



# An Online Survey of Associations of Sociodemographic and Nutritional Status with Type 2 Diabetes Risk

## Among a Sample of Malaysian Adults

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### INTRODUCTION

- The prevalence of type 2 diabetes (T2DM) in Malaysia was **18.3%**, with the prevalence of undiagnosed diabetes soared significantly from 4% in 2011 to 8.9% in 2019 (Ministry of Health Malaysia, 2019).
- T2DM is associated with a cluster of risk factors, both **non-modifiable** (age, ethnicity, family history) and **modifiable** (low socioeconomic status, obesity, metabolic syndrome, unhealthy dietary habit and lifestyle behaviours) (Kyrou et al., 2020).
- However, there were inconsistent findings from the current literature and limited studies available for type 2 diabetes risk and its associated factors.

### OBJECTIVE

To determine the associations of sociodemographic factors and nutritional status (anthropometric measurements and dietary intake) with type 2 diabetes risk among a sample of Malaysian adults.

### METHODOLOGY

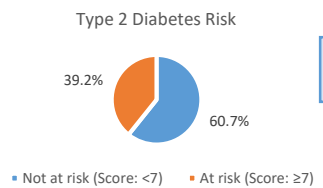
- Study design:** Cross-sectional study.
- Study location:** Malaysia.
- Respondents:** 191 Malaysian adults without history of type 1 or type 2 diabetes.
- Sampling method:** Convenience sampling.
- Data collection:** February 2021 until April 2021.
- Study approval:** Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia (JKEUPM).
- Data analysis:** SPSS Statistics Version 25 with a significance level  $p < 0.05$ .
  - Descriptive statistics: All variables.
  - Pearson's Product Moment Correlation/ Spearman's Rho test: Association between continuous variables.
  - Pearson's Chi-Square Test: Association between categorical variables.

**Table 1**  
Instruments of the Study using A Self-Administered Questionnaire (Google Forms)

Variables	Measures
Sociodemographic factors	Structured questionnaire
Anthropometric measurements (height, weight, estimated waist circumference)	Self-reported measurements (estimated waist circumference obtained with the aid of UNIQLO pant sizes in inches)
Dietary intake	Singapore short diet screener (Whitton et al., 2018)
Type 2 diabetes risk	Finnish Diabetes Risk Score (FINDRISC) (Lindström & Tuomilehto, 2003)

### RESULTS

**Figure 1**  
Type 2 diabetes risk of the respondents (n = 191)



Mean type 2 diabetes risk score: **6.22 ± 4.40**

### RESULTS (CONT.)

**Table 2**  
Distribution of sociodemographic factors and nutritional status of the respondents and their associations with type 2 diabetes risk (n = 191)

Variables	n (%) / Mean ± SD	r-value/ $\chi^2$	p-value
<b>Sociodemographic factors</b>			
Age	30.09 ± 9.44	0.325 <sup>a</sup>	<0.001**
Gender		12.072 <sup>c</sup>	0.001**
Male	49 (25.7)		
Female	142 (74.3)		
Ethnicity		13.266 <sup>c</sup>	<0.001**
Malay	120 (62.8)		
Non-Malay	71 (37.2)		
Marital status		30.829 <sup>c</sup>	<0.001**
Single	106 (55.5)		
Married	85 (44.5)		
Monthly household income (RM)	7173.51 ± 5838.37	0.158 <sup>a</sup>	0.029*
Family history of diabetes		26.891 <sup>c</sup>	<0.001**
Yes	88 (46.1)		
No	103 (53.9)		
<b>Anthropometric measurements</b>			
BMI (kg/m <sup>2</sup> )	23.64 ± 5.10	0.631 <sup>a</sup>	<0.001**
Estimated waist circumference (cm)		71.406 <sup>c</sup>	<0.001**
Normal (Male <90; Female <80)	133 (69.6)		
Abdominal obesity (Male ≥90; Female ≥80)	58 (30.4)		
<b>Food groups (servings/day)</b>			
Bread, cereal & cereal products	0.59 ± 0.63	-0.177 <sup>b</sup>	0.014*
Non-starchy vegetables	2.25 ± 2.03	-0.164 <sup>b</sup>	0.023*
Fats & oils	1.10 ± 1.16	0.156 <sup>b</sup>	0.031*
Tea & coffee	0.70 ± 0.80	0.307 <sup>b</sup>	<0.001**

<sup>a</sup> Pearson's Product-Moment Correlation; <sup>b</sup> Spearman's Rho test; <sup>c</sup> Pearson's Chi-square Test  
\* Correlation is significant at  $p < 0.05$ ; \*\* Correlation is significant at  $p < 0.01$

### DISCUSSION

- A significant number of respondents (**39.2%**) had an elevated type 2 diabetes risk with risk score of  $\geq 7$ . However, this proportion was smaller compared to a local study (Oo et al., 2020).
- This study revealed that **age, gender, ethnicity, marital status, monthly household income, family history of diabetes were significantly associated with type 2 diabetes risk**, which was in line with previous studies (Abdullah et al., 2018; Bird et al., 2015; Ramezankhani et al., 2019).
- The findings of the **significant associations between BMI, estimated waist circumference with type 2 diabetes risk** were comparable with previous studies (Abdullah et al., 2018; Ishaque et al., 2017).

### DISCUSSION (CONT.)

- There were **inverse significant associations between intakes of bread, cereal and cereal products, non-starchy vegetables with type 2 diabetes risk**, which were congruent with past studies (Kochar et al., 2007; Wang et al., 2016). Wholegrain bread and cereals have a protective effect on type 2 diabetes due to their rich fiber and other nutrient contents such as vitamin E and magnesium, and low glycemic load (Fung et al., 2002). Meanwhile, vegetables are rich sources of fiber, flavonoids and antioxidants that are protective towards type 2 diabetes (Wang et al., 2016).
- There was a **positive significant association between intake of fats and oils with type 2 diabetes risk**, which concurred with a past study conducted in China (Zhuang et al., 2020). Cooking methods of frying/ stir-frying foods increase the energy density of food (Sayon-Orea et al., 2015), which in turn increase type 2 diabetes risk.
- The finding of a **positive significant association between intakes of tea and coffee with type 2 diabetes risk** was not congruent with past study (Van Dieren et al., 2009). Further studies are warranted to show the association of intake of sweetened tea and coffee with type 2 diabetes risk.

### CONCLUSION

- A significant proportion (39.2%) of a sample of Malaysian adults had an elevated type 2 diabetes risk.
- There were significant associations between **sociodemographic factors** (age, monthly household income, gender, ethnicity, marital status, family history of diabetes), **anthropometric measurements** (BMI, estimated circumference) and **dietary intake** (intakes of bread, cereal and cereal products, non-starchy vegetables, fats and oils, tea and coffee) with type 2 diabetes risk.
- The modifiable risk factors of type 2 diabetes identified in this study should be monitored to prevent the at risk population from developing type 2 diabetes in the next 10 years.

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