

# The Role of Nutrition In the prevention of CKD

by

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# Risk factors for CKD

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Diabetes

Hypertension

Family history of kidney disease

Cardiovascular disease

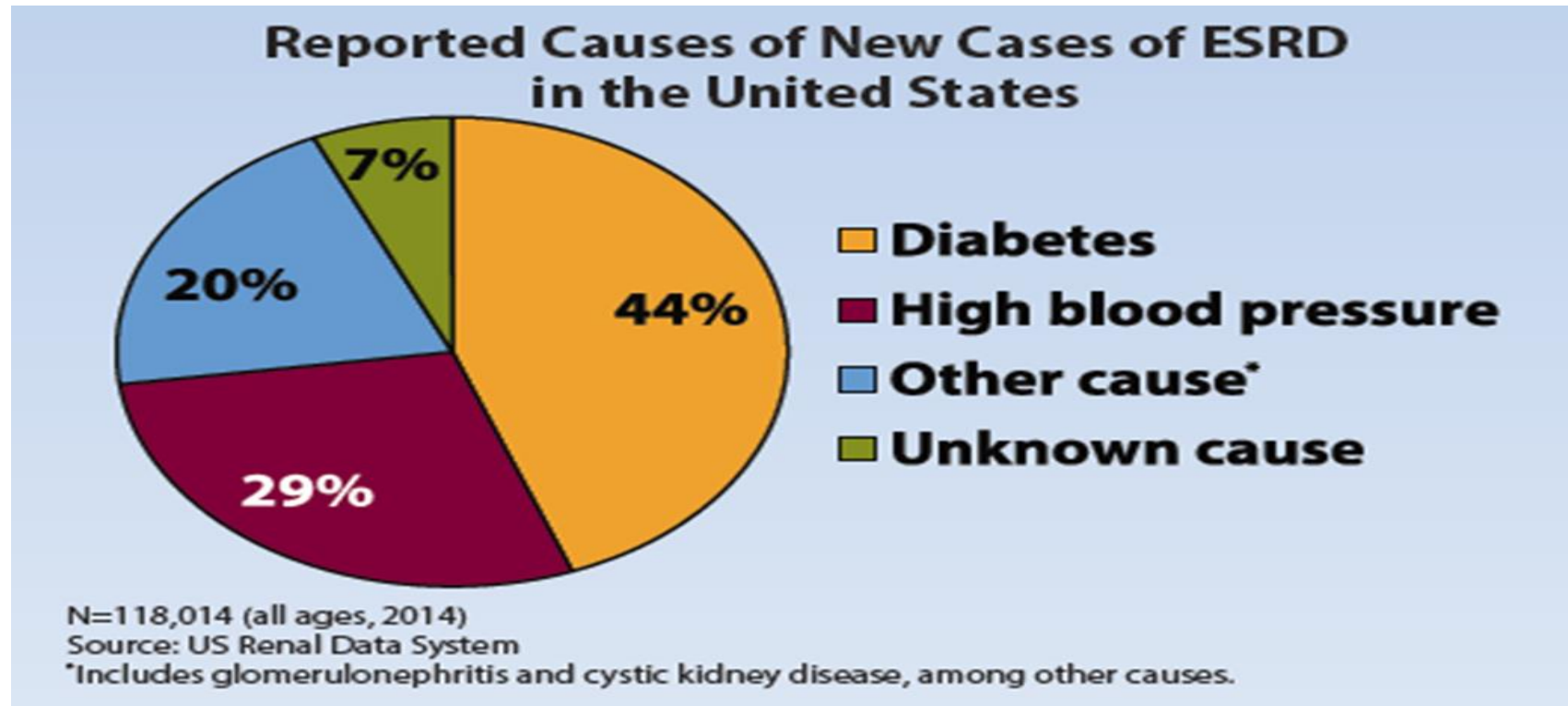
Obesity

Acute kidney injury



# Diabetes and hypertension are the leading causes of kidney failure in the United States

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Reference: CDC National Chronic Kidney Disease Fact Sheet, 2017

**Hypertension** is a common health problem in developed countries

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Untreated hypertension leads to diseases including ischaemic heart disease, stroke, congestive heart failure, end stage renal diseases & peripheral vascular disease.

Often called **silent killer**



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The emphasis on **lifestyle modification** has given a **diet** a prominent role for both the primary prevention & management of HTN.

Obesity & weight gain are predictive of progression to HTN.

Gaining 10% of BW was associated with a rise in BP of 7 mm Hg.

# DASH Diet

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Based on the **Dietary Approach to Stop Hypertension** (Dash) research findings (1997), **combination** of eating plan & reduced sodium intake gives greater impact for hypertensive individuals and may help prevent the development of HTN



The DASH diet focuses on vegetables, fruits and whole grains. It includes fat-free or low-fat dairy products, fish, poultry, beans and nuts. The diet limits foods that are high in salt, also called sodium. It also limits added sugar and saturated fat, such as in fatty meats and full-fat dairy products

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# LIFESTYLE INTERVENTIONS FOR BP CONTROL

INTERVENTION	SPECIFIC GUIDANCE	AVERAGE SYSTOLIC BLOOD PRESSURE REDUCTION <sup>a</sup>
<b>Weight reduction</b>	Maintain a normal body weight (body mass index 18.5 to 24.9 kg/m <sup>2</sup> ).	5 to 20 mm Hg/10 kg
<b>DASH eating plan</b>	Adopt a diet rich in fruits, vegetables, and low-fat dairy products with reduced content of saturated and total fat.	8 to 14 mm Hg
<b>Dietary sodium reduction</b>	Reduce dietary sodium to $\leq 100$ mmol per day (2.4 g sodium or 6 g sodium chloride).	2 to 8 mm Hg
<b>Aerobic physical activity</b>	Regular aerobic physical activity (e.g., brisk walking) at least 30 minutes per day, most days of the week.	4 to 9 mm Hg
<b>Moderation of alcohol consumption</b>	Men: limit to $\leq 2$ drinks <sup>b</sup> per day. Women and lighter-weight men: limit to $\leq 1$ drink <sup>a</sup> per day.	2 to 4 mm Hg



# NUTRITION PRESCRIPTION

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## **CHO:**

- 50-60% total energy intake
- Most should come from complex CHO: brown rice, whole meal bread, oats, bran.
- Fiber:** 20-30 gr/day

## **Protein:**

- 15-20%

## **Fat:**

25-30%

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**Dietary sodium:** 6g of sodium chloride or < 2400 mg Na/d

Avoid food with high sodium

Avoid intake of processed & preserved foods, canned foods & fast food

## potassium:

○ High potassium diet reduce BP.

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□ Recommendation: 4700 mg/d.

□ Choose food with high in potassium: leafy vegetables & root veg (oranges, beet greens, white beans, spinach, bananas & sweet potato).

□ whole grains & low fat dairy products contain potassium but not well-absorbed as that from fruits & veg.

# Managing Diabetes Successfully

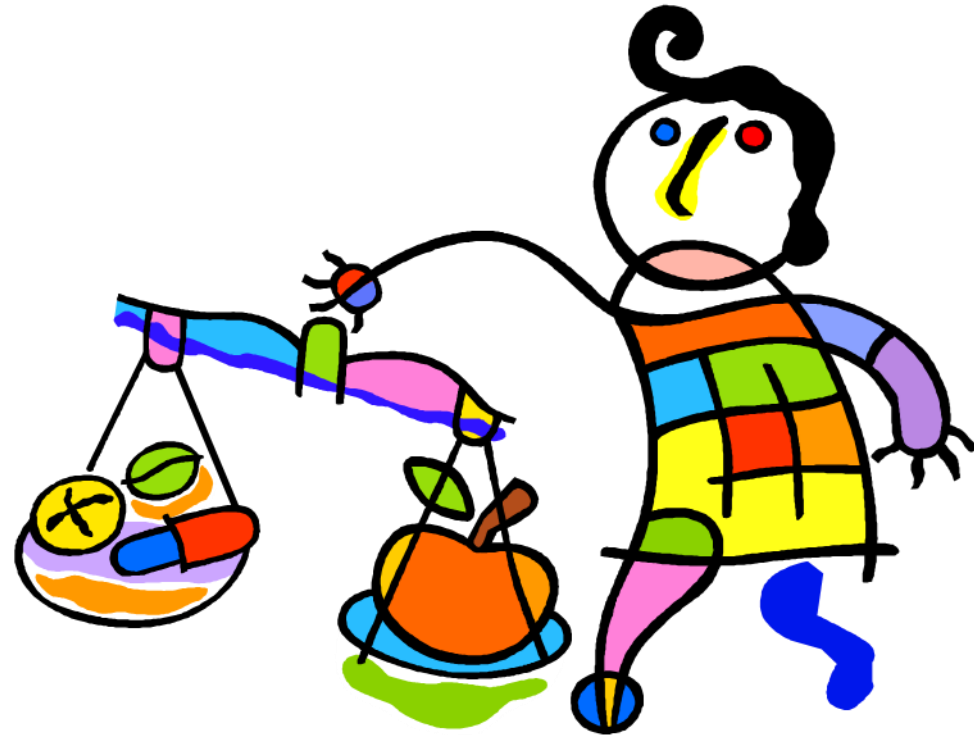
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Involves three things:

Food

Exercise

Medication



# Nutrition Assessment

- ✓ Type of diabetes, any complications
- ✓ Blood sugar control
- ✓ Past medical history
- ✓ Anthropometrics- height, weight, BMI, body composition
- ✓ Biochemical- labs
- ✓ Medications, including supplements
- ✓ Dietary 24 hour recall (meals, snacks, and beverages)
- ✓ Favorite foods
- ✓ Food allergies
- ✓ Eating patterns and habits
- ✓ Physical activity
- ✓ Readiness to change
- ✓ Attitude

# Meal Planning Strategies

- Timing of meals
- Healthy choices and balanced meals
- Variety including nutrient-rich foods and high-fiber foods
- Moderation using portion control
- Limit refined sugars
- Carbohydrate counting
- Exchange system
- Carbohydrate servings
- Label reading
- Glycemic index

# SETTING UP THE DIABETIC DIET

1. Calculating caloric needs
2. Determining dietary distribution of



**Carbohydrate**



**Protein**



**Fat**

3. Dividing the daily prescription into practical, healthy meals.

# Carbohydrates in Diabetes

Carbohydrate Intake: 45%-60%.

Monitoring CHO, whether by CHO counting, exchange, or estimation remains a key strategy in achieving glycemic control





# Protein and Diabetes

- Normal renal function: 15–20%.
- Renal disease?



## Dietary Fat

- ✓ 7–10% of SFA, 10% PUFA, and 10–15% MUFA.
- ✓ Cholesterol: <200 mg/day
- ✓ Minimize intake of trans-fatty acids

Two or more servings of fish per week providing n-3 polyunsaturated fatty acids are recommended



# Fiber

- Benefit both the carbohydrate and lipid abnormalities.
- recommendations are similar to those for the general public.
- 25-30 g/d, with special emphasis on soluble fiber sources (7-13 g).



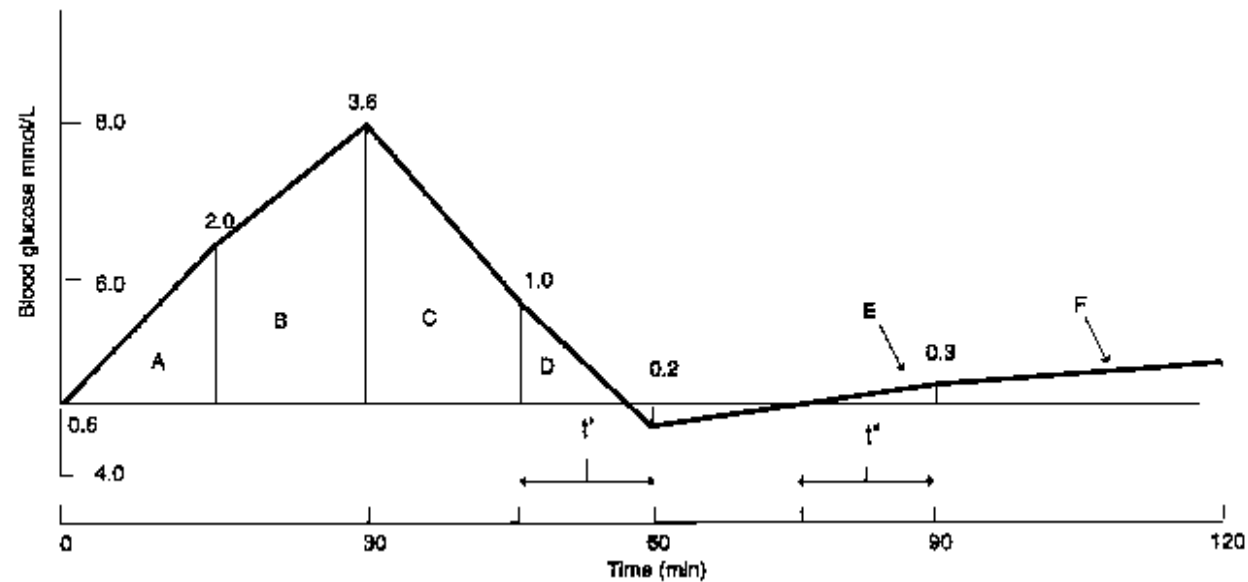
# Micronutrient Intake in DM

- For most vitamins and minerals, ensure adequate dietary Intakes. (magnesium, chromium, and zinc)



# Glycemic Index

The blood glucose response of a given food compared to an equal amount of a CHO standard (typically glucose or white bread)



G.I. ranges, in general:

Low G.I. Foods ----- below 55

Intermediate G.I. Foods ---- 55 - 70

High G.I. Foods ----- > 70



Carbohydrates that break down quickly, release glucose rapidly into the bloodstream have a high GI

Conversely, those that break down more slowly, release glucose more gradually have a low GI



# FACTORS WHICH INFLUENCE THE G.I. OF A FOOD

## Fiber

- Soluble fiber helps to slow down the digestion of starches & absorption of glucose.
- E.g. Fruit pectin (guava, apples, plums)  
Oats fiber  
Legume fiber (beans & lentils)





# FACTORS WHICH INFLUENCE THE G.I. OF A FOOD

## Type of Starch

- The more amylose a food contains, the lower its rate of starch digestion.

Individual glucose

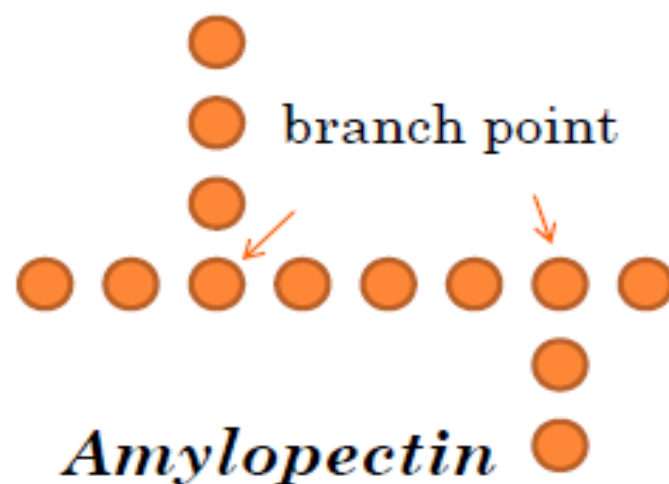
molecules



*Amylose* slowly

digested

e.g. long grain rice,  
all sorts of legumes



*Amylopectin*

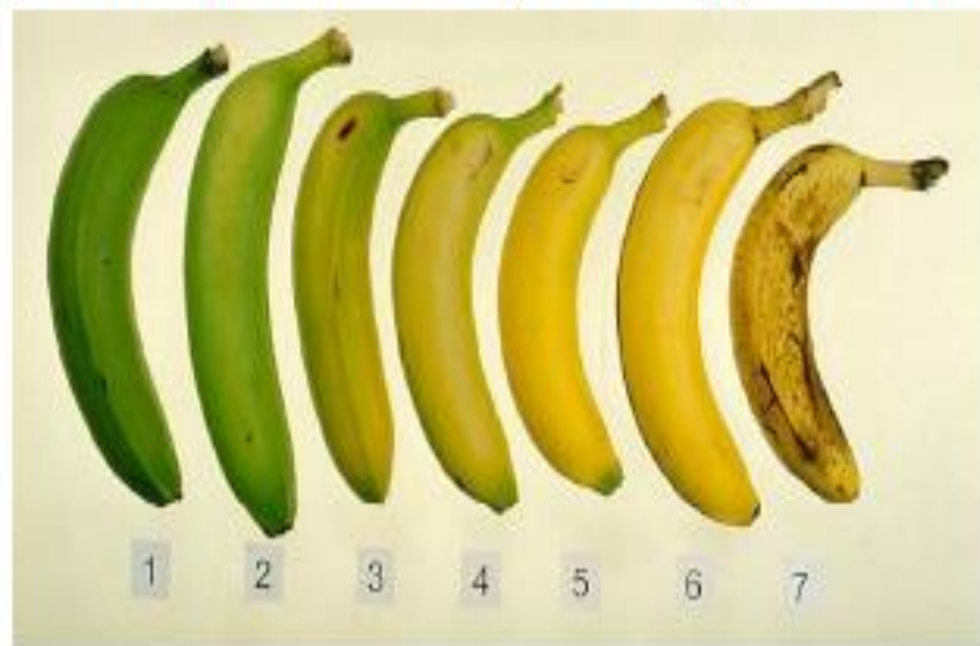
quickly digested

e.g wheat flour,  
white bread



## Degree of Ripeness

- the riper the food, the higher the G.I.
- e.g. ripe bananas vs just ripe bananas



## 6. Combination of Foods in Mixed Meals

- Adding protein rich food in a meal lower the overall G.I. of the meal



- Adding fat to a meal will also lower G.I. by delaying stomach emptying.



**Acidity:** Acidic foods in a meal help slow digestion of starches generally.

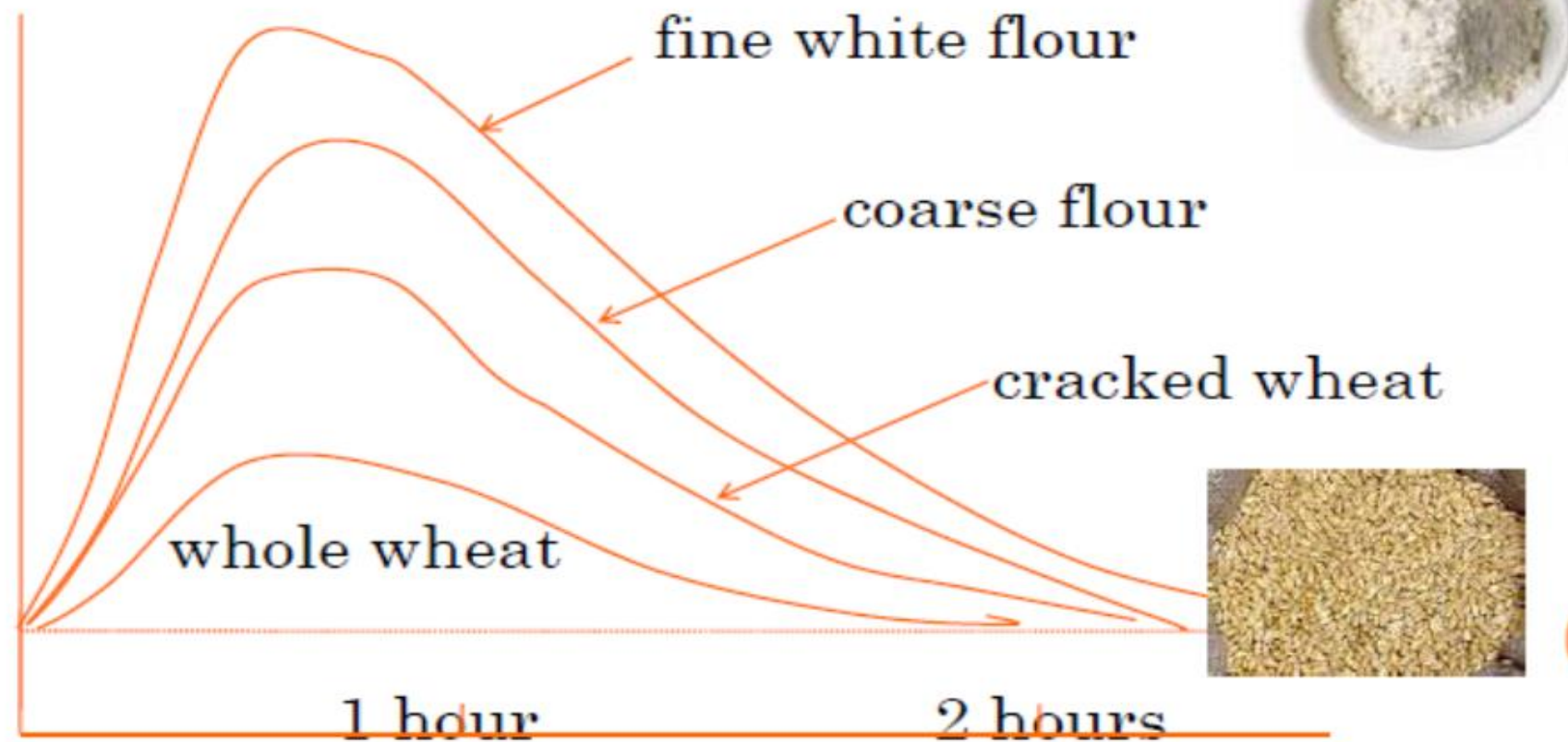
e.g. lemon juice, vinegar, fruits with higher acidity have lower G.I.



# FACTORS WHICH INFLUENCE THE G.I. OF A FOOD

## The degree of processing / cooking

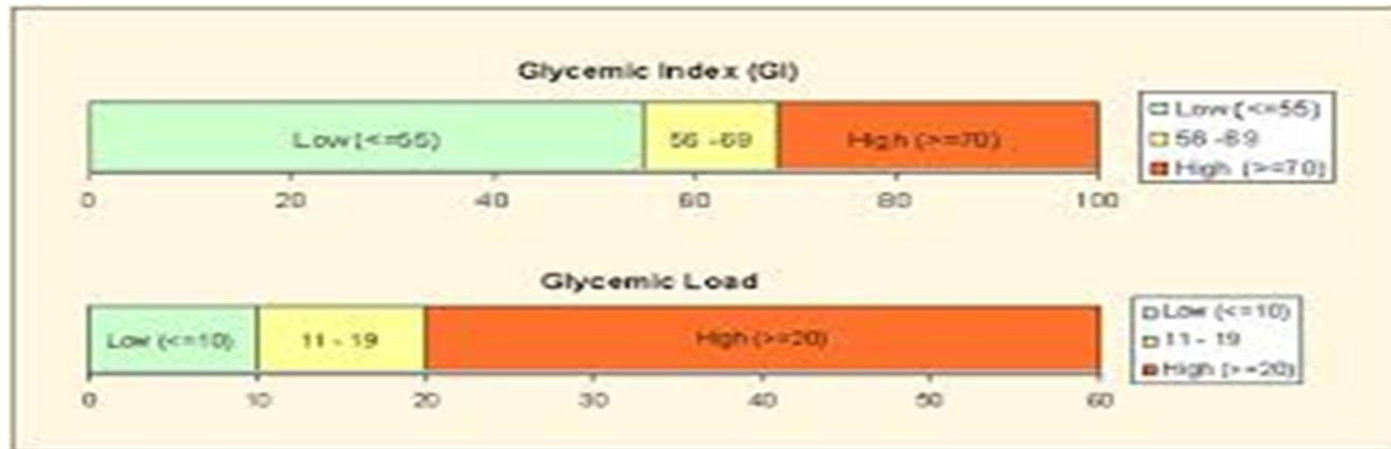
- The more processed / refined a food is, the higher the G.I.



# Glycemic load

Glycemic load = glycemic index x actual amount of available carbohydrates consumed

Reminder that serving size is still important!



## Fruit

Apple (avg)	38	6
Apricot (dried)	31	9
Banana (avg)	51	13
Cherries	22	3
Grapefruit	25	3
Grapes (avg)	46	8
Kiwi fruit (avg)	53	6
Mango	51	8
Orange (avg)	48	5
Papaya	59	10
Peach (avg)		
Canned (natural juice)	38	4
Fresh (avg)	42	5
Pear (avg)	38	4
Pineapple	59	7
Plum	39	5
Raisins	64	28
Cantaloupe	65	4
Watermelon	72	4



**Thank You  
For Your  
Attention**