WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health

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Glycaemic Index

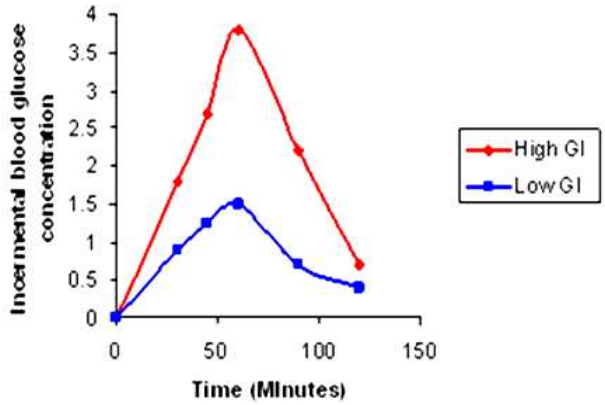
Background

The Glycaemic Index (GI) is a numerical Index that ranks carbohydrates based on their rate of glycaemic response (i.e. their conversion to glucose within the human body). GI uses a scale of 0 to 100, with higher values given to foods that cause the most rapid rise in blood sugar. Pure glucose serves as a reference point and is given a GI of 100.

GI values are determined experimentally by feeding human test subjects a fixed portion of the food (after an overnight fast) and subsequently extracting and measuring samples of their blood at specific intervals of time.

Nutritionists used to believe that all simple sugars digested quickly and caused a rapid rise in blood sugar and that the opposite was true for "complex carbohydrates". But that is not always the case. While many sweet and sugary foods do have high GI's, some starchy foods like potatoes or white bread score even higher than honey or table sugar.

Calculation of Glycaemic Index (Source-University of Sri Jayawardanapura)



- GI of a test food is calculated with reference to a standard

$$GI = \frac{IAUC^{*}\text{ of test food}}{IAUC\text{ of standard}} \times 100$$

*Incremental Area Under the blood glucose response Curve

Why is the Glycaemic Index Important?

The body performs best when the blood sugar is kept relatively constant. If the blood sugar drops too low, the person concerned become lethargic and/or experience increased hunger. And if it goes too high, the brain signals the pancreas to secrete more insulin. Insulin brings blood sugar back down, but primarily by converting the excess sugar to stored fat. Also, the greater the rate of increase in blood sugar, the more chance that the body will release an excess amount of insulin and drive blood sugar back down too low.

Therefore, when someone consumes foods that cause a large and rapid Glycaemic response, he or she may feel an initial elevation in energy and mood as blood sugar rises, but this is followed by a cycle of increased fat storage, lethargy and more hunger.

Although increased fat storage may sound bad enough, individuals with diabetes (diabetes mellitus types 1 and 2) have an even worse problem. Their inability to secrete or process insulin causes their blood sugar to rise too high, leading to a host of additional medical problems.

The theory behind the GI is simply to minimize insulin-related problems by identifying and avoiding foods that have the greatest effect on blood sugar.

Should All High-GI Foods be Avoided? For non-diabetics, there are times when a rapid increase in blood sugar (and the corresponding increase in insulin) may be desirable. For example, after strenuous physical activity, insulin also helps move glucose into muscle cells, where it aids tissue repair. Because of this, some coaches and physical trainers recommend

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high-GI foods (such as sports drinks) immediately after exercise to accelerate recovery.

Also, it's not GI alone that leads to the increase in blood sugar. Equally important is the amount of the food that is consumed. The concept of GI combined with total intake is referred to as "Glycaemic Load".

How Glycaemic Load Improves the Glycaemic Index

Although most sweets have a relatively high Glycaemic Index, eating a single piece of a sweet will result in a relatively small glycaemic response. That happens because the body's glycaemic response is dependent on both the type AND the amount of carbohydrate consumed. This concept is known as Glycaemic Load (GL)

GL = GI/100 x Net Carbs
(Net Carbs are equal to the Total Carbohydrates minus Dietary Fiber)

Therefore, glycaemic response can be controlled by consuming low-GI foods and/or by restricting the intake of carbohydrates.

Limitations of the Glycaemic Index and the Glycaemic Load

Some advise that GI and GL are all that matters when selecting which foods to eat. In reality, diet is a more complex issue than that. Even though GI is a marvelous tool for ranking carbohydrates (and much better than the earlier "simple" and "complex carbohydrate" categorization). However, there are also many limitations to GI and GL. They are,

Scarcity of GI data Although methods for determining GI have been in existence for more than 20 years, GI values have so far only been determined for about 5% of the foods in food databases. Seemingly similar foods can have very different GI values, so it's not always possible to estimate GI from either food type or composition. This means that each food has to be physically tested. GI testing requires human subjects and is both relatively expensive and time-consuming. The fact that only a very limited number of researchers currently do GI testing compounds this problem. Food manufacturers continue to introduce thousands of new foods each year. Since GI testing is neither required nor common, this problem is likely to get worse rather than better.

Wide variations in GI measurements

Most of the articles give a single value of GI for each food. In reality, the measurements are not so precise. Reported values are generally averages of several tests. There is nothing wrong with that methodology, but individual measurements can vary a significant amount. The GI for the same fruit has even been shown to increase as the fruit ripens. This amount of variation adds a great deal of uncertainty to GI calculations.

GI values affected by preparation method The GI gets even trickier when you take into account the changes in value that occur in response to differences in food preparation. Generally, any significant food processing, such as grinding or cooking, will elevate GI values for certain foods, because it makes those food quicker and easier to digest. This type of change is even seen with subtle alterations of the preparation, such as boiling pasta for 15 minutes instead of 10.

GI values are affected when combined with other foods While tests for Glycaemic Index are usually done on individual foods, we often consume those foods in combination with other foods. The addition of other foods that contain fiber, protein or fat will generally reduce the GI of the meal. The GI of this "mixed meal" can be estimated by taking a weighted average of the GI's of the individual foods in the meal. However, this averaging method may become less accurate as the total percentage of carbohydrate decreases. Therefore, foods like pizza often create a higher Glycaemic response than the simple weighted average of the ingredient GI's would predict.

Individual differences in Glycaemic response The rate at which different people digest carbohydrates also varies, so there are some individual differences in Glycaemic response from person to person. In addition it has been shown that one person's Glycaemic response may vary from one time of day to another. And finally, different people have different insulin responses (i.e. produce different levels of insulin), even with an identical Glycaemic response. This fact alone means that a diabetic can not rely completely on the Glycaemic Index without monitoring his own blood sugar response. (This, of course, is a limitation of any food index, and not a specific limitation of GI.)

Reliance on GI and GL can lead to overconsumption. It's important to remember that the Glycaemic Index is only a rating of a food's carbohydrate content. If one uses GI and GL values as the sole factor for determining your diet, one can easily end up over-consuming fat and total Calories.

How the GI can encourage overeating

Apples have a GI of 38 and a medium-size apple, weighing 138 grams, contains 16 grams of net carbohydrates and provides a Glycaemic Load of 6. This is a low GL and most would consider the apple to be a very appropriate snack. But now consider peanuts. A 4-oz serving not only weighs less than the apple, but has a much lower GI (14), and provides an even lower GL of 2. Based on Glycaemic Load alone, one has to believe that the peanuts were a better dietary choice than the apple. But if you takes a look at the calories contained in these two foods, you'll see that the apple contains approximately 72 Calories, while the peanuts contain more than 500!

Practical uses of GI

After considering advantages and disadvantages of GI, practical uses of GI should be considered. These are,

- Changing overall eating habits
- Having a diet plan without having to count calories or without adopting a low-carbohydrate diet plan
- To create a diet plan which can be used for a long time

Source-Glycemic Index, available from

http://nutritiondata.self.com/topics/glycemic-index

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 4: Selected notifiable diseases reported by Medical Officers of Health 26th Oct – 01st Nov(44th Week)

RDHS	Dengue Fe-		Dysentery		Encephalit		E Fever		F Poisoning		Leptospirosis		T Fever		V Hepatitis		H Rabies		Chickenpox		Meningitis		Leishmani-		WRCD %	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	145	8495	3	187	0	17	6	140	0	56	0	187	1	8	1	78	0	1	4	399	2	62	0	0	**77**	**23**
Gampaha	59	3174	8	188	0	20	0	48	3	39	17	378	1	20	1	171	0	0	4	158	2	87	0	5	**87**	**13**
Kalutara	20	1553	3	163	0	20	1	77	0	25	0	355	0	6	0	24	0	0	6	248	1	69	0	0	**85**	**15**
Kandy	9	1554	5	148	0	11	1	26	0	10	0	69	0	96	2	113	0	0	2	128	1	16	0	4	**83**	**17**
Matale	1	417	2	90	0	4	0	24	0	10	1	60	0	4	1	49	0	0	0	45	0	35	0	11	**85**	**15**
NuwaraEliya	2	229	3	150	0	2	0	15	0	217	0	28	0	60	0	22	0	0	3	126	0	12	0	0	**92**	**8**
Galle	1	765	0	111	0	19	1	7	0	89	0	197	2	58	0	15	0	2	6	297	0	45	0	1	**79**	**21**
Hambantota	0	295	0	55	0	3	0	15	1	34	0	161	0	63	1	87	0	0	1	96	1	50	9	309	**50**	**50**
Matara	4	421	1	77	0	13	0	28	1	29	2	142	2	83	1	140	0	2	0	243	1	77	2	88	**94**	**6**
Jaffna	10	637	8	372	0	10	1	308	2	101	0	9	4	339	0	17	0	1	0	140	0	55	0	0	**58**	**42**
Kilinochchi	0	60	0	39	0	0	0	15	0	5	0	9	0	16	0	0	0	2	0	2	0	7	0	11	**25**	**75**
Mannar	0	68	0	73	0	3	1	65	0	36	0	15	0	19	0	2	0	0	0	12	0	5	0	4	**80**	**20**
Vavuniya	0	68	0	57	0	13	0	12	0	20	0	50	0	3	0	3	0	2	0	22	0	34	1	11	**75**	**25**
Mullaitivu	0	115	0	23	0	2	0	10	0	43	0	38	0	7	0	1	0	2	0	8	0	6	0	15	**40**	**60**
Batticaloa	2	513	4	292	0	5	0	10	0	73	0	33	0	2	0	14	0	3	0	44	0	8	0	0	**43**	**57**
Ampara	7	184	5	174	0	1	0	5	0	12	0	36	0	1	0	9	0	0	0	86	0	18	0	3	**71**	**29**
Trincomalee	0	186	2	63	0	3	0	6	0	3	0	59	0	15	0	3	0	1	1	40	0	4	0	28	**42**	**58**
Kurunegala	9	2562	9	183	0	41	0	38	0	26	6	300	0	45	2	57	0	1	3	333	0	96	2	55	**85**	**15**
Puttalam	3	817	1	75	0	7	0	16	0	36	1	43	1	14	0	7	0	1	1	79	1	34	0	10	**54**	**46**
Anuradhapura	4	478	0	100	0	16	0	3	0	62	1	307	1	24	0	25	0	2	4	164	1	94	2	385	**63**	**37**
Polonnaruwa	5	421	2	80	0	2	0	14	0	64	0	161	0	3	0	31	0	2	0	124	1	19	3	154	**71**	**29**
Badulla	6	465	4	194	0	5	0	18	0	11	0	56	2	83	1	46	0	0	3	123	0	67	0	7	**71**	**29**
Monaragala	1	235	0	113	0	4	0	23	0	35	0	196	0	58	0	165	0	1	0	51	0	24	0	10	**27**	**73**
Ratnapura	5	1608	2	354	0	83	0	40	0	17	1	337	2	68	25	497	0	1	4	175	0	76	0	13	**61**	**39**
Kegalle	17	1043	1	125	1	17	1	29	0	11	7	235	0	72	5	220	0	0	8	308	0	103	0	2	**91**	**9**
Kalmune	1	494	1	143	0	2	0	3	0	118	0	10	0	2	0	5	0	0	3	87	1	10	0	1	**38**	**62**
SRI LANKA	**311**	**26857**	**64**	**3629**	**1**	**323**	**12**	**995**	**7**	**1182**	**36**	**34871**	**16**	**1169**	**40**	**1801**	**0**	**24**	**53**	**3538**	**12**	**1113**	**19**	**1127**	**69**	**31**

Source: Weekly Returns of Communicable Diseases (WRCD).

***T=**Timeliness refers to returns received on or before 01st November , 2013 Total number of reporting units 339. Number of reporting units data provided for the current week:266 C** Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.**H Rabies***= Human Rabies, **E Fever***=Enteric Fever, **F Poison*** =Food Poisoning, **T Fever***=Typhus Fever, **V Hepatitis***=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP 26th October – 01st November 2013 (44th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	00	00	00	00	81	67	+20.9 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Mumps	00	02	00	01	02	02	01	00	03	11	-	1330	-	- 67.3 %
Measles	21	01	13	00	02	00	05	03	19	64	00	3476	58	+ 6185.7 %
Rubella	00	01	00	00	00	01	00	00	00	01	-	27	-	-
CRS**	00	00	00	00	00	00	00	00	00	00	-	06	-	-
Tetanus	00	00	00	00	00	00	00	00	01	01	00	21	11	+ 90.9%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	-	00	-	-
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	-	66	-	-
Whooping Cough	01	00	00	00	00	00	00	00	01	02	02	75	91	- 17.6 %
Tuberculosis	19	06	21	09	11	29	00	09	12	116	86	7016	7485	- 6.2 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

Thoroughly clean the water collecting tanks bird baths, vases and other utensils once a week to prevent dengue mosquito breeding.

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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