Dietary Guidelines For Whole Grain Consumption In Promoting Good Health

Rekha Sharma, R.D.

Former Chief Dietician ,All India Institute of Medical Sciences, New Delhi

President , Indian Dietetic Association (2011-2014)

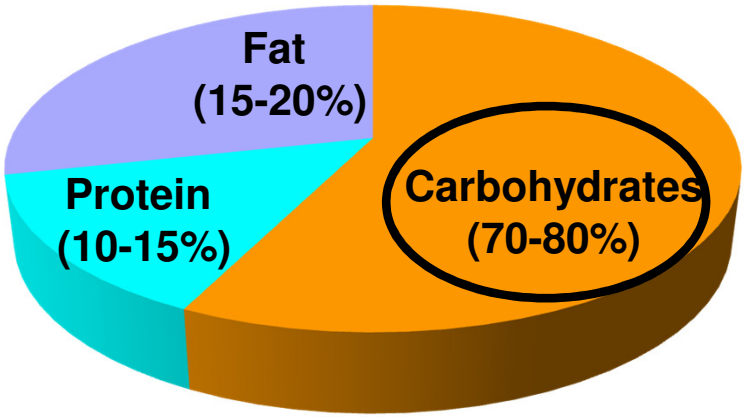
President and Director, Clinical Nutrition and Dietetics Diabetes Foundation (INDIA)

Country representative and Director International Federation of Dietetic Associations (2012-2016)

Indian Scenario

Indian Meal Macronutrients

(% EN)



- **Indian Meal has higher intake of carbohydrates.**
- **Carbohydrates : Sources are primarily from cereals , some from pulses and other sources like sugars and starches.**
- **Quality of cereals is important**
- **Whole grains : power packed with nutrients, help in the prevention of Non Communicable Diseases, some cancers and are gut friendly.**

Dietary Guidelines of Indians, NIN, Hyderabad

Transition In Dietary Habits

- **Carbohydrates from whole grains are being replaced by refined products**
- **Carbohydrates are also being replaced by unhealthy fats specially by SFA and Trans Fats**
- **Fiber, MUFA & N3 content of the diets is reducing.**
- **Traditional foods are being replaced by modern refined foods**
- **Increase in sedentary life styles and there is lack of physical activity**

All leading to increased incidence of

Obesity ,Metabolic syndrome, DM, & CHD

Scientific Data

- **Lower intake of monounsaturated fatty acids (MUFA),**
- **Low ratio of n-6/n-3 fatty acids,**
- **Even when mean body mass index (BMI) is in a low range, %BF is high and a high prevalence of abdominal obesity also in both males and females**
- **High prevalence of hypercholesterolemia, hypertriglyceridemia and low levels of high-density lipoprotein cholesterol(HDL)**

Components Of Good Health And Lifestyle That We Can Control

- **Nutrition – Diet**
- **Physical Activity - Exercise**
- **Behaviour Modification / Stress Management**

Dietary factors often over ride genetic factors

in Asian Indians for Obesity ,Insulin resistance,

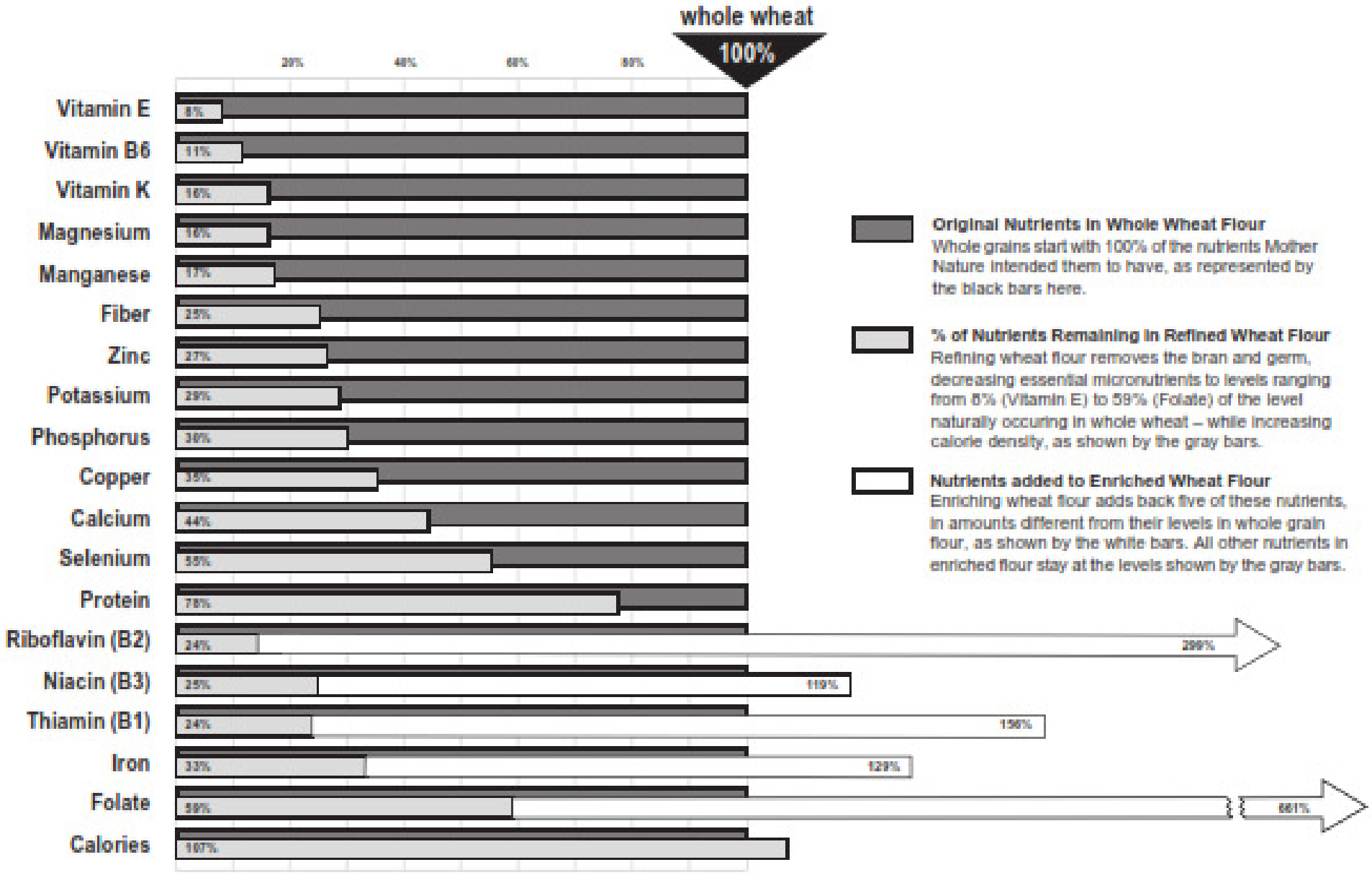
Metabolic Syndrome & Type II DM

Whole Grain Components

• Dietary Fiber • Iron • Zinc • Manganese • Folate • Magnesium • Copper	• Thiamin • Niacin, • Vitamin B_6 • Phosphorus • Selenium • Riboflavin • Vitamin A

Nutrients in Wheat Flour: Whole, Refined and Enriched

Refining wheat flour removes many nutrients, including those listed here. Enriching replaces five nutrients.



Whole Grain food

- **Whole grain :100% of the original kernel – all of the bran, germ, and endosperm – must be present to qualify as a whole grain.**
- **Definition : A food providing at least 8 g of whole grains/30-g serving of food, be defined as a whole-grain food**
- **At least half of all the grains eaten should be whole grains**

Adv Nutr March 2014

Whole Grain Consumption And Risk Of Cardiovascular Disease , Cancer And All Cause Mortality

- **A systematic review and dose-response meta-analysis of prospective studies**
- **Study was to quantify the dose-response relation , between consumption of whole grain & and the risk of cardiovascular disease, total cancer, and all cause and cause specific mortality.**
- **45 studies (64 publications) were included**

BMJ 2016

Whole Grain Consumption And Risk Of Cardiovascular Disease , Cancer And All Cause Mortality

- **Whole grains are rich in fibre, which can reduce the postprandial glucose and insulin responses leading to better glycaemic control. They have suggested a lower risk of overweight and obesity and of type 2 diabetes among people with a high whole grain intake.**
- **Though both adiposity and type 2 diabetes are established risk factors for cardiovascular disease, cancer, and mortality, in this analysis all the studies adjusted for BMI, suggesting an association independent of BMI.**

BMJ 2016

Whole Grain Consumption And Risk Of Cardiovascular Disease , Cancer And All Cause Mortality

- **An average of 90 g/day of whole grain was given**
- **There was a clear dose-response relation, and the lowest risk was observed at 225 g/day**
- **Whole grain bread, whole grain breakfast cereals, added bran, total breakfast cereals and pasta**

BMJ 2016

Whole Grain Consumption And Risk Of Cardiovascular Disease , Cancer And All Cause Mortality

This meta-analysis provides evidence that

- **Whole grain intake is associated with:**

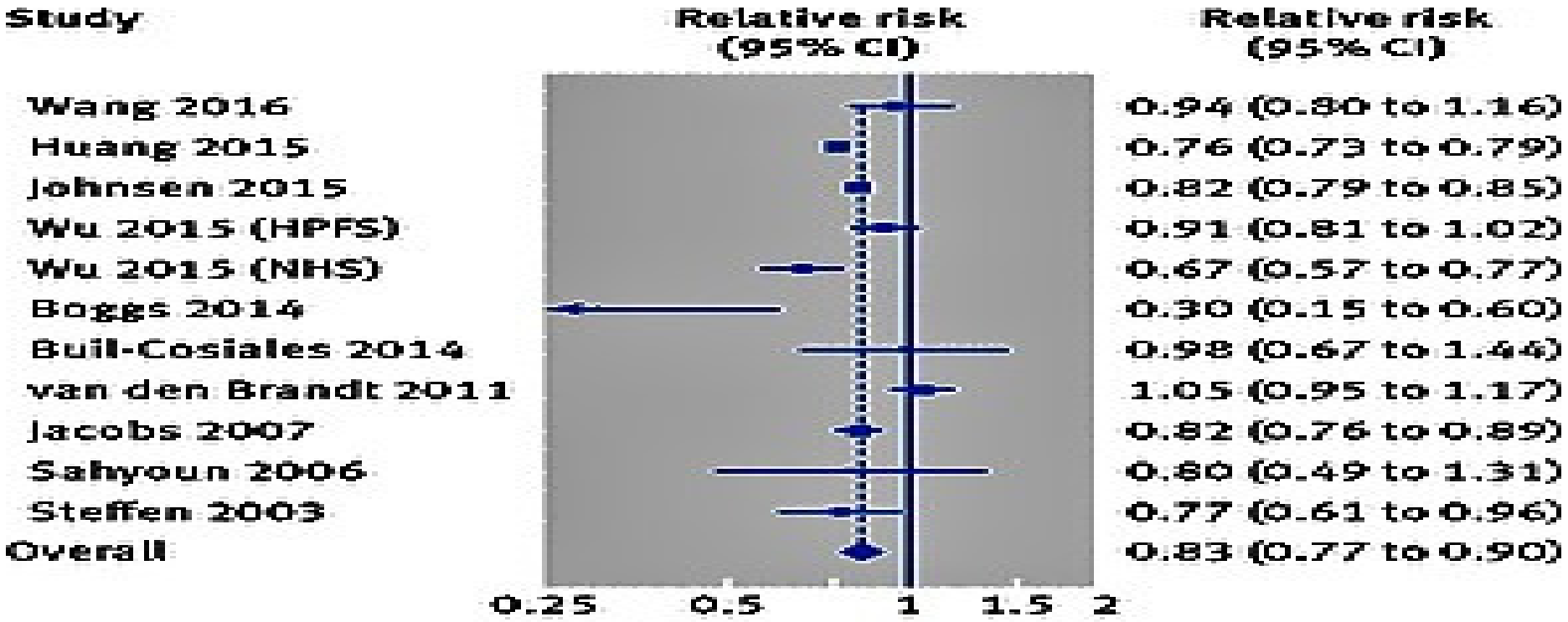
  A reduced risk of coronary heart disease, cardiovascular disease, and total cancer. Mortality from all causes, respiratory diseases, infectious diseases, diabetes, and all non-cardiovascular, non-cancer causes.
- **Findings support dietary guidelines that recommend:**

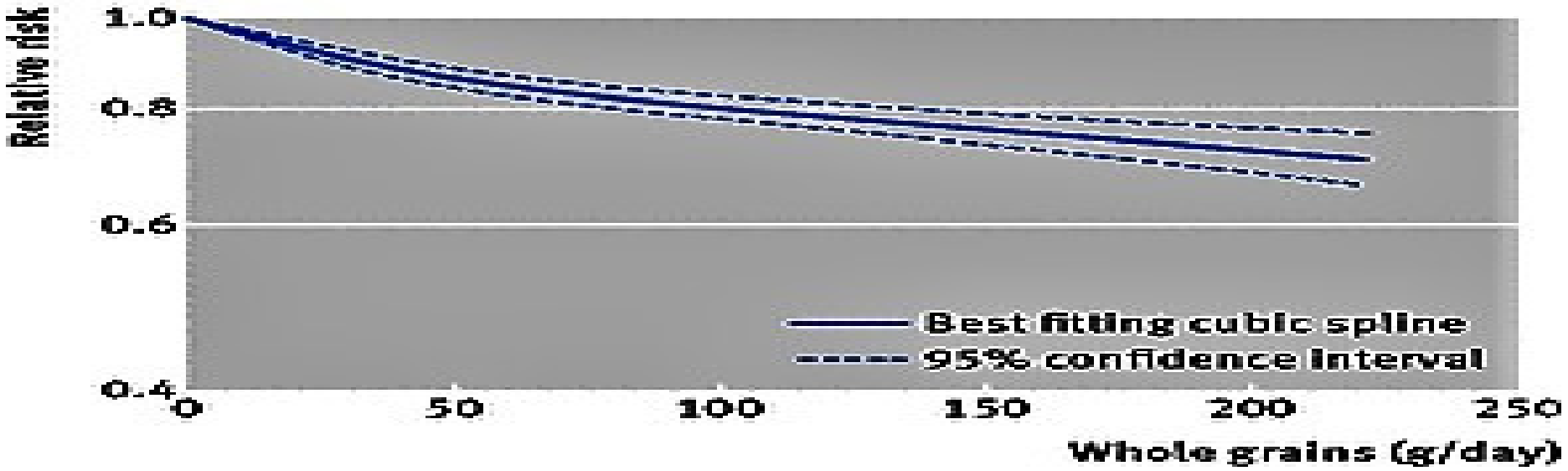
  Increased intake of whole grain to reduce the risk of chronic diseases and premature mortality. To increase it as much as possible and reduce refined grains.

BMJ 2016; 353

Reductions In The Relative Risk With Per 90 G/Day Of Whole Grain

- Coronary heart disease (19%),
- Cardiovascular disease (22%),
- All cause mortality (17%),
- Mortality from stroke (14%),
- Cancer (15%),
- Respiratory disease (22%),
- Infectious disease (26%),
- Diabetes (51%)


Study
Relative risk (95% CI)
Relative risk (95% CI)
Wang 2016
0.94 (0.80 to 1.16)
Huang 2015
0.76 (0.73 to 0.79)
Johnsen 2015
0.82 (0.79 to 0.85)
Wu 2015 (HPFS)
0.91 (0.81 to 1.02)
Wu 2015 (NHS)
0.67 (0.57 to 0.77)
Boggs 2014
0.30 (0.15 to 0.60)
Buil-Cosiales 2014
0.98 (0.67 to 1.44)
van den Brandt 2011
1.05 (0.95 to 1.17)
Jacobs 2007
0.82 (0.76 to 0.89)
Sahyoun 2006
0.80 (0.49 to 1.31)
Steffen 2003
0.77 (0.61 to 0.96)
Overall
0.83 (0.77 to 0.90)
0.25
0.5
1
1.5
2


Relative risk
1.0
0.8
0.6
0.4
0
50
100
150
200
250
Best fitting cubic spline
95% confidence interval
Whole grains (g/day)

Associations Between Eating Patterns And Health

- **Strong evidence shows that healthy eating patterns are associated with a reduced risk of cardiovascular disease (CVD).**
- **Moderate evidence indicates that healthy eating patterns also are associated with a reduced risk of type 2 diabetes, certain types of cancers (such as colorectal and postmenopausal breast cancers), overweight, and obesity.**
- **Emerging evidence also suggests that relationships may exist between eating patterns and some neurocognitive disorders and congenital anomalies.**

USDA 2015

Associations Between Eating Patterns And Health

Based on that :

- **Higher intakes of vegetables and fruits consistently have been identified as characteristics of healthy eating patterns**
- **Whole grains have also been identified ,although with slightly less consistency.**
- **Other characteristics with less consistency : fat-free or low-fat dairy, seafood, legumes, and nuts.**
- **Lower the intakes of meats, including processed meats; processed poultry; sugar-sweetened foods, particularly beverages and refined grains.**

USDA 2015

WHO – Healthy Eating Guidelines

- **A healthy diet helps protect against malnutrition in all its forms, as well as noncommunicable diseases (NCDs), including diabetes, heart disease, stroke and cancer.**

- **Fruits, vegetables, legumes (e.g. lentils, beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat, brown rice).**

WHO 2015

WHO – Healthy Eating Guidelines

In order to improve fruit and vegetable consumption you can:

- **always include vegetables in your meals**
- **eat fresh fruits and raw vegetables as snacks**
- **eat fresh fruits and vegetables in season**
- **eat a variety of choices of fruits and vegetables**

WHO 2015

The Whole Grains Council Plans For 2017

- Whole grains are a tasty part of everyday diets.
- Whole-grain-based meals are the foundation of sustainable diets.
- Whole grains are an affordable way to eat healthy.

1. New Stamp Launch.
2. Whole grain Sampling day
3. Whole grain month
4. Whole grain themes and messages

ICMR Centenary Year Celebrations

Dietary Guidelines for Indians

- A Manual

NATIONAL INSTITUTE OF NUTRITION
Indian Council of Medical Research
Hyderabad - 500 007, INDIA


Exercise regularly and be physically active
EAT SPARINGLY
EAT MODERATELY
EAT LIBERALLY
CONSUME ADEQUATELY
Abstain from drinking alcohol
Say NO to Tobacco

Foods For Energy

- **Use a combination of whole grains, grams and greens. Include jaggery or sugar and cooking oils to bridge the calorie or energy gap.**

NIN 2011

DIABETES TECHNOLOGY & THERAPEUTICS
Volume 13, Number 6, 2011

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Review

Consensus Dietary Guidelines for Healthy Living and Prevention of Obesity, the Metabolic Syndrome, Diabetes, and Related Disorders in Asian Indians

Anoop Misra, M.D., Rekha Sharma, M.Sc., Seema Gulati, Ph.D., Shashank R. Joshi, M.D., D.M., Vinita Sharma, Ph.D., Ghafoorunissa, Ph.D., Ahamed Ibrahim, Ph.D., Shilpa Joshi, M.Sc., Avula Laxmaiah, MBBS, M.P.H., Anura Kurpad, M.D., Ph.D., Rebecca K. Raj, Ph.D., Viswanathan Mohan, M.D., Ph.D., Hemraj Chandalia, M.D., Kamala Krishnaswamy, M.D., Sesikeran Boindala, M.D., Sarath Gopalan, M.D., Siva Kumar Bhattiprolu, Ph.D., Sonal Modi, M.Sc., Naval K. Vikram, M.D., Brij Mohan Makkar, M.D., Manju Mathur, M.Sc., Sanjit Dey, Ph.D., Sudha Vasudevan, M.Sc., Shashi Prabha Gupta, M.Sc., Seema Puri, Ph.D., Prashant Joshi, M.D., Kumud Khanna, Ph.D., Prashant Mathur, M.D., Sheela Krishnaswamy, M.Sc., Jagmeet Madan, Ph.D., Madhukar Karmarkar, M.D., Veenu Seth, Ph.D., Santosh Jain Passi, Ph.D., Davinder Chadha, M.D., D.M., and Swati Bhardwaj, M.Sc. for the National Dietary Guidelines Consensus Group[1]

Abstract

India is undergoing rapid nutritional transition, resulting in excess consumption of calories, saturated fats, *trans* fatty acids, simple sugars, salt and low intake of fiber. Such dietary transition and a sedentary lifestyle have led

Carbohydrates And Fiber

- **The daily carbohydrate intake should be approximately 50-60% of total calorie intake.**
- **Complex carbohydrates and its products are to be preferred over refined carbohydrate and its products**
- **Low Glycemic Index carbohydrate foods should be preferred.**
- **The total dietary fiber in daily diet should be 25 to 40 gms per day. Foods high in soluble fiber should be included such as oat bran, oatmeal, beans, peas, rice bran, barley, citrus fruits, strawberries, and apple pulp**
- **Fruits and vegetables: Minimum of five servings per day: vegetables: 3, fruits: 2**
- **Simple sugars like direct sugar, sugarcane juice, sweetened carbonated beverages, fruit juices and sugar syrups should be avoided.**

2015-2020 Dietary Guidelines For Americans

- **At the core , the guidance is the importance of including vegetables, fruits, grains, dairy, protein foods, and oils—eaten within an appropriate calorie level and in forms with limited amounts of saturated fats, added sugars, and sodium.**

2015-2020 Dietary Guidelines For Americans

- **Consume at least half of all grains as whole grains.**
- **Increase whole-grain intake by replacing refined grains with whole grains.**
- **The Healthy Mediterranean-Style Pattern**
- **The Healthy Vegetarian Pattern**

USDA 2015

Healthy Eating Pattern

- **Include whole grains and limit the intake of refined grains and products made with refined grains, especially those high in saturated fats, added sugars, and/or sodium, such as cookies, cakes, and some snack foods.**
- **Grains with small amounts of added sugars and saturated fats can fit within healthy eating patterns.**

USDA 2015-2020

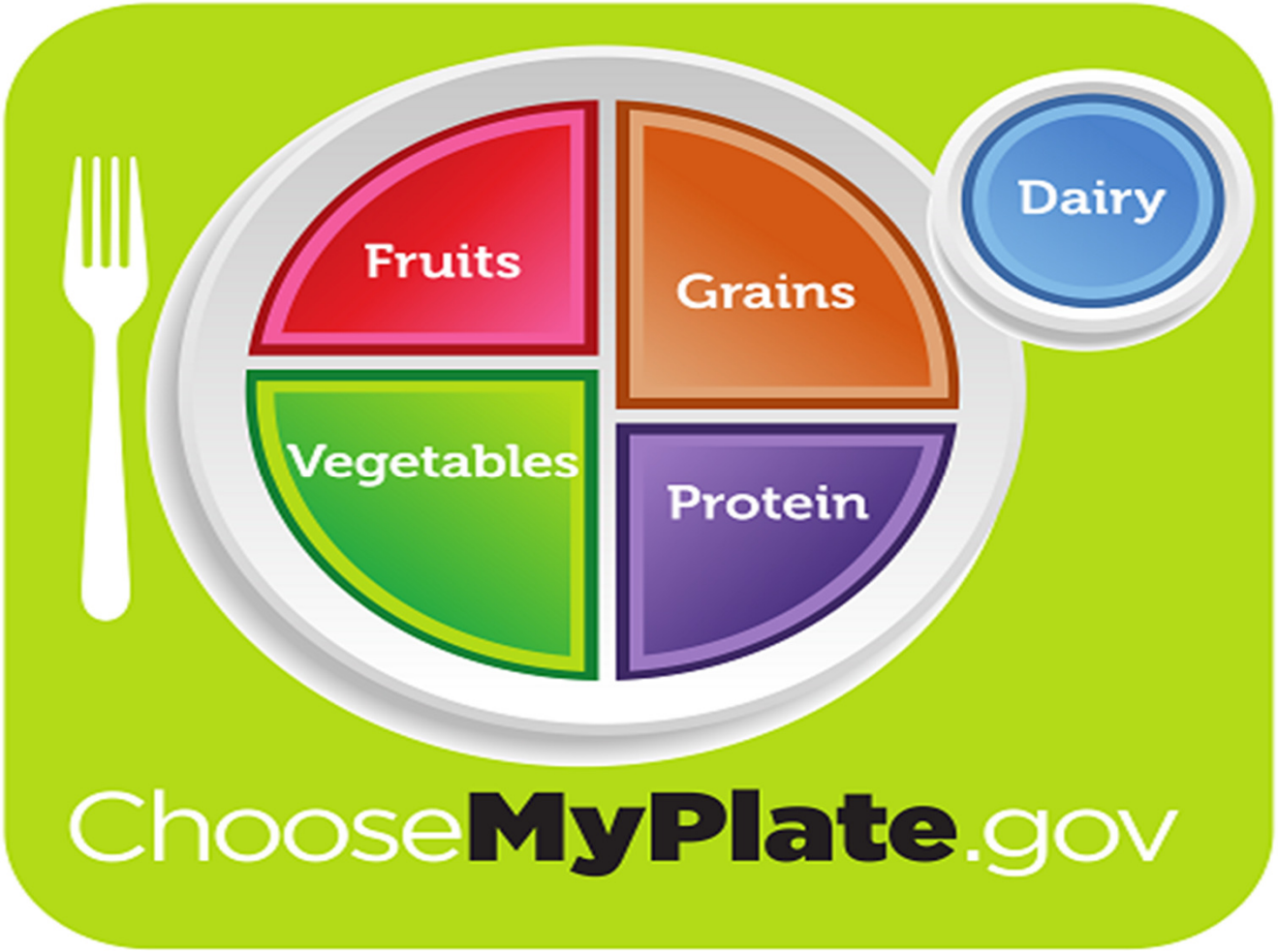
The Healthy Mediterranean-Style Pattern

- **Use whole grains and minimally processed grains. Brown rice, barley, oats, fiber-rich whole wheat , *Millets , grain pulses***
- **Vegetables and fruits in every meal.**

  Filling half your plate with vegetables and fruits
- **Fish and seafood are healthy sources of protein, along with nuts and seeds**
- **Olive oil ..... MUFA rich**

USDA 2015 - 2020

USDA “My Plate concept



The Healthy Vegetarian Pattern

- **Amounts of soy products (particularly tofu and other processed soy products),**
- **Legumes, nuts ,seeds, and whole grains are to be increased,**
- **Meat, poultry, and seafood are eliminated.**
- **Dairy and eggs are included ,as they are consumed by the majority of these vegetarians.**

USDA 2015 - 2020

Sources Of Whole Grains

- **Cereals and Millets :**

  Whole wheat , whole wheat porridge , oats , millets, maize , barley , sorghum , quinoa,

  Buck wheat , Amaranth
- **Grain pulses**

Indian Food Composition Tables

T. Longvah
R. Ananthan
K. Bhaskarachary
K. Venkaiah

NATIONAL INSTITUTE OF NUTRITION
(Indian Council of Medical Research)
Department of Health Research
Ministry of Health & Family Welfare, Government of India
Hyderabad- 500 007, Telangana State, INDIA

2017

Table 1. PROXIMATE PRINCIPLES AND DIETARY FIBRE

(All values are expressed per 100g edible portion; All blank space in the table represent below detectable limit)

Food code	Food Name	No. of Regions	Moisture	Protein	Ash	Total Fat	Dietary Fibre			Carbohydrate	Energy
							Total	Insoluble	Soluble		
			← g →								KJ
			WATER	PROTCNT	ASH	FATCE	FIBTG	FIBINS	FIBSOL	CHOAVLDF	ENERC
A	**CEREALS AND MILLETS**										
A001	**Amaranth seed, black** *(Amaranthus cruentus)*	1	9.89	14.59	2.78	5.74	7.02	5.76	1.26	59.98	1490
A002	**Amaranth seed, pale brown** *(Amaranthus cruentus)*	6	9.20±0.40	13.27±0.34	3.05±0.30	5.56±0.33	7.47±0.09	5.80±0.17	1.67±0.21	61.46±0.60	1489±10
A003	**Bajra** *(Pennisetum typhoideum)*	6	8.97±0.60	10.96±0.26	1.37±0.17	5.43±0.64	11.49±0.62	9.14±0.58	2.34±0.42	61.78±0.85	1456±18
A004	**Barley** *(Hordeum vulgare)*	6	9.77±0.38	10.94±0.51	1.06±0.22	1.30±0.20	15.64±0.64	9.98±0.62	5.66±0.68	61.29±0.77	1321±19
A005	**Jowar** *(Sorghum vulgare)*	6	9.01±0.77	9.97±0.43	1.39±0.34	1.73±0.31	10.22±0.49	8.49±0.40	1.73±0.40	67.68±1.03	1398±13
A006	**Maize, dry** *(Zea mays)*	6	9.26±0.55	8.80±0.49	1.17±0.16	3.77±0.48	12.24±0.93	11.29±0.85	0.94±0.18	64.77±1.58	1398±25
A007	**Maize, tender, local** *(Zea mays)*	6	68.29±0.52	3.57±0.42	0.38±0.04	1.40±0.30	3.67±0.26	3.23±0.23	0.43±0.07	22.69±0.94	502±7
A008	**Maize, tender, sweet** *(Zea mays)*	4	74.40±0.71	4.16±0.41	0.36±0.06	1.35±0.07	3.30±0.51	2.71±0.53	0.59±0.11	16.42±0.89	405±14
A009	**Quinoa** *(Chenopodium quinoa)*	1	10.43	13.11	2.65	5.50	14.66	10.21	4.46	53.65	1374
A010	**Ragi** *(Eleusine coracana)*	5	10.89±0.61	7.16±0.63	2.04±0.34	1.92±0.14	11.18±1.14	9.51±0.65	1.67±0.55	66.82±0.73	1342±10
A011	**Rice flakes** *(Oryza sativa)*	6	10.36±0.53	7.44±0.35	0.85±0.13	1.14±0.11	3.46±0.32	2.65±0.34	0.81±0.12	76.75±0.96	1480±16
A012	**Rice puffed** *(Oryza sativa)*	6	9.40±0.22	7.47±0.15	1.28±0.10	1.62±0.13	2.56±0.33	1.76±0.13	0.80±0.38	77.68±0.54	1514±4
A013	**Rice, raw, brown** *(Oryza sativa)*	6	9.33±0.39	9.16±0.75	1.04±0.18	1.24±0.08	4.43±0.54	3.60±0.55	0.82±0.15	74.80±0.85	1480±10
A014	**Rice, parboiled, milled** *(Oryza sativa)*	6	10.09±0.43	7.81±0.63	0.65±0.08	0.55±0.08	3.74±0.36	2.98±0.35	0.76±0.09	77.16±0.76	1471±8
A015	**Rice, raw, milled** *(Oryza sativa)*	6	9.93±0.75	7.94±0.58	0.56±0.08	0.52±0.05	2.81±0.42	1.99±0.39	0.82±0.22	78.24±1.07	1491±15
A016	**Samai** *(Panicum miliare)*	6	11.36±0.19	10.13±0.45	1.34±0.16	3.89±0.35	7.72±0.92	5.45±0.48	2.27±0.52	65.55±1.29	1449±19
A017	**Varagu** *(Setaria italica)*	5	14.23±0.45	8.92±1.09	1.72±0.27	2.55±0.13	6.39±0.60	4.29±0.82	2.11±0.34	66.19±1.19	1388±10
A018	**Wheat flour, refined** *(Triticum aestivum)*	6	11.34±0.93	10.36±0.29	0.51±0.07	0.76±0.07	2.76±0.29	2.14±0.30	0.62±0.14	74.27±0.92	1472±16

Food code	Food Name	No. of Regions	Moisture	Protein	Ash	Total Fat	Dietary Fibre			Carbohydrate	Energy
							Total	Insoluble	Soluble		
			← g →								KJ
			WATER	PROTCNT	ASH	FATCE	FIBTG	FIBINS	FIBSOL	CHOAVLDF	ENERC
A019	**Wheat flour, atta** *(Triticum aestivum)*	6	11.10±0.35	10.57±0.37	1.28±0.19	1.53±0.12	11.36±0.29	9.73±0.47	1.63±0.64	64.17±0.32	1340±7
A020	**Wheat, whole** *(Triticum aestivum)*	6	10.58±1.11	10.59±0.60	1.42±0.19	1.47±0.05	11.23±0.77	9.63±0.19	1.60±0.75	64.72±1.74	1347±23
A021	**Wheat, bulgur** *(Triticum aestivum)*	6	8.61±0.32	10.84±0.75	1.23±0.06	1.45±0.02	8.81±0.45	6.56±0.20	2.25±0.38	69.06±0.74	1430±6
A022	**Wheat, semolina** *(Triticum aestivum)*	6	8.94±0.68	11.38±0.37	0.80±0.17	0.74±0.10	9.72±0.74	8.16±0.58	1.55±0.18	68.43±0.99	1396±18
A023	**Wheat, vermicelli** *(Triticum aestivum)*	6	9.59±0.37	9.70±0.52	0.60±0.04	0.45±0.03	9.28±0.69	7.53±0.51	1.75±0.24	70.39±0.61	1392±8
A024	**Wheat, vermicelli, roasted** *(Triticum aestivum)*	6	7.61±0.47	10.37±0.70	0.56±0.04	0.49±0.05	9.55±0.40	7.79±0.29	1.76±0.18	71.42±0.71	1423±13
B	**GRAIN LEGUMES**										
B001	**Bengal gram, dal** *(Cicer arietinum)*	6	9.18±0.58	21.55±1.45	2.10±0.10	5.31±0.06	15.15±0.17	12.67±0.22	2.48±0.15	46.72±1.29	1377±10
B002	**Bengal gram, whole** *(Cicer arietinum)*	6	8.56±0.37	18.77±0.42	2.78±0.13	5.11±0.11	25.22±0.39	22.70±0.60	2.52±0.87	39.56±0.16	1201±9
B003	**Black gram, dal** *(Phaseolus mungo)*	6	9.16±0.35	23.06±0.59	3.17±0.02	1.69±0.12	11.93±0.26	7.58±0.13	4.35±0.15	51.00±0.80	1356±9
B004	**Black gram, whole** *(Phaseolus mungo)*	6	8.70±0.33	21.97±0.63	3.35±0.03	1.58±0.06	20.41±0.06	15.47±0.05	4.94±0.07	43.99±0.76	1219±5
B005	**Cowpea, brown** *(Vigna catjang)*	6	9.42±0.39	20.36±0.59	2.90±0.11	1.15±0.06	11.54±0.13	8.75±0.09	2.80±0.05	54.62±0.49	1340±7
B006	**Cowpea, white** *(Vigna catjang)*	1	9.32	21.25	2.83	1.14	11.70	8.91	2.79	53.77	1340
B007	**Field bean, black** *(Phaseolus vulgaris)*	1	9.57	19.93	2.73	0.92	23.40	17.99	5.41	43.46	1155
B008	**Field bean, brown** *(Phaseolus vulgaris)*	1	8.74	19.90	2.74	0.98	22.40	17.32	5.08	45.24	1184
B009	**Field bean, white** *(Phaseolus vulgaris)*	5	8.61±0.36	19.84±1.04	3.09±0.15	0.94±0.02	22.99±0.83	17.45±2.27	5.54±2.28	44.53±1.42	1173±24
B010	**Green gram, dal** *(Phaseolus aureus)*	6	9.77±0.67	23.88±0.61	3.04±0.03	1.35±0.20	9.37±0.38	7.75±0.39	1.62±0.19	52.59±0.45	1363±10
B011	**Green gram, whole** *(Phaseolus aureus)*	6	9.95±0.42	22.53±0.43	3.22±0.04	1.14±0.17	17.04±0.38	14.59±0.42	2.44±0.15	46.13±0.64	1229±10
B012	**Horse gram, whole** *(Dolicus biflorus)*	6	9.28±0.57	21.73±0.29	3.24±0.11	0.62±0.04	7.88±0.02	6.22±0.03	1.66±0.03	57.24±0.50	1379±9
B013	**Lentil dal** *(Lens culinaris)*	6	9.71±0.48	24.35±1.10	2.23±0.13	0.75±0.04	10.43±0.39	8.60±0.42	1.83±0.23	52.53±1.05	1349±11


Thank You