



EDUCATION BULLETIN – SEPTEMBER 2016

CARBOHYDRATE COUNTING

People living with type 1 diabetes might find that carbohydrate (CHO) counting, or carb counting, is an effective way of managing their blood glucose levels – the insulin dose can be individually matched to the amount of carbohydrate the person eats and drinks.

Being aware of the amount of carbs in food and drinks is important for everyone with diabetes, but carb counting is particularly helpful for those on basal-bolus (MDI or multiple daily injections) insulin regimen.

Key aspects:

- CHO counting helps to keep track of how much carbohydrate the person with diabetes is eating. A limit can be set for the maximum amount of carbohydrate to eat for a meal, and with the right balance of physical activity and insulin, can help to keep blood glucose levels in the target range.
- CHO counting is a meal planning approach that focuses on CHO as the primary nutrient affecting postprandial (after-meal) glycaemic (blood glucose) response. It aims to improve glycaemic control and allow flexibility of food choices.

It is entirely possible to introduce CHO counting in less-resourced countries, and indeed it is already being introduced in LFAC supported centres e.g. Haridwar in India, Ecuador, and Bolivia

There are three levels of CHO counting:

Level 1 - Consistent CHO intake.

A consistent CHO intake is specified using exchange or portion lists of measured quantities of food. This is appropriate for those on twice daily insulin.

Level 2 - Pattern management principles.

An intermediate step in which patients eat a consistent CHO intake, use a consistent baseline insulin dose, and frequently monitor BGL.

They learn to recognize patterns of BG response to CHO intake modified by insulin and exercise. With this understanding, and team support, they make adjustments to their insulin dose for food and exercise to achieve BG goals.

Level 3 - Insulin to CHO Ratios (ICR)

Appropriate when using basal bolus (multiple daily injections) or an insulin pump. The ICR (amount of CHO in grams covered by 1 Unit of insulin) is calculated, individualized according to age, sex, pubertal status, duration of diagnosis, and activity. This lets patients adjust their prandial (mealtime) insulin dose according to CHO consumption.

Methods of quantifying CHO include:

- Gram increments of CHO
- 10 – 12 g CHO portions
- 15 g CHO exchanges

The “500-rule” can be used as a first estimate for ICR, which then is adjusted according to the individual response of the child. Divide 500 by the Total Daily Dose (Total Daily Dose is the sum in units of all insulin injections on a normal day) to find ICR.

Excessive weight gain may be a sign of mis-match between insulin doses and carbohydrate intake i.e. too much insulin (excessive hypoglycaemia and treatment) or extra carbohydrate consumption beyond appetite to avoid hypoglycaemia.

Fine-tuning of insulin dosage can then be guided by BGM.

Regular review is necessary as children grow and new foods are introduced.

Glycaemic Index (GI)

The GI is a ranking given to food to describe how quickly the CHO in that food is broken down and absorbed into the bloodstream. The GI scale ranges from 0 to 100. Lower numbers represent a low GI food.

Low GI foods are broken down and absorbed more slowly into the blood stream. Foods with a high GI are quickly broken down and absorbed by the body and result in a rapid rise in blood sugar levels.

Eating low GI foods may:

- help to keep hunger at bay for longer after eating
- provide a gradual, continuous supply of energy from one meal to the next
- help to keep BGLs stable, by providing a slower, more sustained release of sugar into the bloodstream

For further reading please refer to [Chapter 10, ISPAD Guidelines 2014](#)