

Diabetes: Know thy foe

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During the COVID-19 pandemic in 2022, Singapore's Minister for Health Ong Ye Kung mentioned, "After the COVID-19 pandemic has passed, we need to tackle a far more challenging pandemic—which is longer-term chronic illness, and diabetes is a major one."¹

Truly, in the past decade, there has been an invisible global epidemic of non-communicable diseases and the predominant types are cardiovascular diseases (including ischaemic heart disease and cerebrovascular accidents) and diabetes.² In Singapore, diabetes mellitus was among the top 10 common causes of hospitalisation in 2021, accounting for 1.9% of admissions to restructured or public hospitals.³ There are multiple subtypes of diabetes mellitus with the predominant one being type 2 diabetes mellitus (T2DM), which is largely adult in onset and characterised by insulin resistance. A closely associated disease entity is metabolic syndrome (MetS), comprising central obesity, raised blood pressure, various degrees of hyperglycaemia mediated by insulin resistance (impaired glucose tolerance [IGT] and impaired fasting glycaemia [IFG]), reduced serum high density lipoprotein and hypertriglyceridaemia. MetS is associated with an increased risk of developing T2DM and subsequent atherosclerotic diseases; however, its long latent period poses an opportunity for timely lifestyle intervention.

The War on Diabetes was launched in Singapore in 2016 on multiple fronts, involving numerous ministries and agencies.⁴ The Health Promotion Board (HPB), Ministry of Education (MOE), Early Childhood Development Agency and preschool operators have come together to serve healthier food under the Healthy Meals in Schools Programme. A total of 1,230 preschools and all MOE mainstream school canteens have come on board this programme as of 2019.⁴ HPB also collaborates with Sport Singapore, a government subsidiary promoting physical activity, to lead community physical activity programmes (such as Zumba) in the parks, named Sundays @ The Park. Under this programme, there were at least 90 weekly sessions over 84 sites in 2019. The Ministry of Health (MOH) had worked with HPB to roll out the Screen for

Life scheme to provide subsidised, convenient and accessible cardiovascular health screening for local residents. About 65,000 Singaporeans had signed up as of 2019. The War on Diabetes resulted in the maintenance of age-standardised diabetes prevalence at 8% between 2017 and 2019.⁵ Will we lose the momentum in keeping this disease and its complications at bay after the pandemic? A key starting point for success is the individual's awareness of his/her risk and diagnosis of T2DM.

Sun Tzu, a famous military strategist in China, once said, "If you know the enemy and know yourself, your victory will not stand in doubt."⁶

In this issue of the *Annals*, Tan et al.⁷ reported on the prevalence of Singapore patients correctly knowing their diagnosis of diabetes and pre-diabetes. The cross-sectional study performed at a Singapore polyclinic showed a substantial concordance between self-reported and medical records of diabetes ($\kappa=0.76$, 95% confidence interval [CI] 0.67–0.85, $P<0.001$) and poor concordance for pre-diabetes ($\kappa=0.36$, 95% CI 0.24–0.48, $P<0.001$). Factors such as Chinese ethnicity and the presence of 3 or more chronic diseases are associated with a reduced concordance of the diagnosis for diabetes.

Although the reference standard (i.e. diagnosis codes) in this study is subject to human error, the study actually shows that self-reported diagnosis of diabetes can potentially be a ready and reliable source of data in both clinical practice and research. Clinically, this reflects the successful communication of the diagnosis of diabetes from the previous healthcare team, independent of educational status as shown in the study. This is particularly helpful in transitioning care across providers in the absence of detailed memorandums and shared electronic databases. It is easily performed, prevents unnecessary diagnostic retesting and frees up consultation time for healthcare providers to discuss further lifestyle plans for the patient. In research, patients' active contribution of their diagnoses to a medical database could result in quicker cardiovascular risk stratification and epidemiological studies,

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especially in geospatial prevalence studies. This would allow policymakers to design accessible lifestyle interventions closer to the homes of patients with T2DM. As such, this could also be extended to other common cardiovascular risk conditions such as hypertension and hyperlipidaemia.

On the other hand, one area of clinical concern is that the concordance of pre-diabetes between patient and medical records is low. Possible factors to explore in future research include unclear communication of the diagnosis of pre-diabetes; patients' denial or downplaying of the diagnosis since hyperglycaemia in pre-diabetes (IFG/IGT) is not perceived as severe as frank T2DM; patients' false impression of the absence of pre-diabetes or benign nature since it is not pharmacologically treated; and the lack of public awareness of the prevalence of pre-diabetes. Deliberate diagnostic labelling is a double-edged sword and may invoke fear, denial and anxiety in some patients; however, this may also serve to activate those affected to be more involved in seeking better health.^{8,9} There are opportunities to explore various ways of improving communication of chronic conditions with long latency, and aid ministerial efforts in increasing public health literacy on the existence and reversibility of such conditions.

Besides Chinese ethnicity and multimorbidity, there are also other associations linked to T2DM awareness. A study by Jeong et al.¹⁰ revealed that these associations include older age, lower educational level, normal weight, the presence of hypertension, hyperlipidaemia and the presence of a positive family history of T2DM. Although associations of pre-diabetes awareness are not explored in this current study, other studies indicated that pre-diabetes awareness may be similarly linked to lower education level and a positive family history of pre-diabetes, but this may be higher in those who are overweight and obese.¹¹ It may also be higher in individuals visiting their usual sources of care (such as general practitioners), possessing health insurance and having 2 or more visits a year to the doctor.¹¹ This may suggest that regular touchpoints for health screening and assessment at the same medical home may contribute to pre-diabetes awareness, although the methodology of these studies is not meant to infer causality.

Currently, the presence of pre-diabetes awareness has not been consistently linked to subsequent patient activation in lifestyle management. As such, it may not be the silver bullet to curb the progression to T2DM. However, a retrospective study by Sherman et al.¹² suggests that the elements of person-centred care and encouraging behavioural change in health coaching

during primary care may be the answer, with a statistically significant mean reduction in HbA_{1c} of 0.2% and weight of 10 pounds over 24 months. In Singapore's context, this health coaching role can potentially be fulfilled by many touchpoints inside and outside of our healthcare system. The former includes care coordinators in the primary care networks of general practitioners, community nurses in transitional care, nurse educators in hospitals and polyclinics, allied health colleagues (dietitians) in hospitals, and even wellbeing coordinators in social prescribing programmes. The latter includes health ambassadors from government agencies such as HPB, Sport Singapore and People's Association. Truly it takes a village to subsequently tackle both T2DM and pre-diabetes. Whether this role can also be effectively extended to digital applications or videoconferencing platforms remains an exciting area for future research efforts.

Currently, Singapore is in the midst of a major healthcare transformation under Healthier SG.¹³ Aside from empanelment to a dedicated family physician who delivers value-driven healthcare, one key component is the formulation of a shared health plan between the patient and provider. Improving understanding and acceptance of chronic conditions such as T2DM and pre-diabetes will certainly pave the way to the successful implementation of the health plans in this programme, with delivery and evaluation via enhanced manpower and IT infrastructure. Health protocols under MOH's Healthier SG for common conditions such as T2DM, hypertension and hyperlipidaemia are under way, ready to serve patients upon diagnoses of these conditions by both physician and patient.

The best fight against the foe is yet to be.

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