

Information Paper on Diabetes in Singapore

The World Diabetes Day falls on 14th November every year and this year's theme is *Eyes on Diabetes*. It emphasizes the importance of screening for early diagnosis of diabetes so that treatment can be put in place to reduce the risk of complications. This paper seeks to highlight some key messages that healthcare professionals can share with their patients.

What is diabetes?

Diabetes is a condition in which the body produces insufficient insulin, a hormone that keeps the blood sugar level in balance, or the body does not respond properly to insulin, resulting in high amount of sugar in the blood. There are three main types of diabetes: Type I diabetes (usually inherited and cannot be prevented), Type II diabetes (the most common type of diabetes and can be prevented) and gestational diabetes (happens during pregnancy).

Diabetes is a worldwide epidemic, where the number of people with diabetes is huge and growing. About 440,000 Singapore residents aged 18 years and above had diabetes in 2014¹ and the number is estimated to grow to 1,000,000 in 2050². Diabetes was the 4th and 8th most common condition of polyclinic attendances and hospitalisation respectively in 2014³. Life years lost due to mortality and ill-health related to diabetes was the 4th largest among all diseases in 2010⁴. The cost burden from diabetes, including medical expenses and productivity loss, was expected to rise from beyond \$940 million in 2014 to \$1.8 billion in 2050⁵.

Trends of diabetes in Singapore

The prevalence of diabetes among Singapore residents (Singapore citizens and Permanent Residents) has increased over the decade. One in nine Singapore residents aged 18 to 69 years were affected by diabetes in 2010 (Table 1)⁶. The prevalence of people with diabetes was similar between the genders. Indians and Malays consistently had higher prevalence of diabetes compared to Chinese across the years. One in three diabetics were unaware that they had diabetes. Among the diabetics who were aware of their disease, one in three had poor control of their condition⁷.

¹ Extrapolation based on National Health Survey 2010, Ministry of Health, Singapore

² Projection done by Saw Swee Hock School of Public Health, Singapore

³ Health Facts Singapore, Ministry of Health, Singapore

⁴ Singapore Burden of Diseases Study 2010, Ministry of Health, Singapore

⁵ Ministry of Health, Singapore

⁶ National Health Survey 1998, 2004, 2010, Ministry of Health, Singapore

⁷ Poor control is defined as having HbA1c ≥ 8%

Table 1: Crude prevalence of diabetes (%) among Singapore residents aged 18 to 69 years

Year	1998	2004	2010
Total	9.0	8.2	11.3
Age group			
18 – 29	0.8	0.5	1.0
30 – 39	3.3	2.4	4.3
40 – 49	9.6	7.9	12.1
50 – 59	21.8	16.7	19.3
60 – 69	32.4	28.7	29.1
Gender			
Male	8.5	8.9	12.3
Female	9.6	7.6	10.4
Ethnic group			
Chinese	8.0	7.1	9.7
Malay	11.3	11.0	16.6
Indian	15.8	15.3	17.2

The prevalence of impaired glucose tolerance (IGT) among Singapore residents remained between 12% and 15% over the decade (Table 2). The profile of those people with IGT was similar to those with diabetes. 1 in 3 people with IGT is estimated to develop diabetes in 8 years⁸.

Table 2: Crude prevalence of IGT (%) among Singapore residents aged 18 to 69 years

Year	1998	2004	2010
Total	15.0	12.0	14.4
Gender			
Male	14.9	11.1	13.5
Female	15.2	12.9	15.2
Ethnic group			
Chinese	14.3	11.7	14.2
Malay	20.2	13.7	14.6
Indian	14.0	12.4	15.5

The high prevalence of diabetes is largely attributed to our ageing population as the risk of diabetes increases with age. However, Table 3 shows that even after accounting for Singapore's ageing population, the prevalence of diabetes in Singapore (10.5%) is higher than the world's average (8.8%)⁹.

⁸ Wong MS et al. The Singapore impaired glucose tolerance follow-up study. *Diabetes Care* 2003; 26:3024-3030

⁹ IDF Diabetes Atlas, 7th Edition, 2015, International Diabetes Federation

Table 3: International comparison on prevalence of diabetes (%) among the residents aged 20 to 79 years

Prevalence	Crude	Age-adjusted
World	8.8	8.8
North America and Caribbean	12.9	11.5
South and Central America	9.4	9.6
Western Pacific	9.3	8.8
Middle East and North Africa	9.1	10.7
Europe	9.1	7.3
South East Asia	8.5	9.1
Africa	3.2	3.8
Countries within South East Asia		
Malaysia	16.6	17.9
Brunei	12.9	13.7
Singapore	12.8	10.5
China	10.6	9.8
Hong Kong	10.2	8.0
Taiwan	10.0	8.4
India	8.7	9.3
Korea	8.7	7.2
Japan	7.6	5.7
Myanmar	6.5	6.8
Indonesia	6.2	6.5
Philippines	6.1	6.9
Vietnam	5.6	6.0

Rising obesity is also a significant contributor to the rise in diabetes prevalence (Table 4)⁶.

Table 4: Crude prevalence of obesity (%) among Singapore residents aged 18 to 69 years

Year	1998	2004	2010
Total	6.0	6.9	10.8
Gender			
Male	5.3	6.4	12.1
Female	6.7	7.3	9.5
Ethnic group			
Chinese	3.8	4.2	7.9
Malay	16.2	19.1	24.0
Indian	12.2	13.4	16.9

Complications of diabetes

Although diabetes is not fatal in the short term, undiagnosed diabetes or poorly controlled diabetes can eventually lead to disabilities and diseases, compromising the quality of life of individuals and their caregivers. The progression to these complications is quickened when diabetes is poorly controlled. Some diseases related to diabetes can also lead to premature death and disability.

Every year in Singapore,

- 2 in 3 new kidney failure cases were due to diabetes.
- 1 in 2 people who had a heart attack had co-existing diabetes; and
- 2 in 5 people who had stroke had co-existing diabetes¹⁰.

Tips to prevent diabetes or delay diabetic-related complications

- **Be aware.** Know your risk and screen for diabetes.
- **Eat right.** Eat in moderation, choose more whole-grains, fruits and vegetables, and reduce intake of sugar and saturated fat¹¹.
- **Adopt an active lifestyle.** Stay fit by engaging in at least 150 minutes of physical activity weekly¹².
- **Take Control.** Aim for a healthy weight and have regular check-ups with your family doctor.
- **Do not smoke.** Smoking worsens the narrowing of blood vessels, reducing blood flow to many organs which can lead to serious complications.
- **Limit alcohol intake.** Alcohol interferes with the meal plan and blood glucose control.

¹⁰ National Registry of Diseases Office, Singapore

¹¹ My Healthy Plate, Health Promotion Board, Singapore

¹² Diabetes Toolkit, American Medical Association



What are the risk factors and common symptoms of diabetes?

Risk factors of diabetes are¹³:

- Overweight/obesity (body mass index $\geq 25.0 \text{ kg/m}^2$)
- First degree relative with diabetes
- High risk race/ethnicity
- Women who have delivered a baby (who weighed $\geq 4 \text{ kg}$) or were previously diagnosed with gestational diabetes
- Hypertension (blood pressure $\geq 140/90 \text{ mmHg}$) or on therapy for hypertension
- High-density lipoprotein cholesterol level $<1.0 \text{ mmol/l}$ for male and $<1.3 \text{ mmol/l}$ for female and/or triglyceride level $\geq 2.2 \text{ mmol/l}$
- Women with polycystic ovarian syndrome
- IGT or impaired fasting glycaemia on previous testing
- History of cardiovascular disease

Common symptoms of diabetes are:

- Frequent hunger
- Frequent thirst
- Frequent urination
- Unexplained weight loss
- Constant and extreme fatigue
- Blurred vision
- Wounds that heal slowly and poorly

¹³ Diabetes Mellitus, MOH Clinical Practice Guidelines 1/2014, Ministry of Health, Singapore

At-risk individuals, such as those with a family history of diabetes or who are overweight, should go for screening before 40 years old. Regular screening should be carried out every 3 years for people whose screening results have been found to be normal¹⁴. Regular health screening for diabetes is recommended once every three years for people who are 40 years or older.

The screening test is free for Pioneer Generation and Community Health Assist Scheme (CHAS) cardholders. Diabetes screening under HPB's Screen for Life programme is available at the GP clinics and polyclinics¹⁵. You can refer to https://www.chas.sg/clinic_locator.aspx?id=90 for the list of CHAS clinics near you.

Since people with IGT have a higher risk of developing diabetes compared to people with normal glucose tolerance, we should be alert once IGT is detected. Studies have shown the cost effectiveness¹⁶ and risk reduction effects¹⁷ of lifestyle modification among people with IGT. Through close monitoring and follow-up, the glucose level of those with IGT can be improved and returned to the normal level.

Early detection, regular monitoring and timely treatment of diabetes can prevent complications and reduce the impact of diabetes on individuals and their caregivers.

¹⁴ Report of the Screening Test Review Committee, Academy of Medicine, Singapore

¹⁵ FAQs on Screen for Life, Health Promotion Board, Singapore

¹⁶ Li R et al. Cost-Effectiveness of Interventions to Prevent and Control Diabetes Mellitus: A Systematic Review. *Diabetes Care* 2010; 33(8): 1872-1894

¹⁷ Baker MK et al. Behavioural Strategies in Diabetes Prevention Programs: A Systematic Review of Randomised Controlled Trials. *Diabetes Research and Clinical Practice* 2011; 91: 1-12