

## SPECIAL FEATURE

Dr Daphne Gardner



# DIABETES SCREENING: WHY YOU SHOULDN'T WAIT

'Mr L' was a 'Master L' when he first came through the clinic doors. At the age of 13, he had been referred to the endocrine clinic for further evaluation as the school health service had detected that his weight put him in the 'at risk' category. Standing at 1.78m tall, and with a weight of 86.7kg, this put his body mass index at  $27.3 \text{ kg/m}^2$  (overweight category). He had hyperpigmentation (areas of darkened skin) behind his neck, and on his armpits, signs which suggested a state of resistance to insulin. He was otherwise feeling well and was doing well academically.

He underwent a 75g oral glucose tolerance test, during which a fasting blood sample is taken, followed by ingestion of 75g of quick acting carbohydrates before a second blood sample is taken two hours later. A fasting glucose level of  $> 7 \text{ mmol/l}$  or a two-hour glucose level of  $> 11.1 \text{ mmol/l}$  would be categorised as diabetes, whilst a level that is not normal yet falling just below these thresholds would be categorised as pre-diabetes.

Master L's fasting glucose level was  $4.5 \text{ mmol/l}$ ; with the two-hour glucose reading at  $12.1 \text{ mmol/l}$ , this put him in the category of diabetes. Having type 2 diabetes at 13 years of age was expectedly a devastating diagnosis for him and his parents. They were astounded especially since he did not have symptoms and had a previous normal 75g oral glucose tolerance test just two years prior to this.



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There is a happy twist to this story, for Master L and his family took on board the gravity of the situation and as a whole family, implemented impressive lifestyle changes. The previously favoured sugary drinks and snacks were removed, portions at mealtimes were reduced, dietary choices were skewed towards healthier options and physical activity became a regular feature.

Over the next year, he lost a substantial amount of weight (close to 10kg), with noticeable improvements to the dark patches of skin suggesting reduced insulin resistance. Two subsequent tests at age 14 years and 15 years were entirely normal, showing he no longer had diabetes. Now at 22 years of age, he still remains under yearly follow-up. Lifestyle changes implemented years ago are still in place, maintaining his body mass index at a healthy  $21.8\text{kg/m}^2$  and keeping diabetes at bay.

This is not a preamble but rather a real-life account to demonstrate a few key points in support of screening for diabetes.

1 Diabetes does not just affect the middle-aged or the elderly. It can affect young ones too, through a combination of familial disposition (inherited set of genes) and an overweight/obese status.

2 Studies show that Asians develop type 2 diabetes at a younger age, and those who are diagnosed young tend to have poorer cardiometabolic outcomes. Asians also tend to suffer from the detrimental effects of excess weight at lower weight thresholds. Therefore, someone who is visually not 'large' can be metabolically unhealthy.

3 A normal glucose test at this point in time does not guarantee normal glucose levels in the future, as clearly demonstrated in the account above. That is why screening guidelines would often suggest repeated screening at regular intervals even if the initial test results are normal.

In fact, the onset of type 2 diabetes is often insidious, and many may not know they have the condition. The symptoms of fatigue, blurred vision, poor healing wounds may often go unnoticed or are attributed to other causes.

The later stage symptoms come on only when glucose levels are higher, resulting in thirst, frequent urination and weight loss; this occurs when the high levels of glucose exceeds the kidneys' ability for glucose reabsorption, and passes out through the urine, drawing out water along with the glucose.

Consequently, individuals with type 2 diabetes may go on for years without exhibiting symptoms, during which time diabetes-related complications could already set in. Inadequate blood glucose control leads to damage in the small blood vessels in the eyes, kidneys and nerves (leading to blindness, kidney failure or loss of feelings in fingers or toes) and the large blood vessels (resulting in heart attacks or strokes).

Since those with early onset diabetes may not exhibit physical signs or symptoms, focus may be better placed on the risk factors for developing the condition, early detection through screening, and intervening early in those who are nearly developing diabetes (ie the pre-diabetes stage).

The **Diabetes Risk Assessment tool by HealthHub** seeks to offer recommendations for targeted screening in those who are younger (age 18 to 39 years) through a risk stratification tool that combines age, gender, weight status, family history, previous history of gestational diabetes and presence of hypertension (high blood pressure). The weightage of these risk factors towards the risk score is not clearly described; a previous history of gestational diabetes automatically defines high risk with this risk scoring system, in line with what has been described in clinical studies.



Those who are above 40 years of age are already deemed to be at high risk and therefore should undergo screening. There are nationwide efforts to make screening affordable and hence widely accessible across the island.

It is estimated that one in seven Singaporeans aged 18 to 69 does not yet have diabetes but is nearly there, a state known as pre-diabetes. The conversion rate to diabetes is high in these individuals, and intervention through lifestyle modifications and the use of medications has been shown in other countries to be very effective in preventing the onset of diabetes.

The **Pre-DICTED (Pre-Diabetes Interventions & Continued Tracking to Ease out Diabetes) programme** led by SingHealth Duke-NUS Diabetes Centre and funded by the Ministry of Health seeks to recruit local participants with pre-diabetes and monitor the diabetes conversion rate over three years.

Participants who are randomised to treatment arm will attend a series of group-based lifestyle intervention programmes over six weeks, with cash incentives offered to those who have achieved and maintained a five percent or more weight loss from baseline. Either standard care or treatment arm participants who are still at high risk of developing diabetes after six months will be given an oral glucose lowering medication known as metformin. The study is currently still in the recruitment phase and further information can be found on [www.predicted.com.sg](http://www.predicted.com.sg).

We are battling diabetes on many fronts as a nation, and knowing the enemy is the key to victory. Looking out for the symptoms of diabetes, going for pre-emptive screening and implementing early lifestyle changes should be instrumental in turning the tide of the diabetes battle in Singapore.

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