The Low down on Glycaemic Index (GI) and Glycaemic Load (GL)

National Diabetes Awareness Week runs form the 10th-14th of November 2008. The 14th of November 2008 is World Diabetes Day…

Diabetes mellitus is a metabolic disorder characterised by the body's inability to metabolise glucose with the end result of hyperglycaemia (high blood sugar levels). Chronic hyperglycaemia is associated with many risk factors such as cardiovascular disease, damage to the nerves in the eyes and kidney failure. It is therefore vital that people who have diabetes learn more about this condition and aim to achieve optimal blood sugar levels, so as to prevent the long term complications as mentioned above. Diabetics can benefit from using the GI and GL concepts to attain that desired level of blood sugar.

So how is the concept of GI and GL linked to diabetes?

We know that when starchy foods are consumed, glucose is released into blood. Insulin is then required to transport the glucose from the blood into the muscle, cells and wherever else it's needed. The GI and GL concepts rate the effect that starchy foods have on blood sugar levels, hence classifying foods as either high, medium or low GI/ GL.

Apart from diabetes, can these concepts be of benefit for other conditions as well?

Yes. It may be used by people wanting to lose weight or in those suffering from other blood glucose control problems like: Polycystic Ovarian Syndrome (PCOS), chronic fatigue syndrome (ME), insulin resistance, hyperinsulinaemia (high insulin levels), hypoglycaemia (low sugar levels), candidiasis, inflammatory conditions like arthritis as well as Attention Deficit Hyperactivity Disorder (ADHD). It is also used in sports nutrition.

What is GI?

GI is a numerical indicator assigned to carbohydrate rich foods. It's a rating of foods according to their actual effect on blood glucose levels. The rates of digestion and absorption seemed to be the most important factors considered when calculating GI i.e. the **quantity** of carbohydrates were not addressed.

What is GL?

The GL "fine tunes" the GI and takes into account both the **quality and quantity** of the carbohydrate portion in a specific food. It's a newer concept and addresses concerns about classifying a food as either good or bad. There is no such thing as a good or bad carbohydrate -as it depends on when you eat it, how much you eat and with what you combine it. The GL of a specific food portion is an expression of how much impact ("oomph") or power the food will have in affecting blood sugar levels.

It is calculated by taking the percentage of the foods carbohydrate content per portion and multiplying it by its GI value.

$$GL = \frac{\text{CHO content per portion} \times GI}{100}$$

Some fruit and vegetables have a high GI value and are perceived as bad. Considering the quantity of carbohydrate per portion, the GL is low. Let's look at a few examples.

- Watermelon has a GI of 72 but in 1 portion of watermelon (150g), its GL is 7 (low). This is due to the fact that watermelon has more water than carbohydrate per portion: hence having a low impact on blood sugar levels.
- The GI of a medium apple if 38 but the GL is 5. Therefore eating one apple will have hardly any effect on your blood sugar levels. However if you consume a 500g packet of dried apples, its GL would be 50! This means it would have a drastic effect on your sugar levels.
- The GL of a slice of seed loaf is 8 whereas that of a roll is more than 20 and that of a bagel is more than 30! Hence greatly affecting your sugar levels.
- The GL of a sandwich made from 2 slices of brown bread (20g slices) is 32. But if you use a thin slice of bread (15g slice) as part of a mixed meal containing low GI beans, skinless chicken & salad vegetables, the GL of the meal will be lower (22) and hence more acceptable.

Recommendations

Low GI and a **low GL** is ideal: e.g. lettuce, cucumber, mushrooms and tomato. This means that it would have a small impact on sugar levels provided a typical portion size is not too large.

High GI and **high GL** spells danger, as these will have a significant effect on blood sugar levels, e.g. cooked mielie meal or bagels. These kinds of food already have a high GI and so a large portion will have a marked effect. Hence, stick to smaller portions.

Low GI and **High GL** will also impact sugar levels. Note that a low GI food, if eaten in large amounts, will increase blood sugar levels significantly. E.g. seed loaf or sweet potato. Hence, stick to a reasonable portion size when choosing these.

High GI and **low GL** will not necessarily increase sugar levels significantly as they might contain small amounts of carbohydrates per portion e.g. watermelon, unless you overindulge!

From this we can see that both high GI and low GI foods can be recommended but high GI options should be consumed in much smaller quantities. Bulk of the meal should however contain low GI options like fruit, veggies, low GI starches, dairy and/or legumes. A mixed meal containing foods from a variety of sources i.e. protein and/or good fats will also help to lower the GI and GL of a meal. New evidence associates high GL meals with an increased risk of heart disease and diabetes particularly in overweight and insulin-resistant people. It is therefore advisable to restrict the total GL per day to:

- < 80 (overweight women)
- <100 (women with a normal BMI OR overweight men- Moderately active)
- <120 (Active women of normal BMI and moderately active men of normal BMI)
- 120+ (Sportsmen and women who do more than 2 hours of sport per day).

Recommended GL values for meals & snacks:

Snacks: <10 (Most Fruit and vegetables)
Light Meals: 10 - 20
Main Meals: 20 -30

GL Values of Typical Foods:

Breads

Refined breads: 2 slices white bread (88g)	= 30
Rye Breads: 2 slices Pumpkinseed rye bread	= 22
Seedloaf/ Low GI Breads: 2 slices Natures harvest	= 18

Cereals

40g High fibre bran	= 6.7
50g Wholewheat Pronutro	= 13.1
40g All Bran Flakes	= 15.8
2 Weetbix	= 33.2

Fruit

1 small apple (80g)	= 4
1 large Apple (220g)	= 11
1 average mango (350g)	= 30
150g watermelon	= 7
1 TruFruit Bar (Tropical)	= 7
1 guava Roll (80g)	= 17.6
1 box low GI Juice (mango & orange)	= 14
1 box high GI Juice (litchi)	= 20

Conclusion

Following a high fat, high GI/GL diet that's low in fibre predisposes you to becoming overweight and hence developing lifestyle diseases like heart disease, obesity and cancer. Rather stick to keeping your total GL/day below the recommended value. Follow a diet rich in unrefined starch, fibre, moderate amounts of lean proteins and overall lower in fats, particularly saturated fats, placing more emphasis on the good fats.

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