

MEDIA RELEASE

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RANDOMISED CONTROLLED TRIAL OF NEW HEALTHY KETO WEIGHT LOSS DIET REVEALS PROMISING RESULTS WITHOUT INCREASING BAD CHOLESTEROL LEVELS

Unlike traditional keto diets, new method encourages ketosis and weight loss without risks of harmful side effects

Singapore — At 115kg, 60-year-old Mr Tan Ban Thong would often feel breathless from the mere act of sitting. He recounted the need to purchase two seats on an airplane, and how even walking a short distance was a struggle to him.

With a body mass index of 38, Mr Tan was plagued with uncontrolled diabetes, sleep apnoea, heart disease, hypertension and fatty liver among other health problems. On the highest dosage of medication for his range of conditions, he believed that he was a “lost cause”.

This all changed when he met Dr Lim Su Lin, Chief Dietitian, Department of Dietetics, National University Hospital (NUH), and he became part of a randomised controlled trial of a Healthy Keto diet programme she developed.

Four months later, Mr Tan had shed 25kg – over a fifth of his initial weight. More importantly, his diabetes came under control within a month under the programme, and his blood glucose, bad cholesterol (LDL cholesterol) and triglycerides had decreased significantly. Tests also revealed a reduction in liver enzyme levels, signifying a reversal of non-alcoholic fatty liver disease.

The new Healthy Keto diet

Many doctors and dietitians caution against adopting the ketogenic (or ‘keto’) diet as it has been linked to increased levels of LDL cholesterol. This worry is real, as recently highlighted in a study done by St. Paul’s Hospital-University of British Columbia, Vancouver, Canada, and a meta-analysis which found significantly higher LDL cholesterol levels for participants following a ketogenic diet.¹

Traditional keto diets tend to have a high intake of saturated fat, which can increase bad cholesterol levels and the risk of heart disease.

¹ Mansoor N, Vinknes KJ, Veierød MB, Retterstøl K. Effects of lowcarbohydrate diets v. low-fat diets on body weight and cardiovascular risk factors: a meta-analysis of randomised controlled trials. *British Journal of Nutrition*, 2016;115(3):466–479.

The new Healthy Keto diet, on the other hand, emphasises healthy fats, such as those found in nuts, seeds, avocados, fatty fish and unsaturated oils, which do not increase bad cholesterol levels.

In addition to healthy fats, the Healthy Keto diet includes adequate amounts of lean protein, high fibre from non-starchy vegetables, and low-carbohydrate fruits. This combination helps the body enter ketosis, a state where it burns fat for energy instead of carbohydrates.

Dr Lim added that the fibre-rich Healthy Keto diet helps to keep patients feeling full and satiated while aiding digestion and promoting gut health.

The Healthy Keto diet plan developed by Dr Lim also includes calorie restriction according to individual profile to aid patients in making progress towards their weight loss goals, while maintaining good health.

Dr Lim said: "Obesity is a serious global health issue, which affects many Singaporeans. Keto diets are popular and yet often unsafe with potential side effects. Through this new method, we hope to provide patients with a safe and effective way to achieve their weight loss goals effectively without compromising their cardiovascular health."

Promising outcomes from the Healthy Keto randomised controlled trial

An on-going randomised controlled trial started by Dr Lim in mid-2021 has shown good outcomes. In the trial involving 80 participants from the National University Health System (NUHS), one group was assigned to the Healthy Keto diet, while the other group was assigned to a standard low-fat, calorie restricted diet.

Over a six-month period of following the respective diets, preliminary results showed that the Healthy Keto group lost on average 7.4kg, while the standard diet group lost only 4.2kg.

Patients who followed the programme closely could lose up to 25kg in four months. With such significant amount of weight loss, many participants were able to control diabetes, reduce their blood pressure, reverse non-alcoholic fatty liver disease and other lifestyle diseases caused by being overweight.

Moreover, the Healthy Keto group experienced greater reductions in fasting blood glucose levels and triglycerides, while also demonstrating significant improvements in insulin sensitivity.

It is notable that none of the participants in the Healthy Keto group had increased cholesterol at six months and one year. In fact, at six months and one year, there were reductions of cholesterol, as opposed to the results of the Canadian study.

At six months, all participants with diabetes/prediabetes managed to reduce their blood glucose levels. 70 per cent of participants with high blood pressure saw a reduction in their blood pressure, and all participants with high liver enzymes also observed a reduction in their liver enzymes.

Maintaining the diet

Most people on a weight loss diet break their diet due to hunger pangs. However, in a Healthy Keto diet, once a person reaches ketosis (usually in two to three days), the gut will naturally produce higher levels of GLP-1. Similar to the weight loss drug recently approved in Singapore, this is the chemical which helps to increase satiety and reduce cravings. Having one's own body produce the GLP-1 naturally via a Healthy Keto diet leads to a much lower risk of side effects as opposed to taking it as a drug.

Research has shown that 80 per cent of participants who lose weight will regain their weight in a year. As such, the Healthy Keto diet programme also includes weight maintenance strategies when participants have reached their target weight, as well as a "relapse and rescue" plan. Currently, data up to one year shows that 80 per cent of the participants are able to maintain their weight – an increase from the 20 per cent indicated in published literature.²

While home-cooking is usually healthier and preferred, Dr Lim has also worked with a local food manufacturer to develop a range of Healthy Ketogenic ready-to-eat blast frozen HealthFull meals. This is meant as a healthier and easier alternative for individuals when cooking a meal from scratch may not be convenient.

Chinese Glossary

National University Health System (NUHS)	国立大学医学组织 (国大医学组织)
National University Hospital (NUH)	国立大学医院 (国大医院)
Dr Lim Su Lin, Chief Dietitian, Department of Dietetics, National University Hospital	林淑玲 首席营养师 营养科 国立大学医院
Randomised controlled trial	随机对照试验
Healthy Keto Diet Programme	健康生酮饮食计划
HealthFull	康满
HealthFull meals	康满餐

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² Wing, R. R., and Phelan, S., 2005. Long-term weight loss maintenance. Am J Clin Nutr. 2005; 82 (1 Suppl):222S-225S.

About the National University Hospital

The National University Hospital (NUH) is Singapore's first university hospital. While the hospital at Kent Ridge first received its patients on 24 June 1985, our legacy started from 1905, the date of the founding of what is today the NUS Yong Loo Lin School of Medicine. NUH is the principal teaching hospital of the medical school.

Our unique identity as a university hospital is a key attraction for healthcare professionals who aspire to do more than practise tertiary medical care. We offer an environment where research and teaching are an integral part of medicine, and continue to shape medicine and transform care for the community we care for.

We are an academic medical centre with over 1,200-beds, serving more than one million patients a year with over 50 medical, surgical and dental specialities. NUH is the only public and not-for-profit hospital in Singapore to provide trusted care for adults, women and children under one roof, including the only paediatric kidney and liver transplant programme in the country.

The NUH is a key member of the National University Health System (NUHS), one of three public healthcare clusters in Singapore.

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