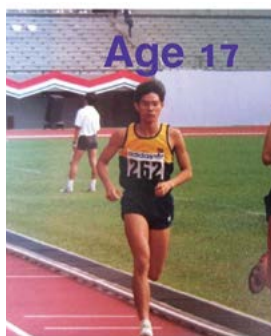


# My Health Journey: Metabolism, Weight, Exercise and Nutrition

by Dr Nicholas Foo Siang Sern, Editorial Board Member

By the time I was in my mid-20s, I had already developed a belly. I am not quite sure how it happened - after all, I had always been lean and fit during my schooldays. I was fairly active during my Medical School days as well. Nonetheless, I completed my 5-year University Education 10kg heavier compared to the start. I did not exercise at all during my first 2 years as a junior doctor, I also felt that I did not overeat. Yet I put on weight much quicker than some on my peers, gaining another 10kg within those 2 years.



When I reenlisted for National Service to serve as a Medical Officer, I failed my first IPPT. However, I regained my fitness in a short time. Within 2 months, I was running below 9 minutes for 2.4 km and getting IPPT Gold. My fairly sizeable belly and weight remained the same. One guy used to rub my belly in a joking manner, asking how I could manage to run below 9 minutes with the belly I had. I was both fit and pudgy during those 2 years in which I served in a Combat Unit.

By the time I was 30, I had really ballooned up. I was now married and had a young child. I was active in general, but decided that I better start running again. It was an on and off affair, until I made the commitment at the age of 33 to run at least twice a week. I am a high responder to exercise-with twice weekly runs of 35 minutes each, I kept my weight to a manageable 74-75kg (My height is 1.72m). One month before my IPPT, I would add on a third session each week. That interval training session of 6 x 400m once a week for a month would enable me to run below 10 minutes for the 2.4km.

I felt tired most of the time, especially after meals. Having food would make me near comatose. I also had bad skin, allergies and was easily irritable. I had intense sugar cravings and was constantly looking for something sweet to snack on. When I look back, it is indeed a miracle that I survived all those years of work and raising a young family. Much credit must go to my wife. I tested for Diabetes-but both my fasting glucose and 2 Hour Oral Glucose Tolerance test (OGTT) were normal.

I started to be more conscious of my food choices, cutting out sweets, snacks, “soft drinks” and fried foods. I now ate what I considered a balanced and healthy meal - brown rice, vegetables, meat and fruit.

From the age of 38 onwards, I had more time to run and exercise. My general health and energy levels started to improve, but I only regained high energy levels, a trim waistline and good health when I figured out what kind of exercise and foods were suitable for me.

## EXERCISE

We all know that exercise is important - both aerobic exercise and strength training. My main form of aerobic exercise is running, but one could swim, cycle or brisk walk as well. But what kind of exercise regime is suitable - High Intensity Interval Training (HIIT) or slower and longer endurance running? Should I do my 30-minute runs to the point of breathlessness, or is a slow 30-minute jog better?

At the age of 39, I started taking part in races again. Over the next few years, I tried everything from the track races - 800m all the way up to the Marathon (42.195km). I noticed 2 things. Firstly, I was fairly good over 800m and 1500m, decent at 5 and 10km race, so-so at 21km and relatively slow at longer distances. Secondly, I felt the fittest and most energetic when I was training like a middle distance runner. Long training runs required for the Marathon made me hungrier, causing me to eat more. In fact, I could gain weight while training for the Marathon.

My current regime is fairly simple. I jog 5km at least 3 times weekly on the weekdays, and go for a longer, faster, but still aerobic 10.5km run on the weekends. It is at an effort where I can still breathe in and out comfortably through my nose with my mouth closed for the entire run. This keeps me under the Ventilatory Threshold, which ensures that my run is at an aerobic intensity.

Periodically, I do a bout of faster running. This could be a 2.4km time trial run at 90% effort, or a “HIIT” session. I start with a 10-minute jog, followed by hard runs to the

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point of breathlessness up a hill about 200m in length. I jog down the hill for recovery, repeating the whole cycle 4 times. I end the session with a slow 10-minute jog.

I spend 5-10 minutes a day doing simple exercises like pull ups, push ups, planks, squats and lunges or do weight training with a barbell. Building muscle is important as muscle is a metabolically active tissue. We lose muscle mass as we age and that in turn slows our metabolism. Weight training is probably the most important piece of exercise most of us don't do.

I had been a middle distance runner in my youth and perhaps this way of exercising suits my make-up.

Besides this, I walk whenever I can. I also avoid prolonged sitting. I will stand up at least once for every patient I see.

## DIET

The "healthy plate" proposed by many Health Authorities is a high carbohydrate diet. It consists of whole grains, fruits, vegetables, meat and very little fat. This diet may work for some, but I have found that I am carbohydrate intolerant. What works well for me is a Low Carbohydrate High Fat (LCHF) diet. There is quite a bit of misunderstanding of what this diet entails. This diet may not be suitable for everyone as there are potential pitfalls.

The following may point to carbohydrate intolerance or insulin resistance;

Symptoms:

Low energy, feeling constantly hungry, need for sweet / sugary foods, sleepiness especially post meals.

Expanding waistline/ belly fat despite exercising and consuming a diet as per the 'healthy plate'.

High normal fasting blood sugar (greater than 90mg/dL or 5.0 mmol/l), elevated Triglycerides (TG) and Low HDL-C. (TG : HDL, in mg/dL should be 1:1 ideally. A ratio of 3:1 or greater points to possible carbohydrate intolerance and insulin resistance)

Taking it a step further, let us look at the definition of Metabolic Syndrome.

3 out of 5 of the following:

Large waist circumference - at least 35 inches (89cm) for women and 40 inches (102cm) for men

- High Triglycerides Level - 150mg/dL
- Reduced high density lipoprotein (HDL) cholesterol - less than 40mg/dL in men or less than 50mg/dL in women
- Increased Blood Pressure 130/85mmHg or higher

- Elevated fasting blood sugar - 100mg/dL (5.6mmol/L) or higher

We know that individuals with Metabolic Syndrome are at higher risk for Diabetes and Cardiovascular Disease.

Since changing my diet, my energy levels are now high throughout the day, I no longer have post prandial sleepiness, my blood pressure is less than 120/80mmHg, my fasting glucose is less than 90mg/dL (5.0 mmol/L), my TG is less than 80mg/dL, my HDL-C levels have risen and I have a TG: HDL ratio close to 1:1. I am satisfied with my LDL-C. I have finally lost that stubborn belly fat and now weigh 66kg.

To understand it, we start by considering that the caloric content of carb, protein, and fat is different.

## LOW CARBOHYDRATE

Carb/protein contains 4 calories/g

Fat contains 9 calories /g

If you're carb sensitive, you have to restrict carbs to 100g/day. Those on a Keto diet will go as low as 30-50g/day.

I once participated in a community health screening. It was eye opening the find that many apparently healthy people who came shortly after lunch had a capillary blood glucose in the 8-10mmol/l range.

If you want to understand how your body reacts to a meal, you can check your capillary blood glucose before the meal, 1 hour post food and 2 hours post food. If you're healthy, random capillary blood glucose should be between 4-6mmol/l, 6-8mmol/l 1 hour post food and normalise 2 hours post food. This is just a gauge to determine your response to a carbohydrate load. To diagnose Diabetes one needs a proper blood sample drawn from the vein.

Carb 100g/day = 400 calories.

(Note: I am referring to net carb content. This excludes the fiber content)

100g is equivalent to 2 bowls of white rice. In contrast, a cup of cooked broccoli has 4g, mushrooms 2g. But it's many many bowls of vegetables. So you have to consume quite a fair bit of leafy vegetables, broccoli, cauliflower etc.

Cut out the pasta, noodles, whole grains, rice and bread. Ditch all the sugary snacks, candies and soft drinks. (It is the fructose content in sugar and high fructose corn syrup found in processed foods which is unhealthy for the liver).

Eat fruits in moderation as fruits have a high 'sugar' (fructose) content. One banana is already 30g of net carbs.

I consume a wide variety of fruits but in small amounts. I avoid fruit juices.

I started off with gradually reducing my rice intake and eating more vegetables. I now eat mainly vegetables and some fruit for my carbohydrate intake. I have experimented with adding rice back to my diet and have since found that I can tolerate small amounts on occasion.

### MODERATE PROTEIN

Protein 100g/day = 400 calories.

Can take up to 140g/day.

About 1.4-2.0g/kg of body weight.

One sizeable piece of meat is about 30g to 50g, with fats. Eat the fats; chicken skin or beef fat is fine as long as not deep fried. We need a little saturated fat. We can get our protein from fish and soy/tofu as well.

### HIGH FAT

Eat fats to satiety. Let's put Fats at 150g/day = 1350 calories. This is already more than 63% of your caloric intake.

Make up the rest of the meal in fat intake such that the meal is satisfying. You just need a little fat to fill you up and should not feel hungry after your meal.

One avocado contains 30g of fat. One table spoon of olive oil is 14g.

A small slice of butter is already 5g fats

Saturated fat: Coconut oil, butter and animal fats are good for cooking foods at high temperature as they don't break down easily with high heat. Some animal fats like grass fed beef/lamb are a mixture of saturated and monounsaturated fat. Same for organic cheese and butter. It is okay to eat some saturated fat.

Monounsaturated fat: this is the good or 'heart healthy' fat. Olive oil and avocados. Olives are good to eat as well.

Eggs are a mixture of monounsaturated and saturated fat.

Nuts and seeds are mixture of mainly monounsaturated, polyunsaturated and some saturated. Try macadamia, pecan, brazil nuts or pumpkin seeds and sesame seeds. Avoid cashew nuts as the carbohydrate content is high.

Polyunsaturated fat:

#### Omega 3

Fish oil, oily fish like salmon, sardine, flax seed, chia seeds and sea vegetables like seaweed. Eggs also have omega 3. It is a good anti-inflammatory fat.

#### Omega 6

Vegetable oils like safflower, corn, sunflower etc. Inflammatory. We need a balance between Omega 6 and Omega 3. The ideal ratio is between 1:1 to 4:1. Many people cook with these oils which are fragile and break down easily with exposure to heat and air. In general most have an imbalance between Omega 6 and 3 consumption, with a 20:1 ratio. Vegetable oils should be avoided as much as possible.

Better to cook with saturated fats like butter or animal fat as they are heat stable. Or olive oil for stir fry.

Avoid trans-fat/partially hydrogenated fats in pastries, cookies, chips, crackers, margarine etc.

A further word about Saturated Fats - they can be good or bad. Note the following:

- Some animal fats are a mixture of saturated and monounsaturated fats, as mentioned above
- Saturated fats are good if they are from healthy animals (eg. grass fed beef or lamb) or natural/organic sources (eg. organic butter, egg yolk, coconuts)
- Saturated fats are bad if they are consumed with a high amount of sugar or refined carbohydrates as their metabolism is affected
- Saturated fats are bad if they are mixed with trans fats, deep fried, processed or hormone treated
- Consume saturated fats in moderation

A Low carb, moderate protein and high fat diet describes the caloric content, not the mass.

Visually, it looks like a lot of vegetables, some fruit, some meat with a bit of saturated fat, nuts, seeds, olives, cheese, a dash of butter or olive oil. However, some people misinterpret it and go meat-crazy, consuming too much meat and saturated fat without taking enough vegetables.

You need to get creative if eating out but it is still possible to eat this way, even in hawker centres. For example, when eating western, skip the fries/ potato and request for a portion of sautéed vegetables to enjoy along with your steak.

I've never counted calories - the above figures are just for illustration - it's more about understanding how to eat. I always eat till I'm satisfied. Even then, I've grown leaner and lost my belly eating this way. My energy levels remain stable throughout the day. Caloric restriction will not work because your metabolism will just slow down if you restrict calories. This is not a fad diet. It is about learning how to eat in such a manner that will alter your metabolism for the better.

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However, it would be disingenuous to say that the number of calories consumed do not matter. Both the types and number of calories consumed do matter. In the past, I was always hungry and felt that I did not overeat- but in reality I did overeat. Now, my appetite regulation is much better and I know when to stop. I eat what I require. The potential pitfall of a LCHF diet for a small number is that their LDL-C (and LDL-P, which is not done in Singapore) levels can go very high, above 200mg/dL even though they lose weight, gain energy and normalise all other health markers. No one is sure why, although various explanations have been proposed. The implication on their health is unknown. It has been suggested that such individuals undergo Coronary Calcium Scoring. They should reduce intake of saturated fat, increase intake of vegetables, monounsaturated fat (avocados, olives, seeds, nuts) and also add carbohydrates (eg. brown rice, sweet potatoes) back into their diet.

## CONCLUSION

How we exercise and how we metabolise food varies from person to person.

There have been arguments whether HIIT or longer but slower aerobic runs are better. Both an adequate volume of steady state aerobic activity and HIIT activate the PGC-1 alpha (Peroxisome proliferator-activated receptor gamma coactivator 1-alpha) master switch, which increases mitochondrial biogenesis, fat oxidative capacity and remodelling of muscle fibres to Type I fibres – a fiber type composition that is metabolically more oxidative and less glycolytic in nature. It also increases GLUT4, the insulin-regulated glucose transporter found primarily found in adipose tissues and striated muscle (skeletal and cardiac). Some form of Strength Training should be incorporated.

Being active in general plays a part in overall health status. The individual must find the types and combination of exercise which works for him.

Studies on Diet are often conflicting and confusing. It has been eye opening for me to make this discovery - how I have optimised my health by finding out how I best function. There is a whole lot of science behind how a LCHF Diet works-controlling insulin response, regulating our appetite hormones and getting in a balanced range of fats needed for our optimal functioning. Even if one does not subscribe to this way of eating, each of us has to find the mixture of

carbohydrate, protein, fat, vitamins and minerals which gives us good energy.

Home cooking is not an issue if one wishes to adopt a LCHF diet, but many Singaporeans eat out. There is a whole range of eating options where one could get in the requisite vegetables and protein, but having a mixture of healthy fats is more challenging. On days I have to eat out, I will try to get more vegetables and some protein in. I may then top up with some healthy fats when I get home - some avocados, a dash of high oleic natural peanut butter, a few olives and macadamia nuts - all these are high in monounsaturated fats. I may have some cheese or a little organic butter as well. There is a general misconception that eating this way costs more. If I am eating to improve my health, it actually reduces my medical bill down the line. Also, for about \$1 (or less) a day, one can get a good dose of healthy fats into his diet.

One needs to chart his progress both objectively and subjectively. It would be prudent to do a basic health screening before and after embarking on a LCHF diet, in view of the potential pitfall mentioned. The objective measures would be

Body Mass Index (BMI), Waist Hip Ratio, Blood pressure, fasting glucose and a lipid panel. Normalising or lowering the TG:HDL-C ratio (mg/dL) ideally to 1:1 shows progress. TC:HDL-C should be 4:1 or lower. It is now thought that the type and number of LDL particles (LDL-P) are more predictive of Cardiovascular Risk. A high LDL-P count with a predominance of small dense LDL suggests greater atherogenicity. We do not measure LDL-P in Singapore, but a useful surrogate is Apolipoprotein B.

Other basic blood tests would be: Full Blood Count, Liver function test, Renal Panel and Thyroid function test.

These basic tests can yield quite a fair bit of information, but some may elect to add on fasting insulin, HbA1c and hsCRP and Lp(a).

A subjective measure would be greater energy levels and better functioning in general. I hope that everyone will take charge of his own health, experiment and see what works. If we want to win the war against Diabetes and Chronic Diseases, we have to start before it's too late.



1/4 avocado, a dash of natural high oleic peanut butter, olives (without preservatives), macademia nuts. All these foods are high in monosaturated fat, which is a healthy fat. This dose of health promoting fats costs \$1 or less.

Images courtesy of Dr Nicholas Foo

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