to perceive that fewer calories are being consumed, even if the food is calorie-dense. ^[87]

Mastication could influence satiation or satiety, and increasing masticatory activity reduces food intake and increases post-prandial satiety.^[88]

Chewing food thoroughly helps improve digestion and allows the body to absorb nutrients more efficiently. It also promotes satiety by giving the brain time to register fullness, which can help prevent overeating.^[88]



Nutrition-based approach to healthy food choice



A nutritionally adequate diet or a balanced diet should be consumed through a wise choice of food items from a variety of food groups. ^[11]

Healthy meal

A healthy meal is defined as a generous number of vegetables, adequate whole grains and pulses, along with modest portions of nuts or seeds, complemented by a selection of fruits and plain curd.

Balanced diet

- Provides required calories, protein, vitamins, minerals and adequate fiber to complete the day's requirements of the body to perform daily activities.
- Nutrients should be obtained through a variety of foods from different food groups, chosen and combined to meet individual needs.
- Physical activity and adequate sunlight exposure should be obtained for vitamin D synthesis and subsequent bone health.

Food groups in IFCT

Food Groups in Indian Food Composition Tables Book

Code	Food Groups
A	Cereals and Millets
B	Grain Legumes
C	Green Leafy Vegetables
D	Other Vegetables
E	Fruits
F	Roots and Tubers
G	Condiments and Spices
H	Nuts and Oil Seeds
I	Sugars
J	Mushrooms
K	Miscellaneous Foods
L	Milk and Milk Products
M	Egg and Egg Products
N	Poultry
O	Animal Meat
P	Marine Fish
Q	Marine Shellfish
R	Marine Mollusks
S	Fresh Water Fish and Shellfish
T	Edible Oils and Fats

- **Richness of Indian food diversity:** The table highlights the vast array of food groups and the substantial number of individual food entries within the Indian food system.
- **Foundation for nutritional planning:** The IFCT, as represented by the food groups, provides a fundamental framework for understanding the nutritional content of various foods. This data is crucial for designing meal plans that meet specific dietary requirements and promote healthy eating.
- **Emphasis on variety:** The sheer number of entries across different food groups (e.g., "Other Vegetables" with 78 entries, "Fruits" with 68) suggests the importance of incorporating a wide variety of foods to ensure a comprehensive intake of essential nutrients.
- **Potential for balanced meals:** With significant representation across categories like cereals and millets, vegetables, fruits, pulses, and animal-source foods, the Indian food landscape offers ample opportunity to construct well-balanced meals that include macronutrients, micronutrients, and fiber.
- **Specific Focus Areas:** The table also points to specific food groups that might require particular attention in meal planning, such as ensuring adequate intake from green leafy vegetables or considering the appropriate inclusion of fats and oils.

Healthy eating habits



Portion control is one of the strongest determinants of a healthy eating habit, along with health-conscious identity and food hedonism. ^[90]

- Inclusion of non-starchy fresh vegetables and green leafy vegetables about 30g in every meal.
- 50% of cereals and other wholegrains will cover adequate nutrients and fiber.
- Consume nuts, oilseeds, fatty fish and restrict cooking oils to 25-30g per day.
- Restricting meal frequency to 2-3 times a day.
- Avoid sugar or restricting to 20g to 25g per day (adults).

Variety within food groups

Food variety is the presence of multiple foods and/or sensory characteristics within and across meals. [92]

Types of cereals, millets and pulses have different nutrient profiles. Daily consumption of these will provide the body with various nutrients.

Food variety is often associated with increased health outcomes, but must be understood with various caveats since experimental results suggest that there must be a limited variety in the diet to sustain weight loss in the long term^[2].

It is important to inculcate a sense of awareness of diversity in the diet at an early age.



Possible nutrient deficiencies in vegans & vegetarians



The main nutrients of concern are vitamin B12, vitamin D, iodine, selenium, calcium, and iron. ⁽⁹³⁾

- Vegetarians and vegans can suffer from multiple nutrient deficiencies depending upon the type and diversity of components in their diet.
- While minerals may be abundantly available in other plant sources and only a question of substitution in the diet, vitamins B12 and D, and omega-3, need to be consciously supplemented based on requirements.
- Algal DHA is a commercially available omega-3 that is suitable for vegetarians/vegans.
- Whole dairy and nutritional yeast may be a suitable source of vitamin B12 for vegetarians/vegans, along with supplement tablets and injections.
- Vitamin D is easily obtained through adequate exposure to sunlight. Vegetarian vitamin D supplements are also available.

Suggested diet for normally nourished sedentary men



The suggestion is for reference individual weighing 65Kg & BMI 18.5–23 and with adequate physical activity.

Breakfast(570 kcal): 8-10AM

Soaked & boiled whole grains-90g
Boiled red / black beans, lobia / chickpea-35g
Green leafy vegetables-50g
Vegetables-50g
Nuts-20g

Lunch(900 kcal): 1-2PM

Cereals (preferably whole grain)-100g
Pulses-30g; or meat
Vegetables-150g
Green leafy vegetables-50g(can be used in curries/chutney)
Nuts/oil seeds-add 20g in curries; with cooking oil (15g) for flavour
Curd -150ml/Paneer equivalent to 150ml
Fruits - End your meal with 50g fruits

Evening Beverage (35 kcal): 5PM

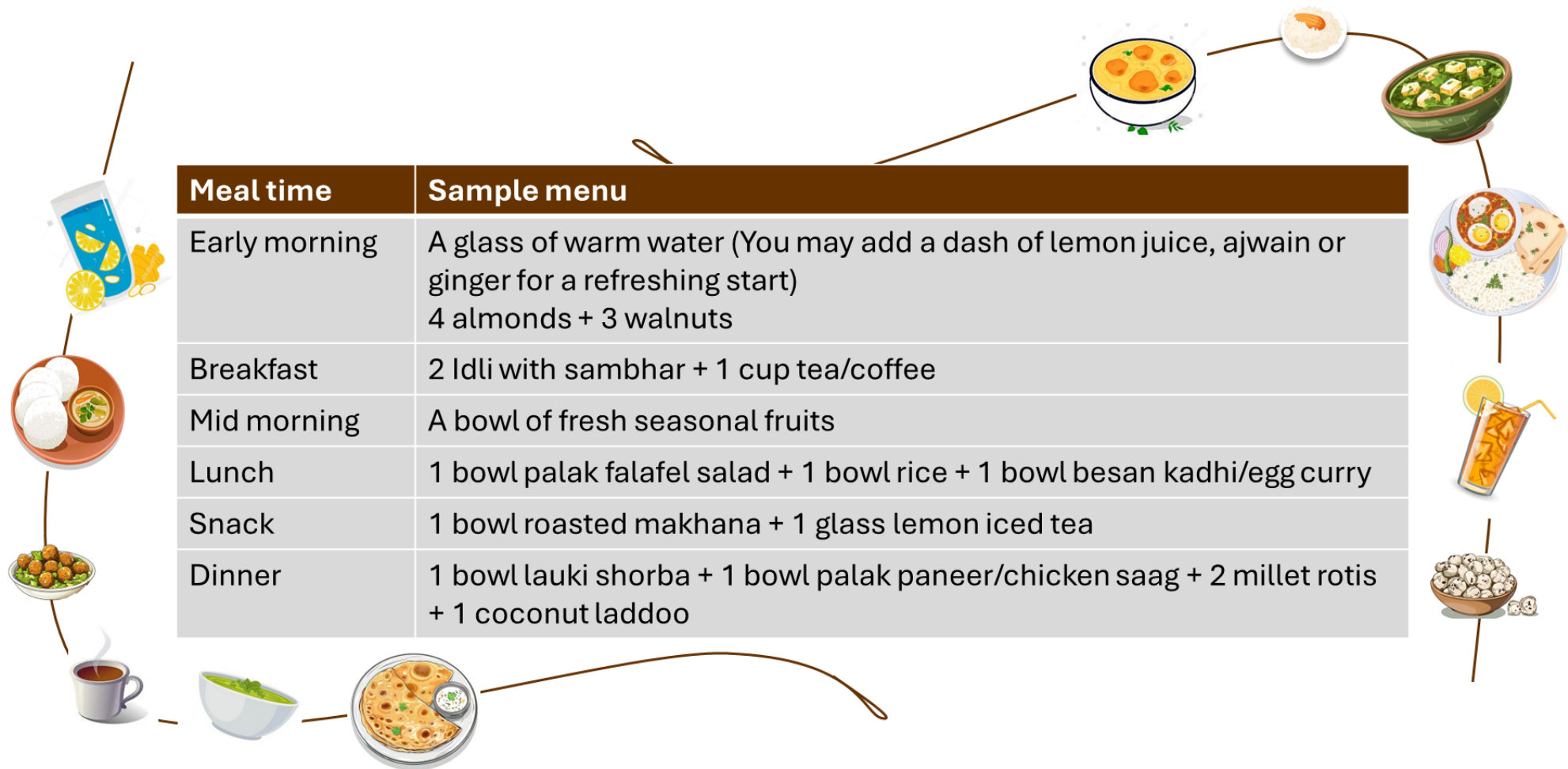
Milk (50ml)

Dinner (590kcal): 7-8PM

Cereals-80g
Pulses-25g
Vegetables-100g
Oil-10g
Curd-100ml
Fruits-end your meal with 50g fruits

Total calories from the above diet is 2100 Kcal/day | Total protein provides 13.7% Kcal/day from the suggested diet | Quantities indicated are for raw ingredients * Measures: 1 cup/Katori =200ml | *Non-veg items like fish/egg/chicken can be consumed as per social acceptability & availability. In the meal preparation, 30g of oil and 5g of iodised salt can be used | Prefer at least 50% cereals/millets as whole grain. It is preferable to take only two meals per day as per individual preferences & needs; Timing and meal proportion given above are only indicative. Note: One may consume sugar, but it must be restricted to 25–30 grams per day. To adjust the total calories, cereals must be reduced if sugar is taken. Energy requirement depends on body weight and physical activity | Added sugar must be restricted to less than 5% of daily energy. Individuals with different body weights may refer to Table 1.6, Page no. 10 in the source.

Sample meal plan for a sedentary adult



Suggested food groups for a balanced diet - All age groups



Suggested food groups for a balanced diet to meet the daily nutrient requirements for people with specific body weights

Age group	Category of work	Body Wt (kg)*	Cereals/Millet (g)**	^Pulses & Beans (g)	GLV (g)	Vegetables (g)	Roots & Tubers (g)	Fruits (g)	Nuts (g)	Milk/Curd (ml)	Fats & oils (g)	Energy obtained from these food groups (Kcal)	Crude protein obtained from these food groups (g)
Men	Sedentary	55	230	75	100	200	100	100	30	300	30	~1900	64
Men	Moderate		320	105	100	200	100	100	40	300	35	~2400	82
Women	Sedentary	50	180	60	100	200	100	100	25	300	25	~1600	55
Women	Moderate		250	85	100	200	100	100	30	300	30	~2000	68
Pregnant women		50+10	220	75	150	200	100	150	40	400	30	~2000	68
Lactating women	0-6 months		260	85	150	200	100	150	40	400	35	~2245	77
Lactating women	7-12 months		250	85	150	200	100	150	40	400	35	~2200	78
Infants	0-6 months	5.8	Exclusive breastfeeding										
Infants	7-12 months	8.5	25	12	20	25	20	40-60	7	*milk	10		
Children	1-3 yrs	12.9	100	50	50	100	50	60-75	10	350	20	~1110	38
Children	4-6 yrs	18.3	160	60	50	100	50	75	15	350	20	~1370	46
Children	7-9 yrs	25.3	200	65	100	150	100	100	20	400	25	~1710	59
Boys	10-12 yrs	34	270	85	100	200	100	100	30	400	35	~2180	74
Girls	10-12 yrs	35	240	80	100	200	100	100	30	400	30	~2000	71
Boys	13-15 yrs	47	360	120	100	200	100	100	40	400	40	~2680	92
Girls	13-15 yrs	44	260	85	100	200	100	100	35	400	35	~2160	73
Boys	16-18 yrs	55	390	130	100	200	100	150	45	400	40	~2860	98
Girls	16-18 yrs	48	270	90	100	200	100	150	35	400	35	~2200	76
Elderly	>60 yrs	Man	170	75	100	200	100	150	30	400	25	~1740	62
Elderly		Woman	140	70	100	200	100	150	30	400	15	~1530	56

Continuation in the next slide. . .

Suggested food groups for a balanced diet - All age groups



** 20% to 30% of Cereals (weight in raw) should be from millets for adults. 20% of cereals (raw weight) should be from millets for children up to 10 years of age.

^ For non-vegetarians, 30g of pulses may be substituted for meat.

*Continue breast milk, which is roughly 580ml per day.

Points to be considered while preparing the diet

- Sugar should be less than 5% of the total energy per day.
- No added sugar for children <2 years old.
- These suggested food groups are for children who are growing normally and for adults with normal BMI (18.5 to 23).
- The suggested diets provide around 30% energy from total fats and ~15% from protein.
- Age groups for children and boys/girls: e.g., 1 to 3 yrs means 1+ to 3 yrs 11 months; 4 to 5 yrs means 4+ to 5 years 11 months and so on.
- For foods that were used for the calculation of the average value of macro and micronutrient composition, please refer to Annexure 4 in the Dietary Guidelines for Indians 2024.

Conclusion



- Nutritionally adequate diet or a balanced diet should be consumed through a wise choice of food items from a variety of food groups.
- Limit consumption of too much fat, salt and sugar in diet.
- Chew the food properly to ensure complete release of nutrition during digestion and to achieve satiety without overconsumption.
- Nutritional needs during different life stages must be acknowledged when designing optimal diets.

Suggested read: 1) Rochelle Embling, Aimee E Pink, Jennifer Gatzemeier, Menna Price, Michelle D Lee, Laura L Wilkinson, Effect of food variety on intake of a meal: a systematic review and meta-analysis, The American Journal of Clinical Nutrition, Volume 113, Issue 3, 2021, Pages 716-741, 2) Amount of Food Group Variety Consumed in the Diet and Long-Term Weight Loss Maintenance, Hollie A. Raynor, Robert W. Jeffery, Suzanne Phelan, James O. Hill, Rena R. Wing, Obesity research, Volume13, Issue5, May 2005, Pages 883-890

Module 8

Impact of processing on nutrition