

Supplementary Table 1. Lifestyle and clinical characteristics of participants with hypertension visiting polyclinics in Singapore with and without Type 2 Diabetes Mellitus (T2DM)

Variables	Prevalence of T2DM [%] (95% CI)	With T2DM ^a (n = 284)	Without T2DM ^a (n = 631)	Total (n = 915)	P-value (Fisher/Student t-test)
Physical activity, n (%)^b					0.043
Low levels	32.6 (29.3% - 36.0%)	243 (85.6)	503 (79.7)	746 (81.5)	
High levels	24.3 (18.4% - 31.3%)	41 (14.4)	128 (20.3)	169 (18.5)	
Dietary quality, n (%)^b					0.119
Poor	36.3 (29.4% - 43.7%)	62 (21.8)	109 (17.3)	171 (18.7)	
Good	29.8 (26.7% - 33.2%)	222 (78.2)	522 (82.7)	744 (81.3)	
Dietary habits in the past month, n (%)^{b, d}					0.084
Dined at hawker center	28.0 (23.9% - 32.6%)	113 (39.8)	290 (46.0)	403 (44.1)	
Never dined at hawker center	33.5 (29.5% - 37.7%)	171 (60.2)	340 (54.0)	511 (55.9)	
Cigarette Smoking, n (%)^b					0.439
Former or current smoker	33.5 (27.4% - 40.3%)	68 (23.9)	135 (21.4)	203 (22.2)	
Never smoked	30.3 (27.1% - 33.8%)	216 (76.1)	496 (78.6)	712 (77.8)	
Body Mass Index (BMI), n (%)^{b, e}					0.001
Normal or underweight ($<23 \text{ kg/m}^2$)	21.8 (16.6% - 28.0%)	44 (15.5)	158 (25.1)	202 (22.1)	
Overweight (23 to $<27.5 \text{ kg/m}^2$)	30.3 (25.9% - 35.1%)	116 (41.0)	267 (42.4)	383 (41.9)	
Obese ($\geq 27.5 \text{ kg/m}^2$)	37.5 (32.4% - 42.9%)	123 (43.5)	205 (32.5)	328 (35.9)	
Waist circumference, n (%)^{b, f}					<0.001
Desirable (M $<90\text{cm}$, F $<80 \text{ cm}$)	17.4 (13.2% - 22.5%)	44 (15.6)	209 (33.2)	253 (27.7)	
High (M 90- $<102\text{cm}$, F 80- $<88 \text{ cm}$)	32.7 (27.9% - 37.8%)	113 (40.1)	233 (37.0)	346 (37.9)	
Very high (M $\geq 102\text{cm}$, F $\geq 88 \text{ cm}$)	39.9 (34.7% - 45.5%)	125 (44.3)	188 (29.8)	313 (34.3)	
History of cardiovascular disease, n (%)^b					0.080
Yes	38.9 (29.8% - 49.0%)	37 (13.0)	58 (9.2)	95 (10.4)	
No	30.1 (27.1% - 33.4%)	247 (87.0)	573 (90.8)	820 (89.6)	

History of stroke, n (%)^{b, e}					0.106
No	30.5 (27.6% - 33.7%)	268 (94.4)	610 (96.7)	878 (96.2)	
Yes	43.2 (28.7% - 59.1%)	16 (5.6)	21 (3.3)	35 (3.8)	
Waist-to-height-ratio (WHtR), mean (SD)^{c, f}	-	0.590 (0.063)	0.565 (0.073)	-	<0.001
Lipid levels, mean (SD)^c					
Total cholesterol (mmol/L) ^g	-	4.207 (0.872)	4.836 (0.865)	-	<0.001
HDL cholesterol (mmol/L) ^g	-	1.293 (0.359)	1.491 (10.435)	-	<0.001
LDL cholesterol (mmol/L) ^h	-	2.218 (0.777)	2.677 (0.767)	-	<0.001
Triglycerides (mmol/L) ^h	-	1.550 (0.779)	1.450 (0.755)	-	0.004

^aT2DM was defined as meeting one of the three criteria: i) self-reported “physician-diagnosed diabetes confirmed through medical records” or taking anti-diabetes; ii) fasting plasma glucose levels ≥ 7.0 mmol/dL; iii) HbA1c $\geq 6.5\%$.

^bP-values are based on Fisher’s exact test.

^cP-values are based on Student t-test.

^d1 missing value due to non-response.

^e2 missing values due to non-response.

^f3 missing values due to non-response.

^g9 missing values due to non-response.

^h15 missing values due to non-response.

Supplementary Table 2. Associations between participants' characteristics and risk of having Type 2 Diabetes Mellitus (T2DM) among patients with uncontrolled hypertension.

Variables	Univariate analysis		Multivariate Model 1 ^a		Multivariate Model 2 ^b		Multivariate Model 3 ^c		Multivariate Model 4 ^d	
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Age										
40-65 years (n = 467)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
>65 years (n = 448)	0.75 (0.56 – 0.99)	0.045 [#]	0.75 (0.53 – 1.05)	0.098	0.74 (0.53 – 1.05)	0.094	0.79 (0.56 – 1.12)	0.199	0.79 (0.54 – 1.16)	0.237
Gender										
Male (n = 467)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Female (n = 448)	0.92 (0.69 – 1.21)	0.563	0.81 (0.59 – 1.10)	0.181	0.78 (0.55 – 1.10)	0.156	0.63 (0.44 – 0.91)	0.015	1.02 (0.68 – 1.55)	0.899
Ethnicity^e										
		<0.001+*		<0.001+*		<0.001+*		<0.001+*		<0.001+*
Chinese (n = 679)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Malay (n = 120)	1.82 (1.21 – 2.72)	0.004*	1.59 (1.04 – 2.44)	0.031 [#]	1.49 (0.97 – 2.31)	0.068	1.31 (0.84 – 2.05)	0.228	1.36 (0.83 – 2.24)	0.213
Indian (n=84)	3.46 (2.18 – 5.51)	<0.001*	3.65 (2.25 – 5.91)	<0.001*	3.50 (2.14 – 5.74)	<0.001*	3.13 (1.88 – 5.22)	<0.001*	2.53 (1.47 – 4.36)	0.001*
Others (n = 32)	0.76 (0.32 – 1.79)	0.538	0.90 (0.37 – 2.16)	0.820	0.88 (0.36 – 2.15)	0.793	0.69 (0.28 – 1.70)	0.430	0.65 (0.25 – 1.68)	0.379
Education^f										
Primary school and below (n = 248)	1.35 (0.99 – 1.84)	0.053	1.44 (1.02 – 2.02)	0.035 [#]	1.36 (0.96 – 1.93)	0.075	1.39 (0.98 – 1.98)	0.061	1.42 (0.98 – 2.08)	0.062
Secondary school and above (n = 654)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Employment status										
Employed (n = 446)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Unemployed (n = 469)	1.00 (0.76 – 1.33)	0.951	1.23 (0.88 – 1.72)	0.216	1.22 (0.87 – 1.70)	0.246	1.31 (0.93 – 1.85)	0.121	1.19 (0.82 – 1.73)	0.353

Living in rental housing										
No (n = 775)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Yes (n = 140)	0.73 (0.48 – 1.10)	0.140	0.73 (0.47 – 1.14)	0.171	0.74 (0.47 – 1.15)	0.189	0.71 (0.45 – 1.12)	0.151	0.73 (0.45 – 1.20)	0.222
Housing type^{c, g}										
Private housing (n = 134)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Public housing (1-3 room) (n = 256)	2.06 (1.25 – 3.40)	0.005*	2.00 (1.16 – 3.43)	0.012*	1.92 (1.11 – 3.31)	0.018 [#]	1.96 (1.12 – 3.42)	0.018 [#]	1.70 (0.94 – 3.05)	0.076
Public housing (4-5 room) (n = 521)	2.04 (1.28 – 3.26)	0.003*	1.86 (1.13 – 3.04)	0.013 [#]	1.80 (1.10 – 2.95)	0.019 [#]	1.83 (1.10 – 3.04)	0.019 [#]	1.70 (1.00 – 2.89)	0.049 [#]
Cigarette smoking										
Former or current smokers (n = 203)	1.15 (0.83 – 1.61)	0.391			0.99 (0.67 – 1.46)	0.964	1.00 (0.67 – 1.49)	0.984	0.95 (0.62 – 1.46)	0.832
Never smoked (n = 712)	Ref	-			Ref	-	Ref	-	Ref	-
Physical activity										
Low levels (n = 746)	1.50 (1.02 – 2.21)	0.036 [#]			1.36 (0.91 – 2.03)	0.132	1.23 (0.81 – 1.86)	0.312	1.03 (0.66 – 1.59)	0.886
High levels (n = 169)	Ref	-			Ref	-	Ref	-	Ref	-
Dietary habits in the past month^h										
Dining at hawker center (n = 403)	0.77 (0.58 – 1.03)	0.079			0.86 (0.62 – 1.18)	0.370	0.84 (0.61 – 1.16)	0.310	0.84 (0.59 – 1.19)	0.346
Never dined at hawker centre (n = 511)	Ref	-			Ref	-	Ref	-	Ref	-
Dietary quality										
Poor (n = 171)	1.33 (0.94 – 1.89)	0.103			1.30 (0.89 – 1.89)	0.164	1.29 (0.88 – 1.89)	0.180	1.24 (0.82 – 1.87)	0.293
Good (n = 744)	Ref	-			Ref	-	Ref	-	Ref	-
Body mass index (BMI)^{e, i}										
Underweight and normal ($<23 \text{ kg/m}^2$) (n = 202)	Ref	$<0.001+*$						-	-	-

Overweight (23-<27.5 kg/m ²) (n = 383)	1.56 (1.04 – 2.32)	0.029 [#]				
Obese (≥27.5kg/m ²) (n = 328)	2.15 (1.44 – 3.22)	<0.001*				
Waist circumference^{e,j}		<0.001+*		<0.001+*		<0.001+*
Desirable (M <90 F <80 cm) (n = 253)	Ref	-	Ref	-	Ref	-
High (M 90-<102 F 80-<88 cm) (n = 346)	2.30 (1.55 – 3.42)	<0.001*	2.43 (1.60 – 3.68)	<0.001*	2.44 (1.56 – 3.82)	<0.001*
Very high (M ≥102 F ≥88 cm) (n = 313)	3.15 (2.12 – 4.69)	<0.001*	3.21 (2.07 – 4.97)	<0.001*	3.00 (1.87 – 4.80)	<0.001*
History of cardiovascular disease						
Yes (n = 95)	1.48 (0.95 – 2.29)	0.080			1.06 (0.63 – 1.78)	0.825
No (n = 820)	Ref	-			Ref	-
History of strokeⁱ						
Yes (n = 35)	0.57 (0.29 – 1.12)	0.105			0.76 (0.33 – 1.74)	0.528
No (n = 878)	Ref	-			Ref	-
Lipid profile						
Total cholesterol (TC) ^k	0.40 (0.33 – 0.48)	<0.001*			-	-
High Density Lipid cholesterol (HDL-c) ^k	0.27 (0.18 – 0.40)	<0.001*			0.28 (0.17 – 0.48)	<0.001*
Low Density Lipid cholesterol (LDL-c) ^l	0.43 (0.35 – 0.53)	<0.001*			0.43 (0.34 – 0.54)	<0.001*
Triglycerides ^l	1.17 (0.98 – 1.40)	0.074			0.73 (0.54 – 0.97)	0.033 [#]

*P-value≤0.0125 indicating statistically significant association between variable and T2DM.

[#]P-value<0.05 but P-value>0.0125 indicating that the association between variable and T2DM did not meet the significance level for multiple testing.

^aModel 1 included age (40-65 years old and >65 years old), gender (men, women), ethnicity (Chinese, Malay, Indian, others), education levels (primary school and below, secondary school and above), employment status (yes, no), living in rental housing (yes, no) and type of housing (private housing, 1-3 room and 4-5 room public housing).

^bModel 2: Model 1 plus cigarette smoking (past or current smoker, never smoked before), physical activity (high levels, low levels), dietary habits in the past month (dining at hawker center, never dined at hawker center) and dietary quality (poor, good).

^cModel 3: Model 2 plus waist circumference (desirable, high, very high).

^dModel 4: Model 3 plus history of heart disease (yes, no), history of stroke (yes, no), lipid profile (HDL-c, LDL-c, triglycerides).

^eType 3 P-value was computed for categorical variables with >2 categories (ethnicity, unweighted composite SES score, body mass index [BMI] and waist circumference) and indicated with a “+”.

^f13 missing value due to non-response.

^g4 missing value due to non-response.

^h1 missing value due to non-response.

ⁱ2 missing values due to non-response.

^j3 missing values due to non-response.

^k9 missing values due to non-response.

^l15 missing values due to non-response.

Supplementary Table 3. Associations between participants' characteristics, unweighted composite SES score and risk of having Type 2 Diabetes Mellitus (T2DM) among patients with uncontrolled hypertension

Variables	Univariate analysis		Multivariate Model 1 ^a		Multivariate Model 2 ^b		Multivariate Model 3 ^c		Multivariate Model 4 ^d	
	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Age										
40-65 years (n = 467)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
>65 years (n = 448)	0.75 (0.56 – 0.99)	0.045 [#]	0.75 (0.54 – 1.03)	0.078	0.74 (0.54 – 1.03)	0.078	0.80 (0.57 – 1.12)	0.206	0.79 (0.55 – 1.14)	0.214
Gender										
Male (n = 467)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Female (n = 448)	0.92 (0.69 – 1.21)	0.563	0.81 (0.60 – 1.10)	0.193	0.78 (0.55 – 1.09)	0.157	0.63 (0.44 – 0.91)	0.014 [#]	1.04 (0.69 – 1.56)	0.852
Ethnicity^e										
		<0.001+*		<0.001+*		<0.001+*		<0.001+*		0.003+*
Chinese (n = 679)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Malay (n = 120)	1.82 (1.21 – 2.72)	0.004*	1.72 (1.12 – 2.62)	0.012*	1.60 (1.04 – 2.46)	0.033 [#]	1.41 (0.91 – 2.20)	0.123	1.46 (0.89 – 2.39)	0.126
Indian (n=84)	3.46 (2.18 – 5.51)	<0.001*	3.62 (2.25 – 5.84)	<0.001*	3.47 (2.12 – 5.65)	<0.001*	3.09 (1.86 – 5.13)	<0.001*	2.51 (1.46 – 4.30)	0.001*
Others (n = 32)	0.76 (0.32 – 1.79)	0.538	0.87 (0.36 – 2.07)	0.754	0.86 (0.35 – 2.08)	0.747	0.67 (0.27 – 1.63)	0.385	0.62 (0.24 – 1.59)	0.321
Unweighted composite socioeconomic (SES) score^{e, f}										
		0.398+		0.061+		0.130+		0.093+		0.193+
Low SES (n = 185)	1.28 (0.83 – 1.89)	0.190	1.26 (1.08 – 2.53)	0.019 [#]	1.54 (1.00 – 2.38)	0.048 [#]	1.63 (1.05 – 2.53)	0.029 [#]	1.53 (0.94 – 2.47)	0.081
Medium SES (n = 342)	1.45 (1.05 – 1.99)	0.825	1.15 (0.81 – 1.62)	0.427	1.11 (0.78 – 1.57)	0.536	1.19 (0.84 – 1.70)	0.319	1.09 (0.74 – 1.60)	0.658
High SES (n = 371)	Ref	-	Ref	-	Ref	-	Ref	-	Ref	-
Cigarette smoking										
Former or current smokers	1.15	0.391			0.98	0.926	0.98	0.933	0.95	0.817

(n = 203)	(0.83 – 1.61)		(0.66 – 1.44)		(0.66 – 1.45)		(0.62 – 1.45)	
Never smoked (n = 712)	Ref	-	Ref	-	Ref	-	Ref	-
Physical activity								
Low levels (n = 746)	1.50	0.036 [#]	1.41	0.091	1.26	0.254	1.05	0.826
	(1.02 – 2.21)		(0.94 – 2.10)		(0.84 – 1.90)		(0.68 – 1.61)	
High levels (n = 169)	Ref	-	Ref	-	Ref	-	Ref	-
Dietary habits in the past month^g								
Dining at hawker center (n = 403)	0.77	0.079	0.85	0.313	0.83	0.252	0.83	0.294
	(0.58 – 1.03)		(0.62 – 1.16)		(0.60 – 1.14)		(0.59 – 1.17)	
Never dined at hawker centre (n = 511)	Ref	-	Ref	-	Ref	-	Ref	-
Dietary quality								
Poor (n = 171)	1.33	0.103	1.33	0.088	1.32	0.141	1.29	0.206
	(0.94 – 1.89)		(0.92 – 1.93)		(0.91 – 1.93)		(0.89 – 1.94)	
Good (n = 744)	Ref	-	Ref	-	Ref	-	Ref	-
Body mass index (BMI)^{e, h}								
Underweight and normal ($<23 \text{ kg/m}^2$) (n = 202)	Ref	$<0.001+^*$						
Overweight ($23-27.5 \text{ kg/m}^2$) (n = 383)	1.56	0.029 [#]						
	(1.04 – 2.32)							
Obese ($\geq 27.5 \text{ kg/m}^2$) (n = 328)	2.15	$<0.001^*$						
	(1.44 – 3.22)							
Waist circumference^{e, i}								
Desirable (M <90 F <80 cm) (n = 253)	Ref	-			Ref	-	Ref	-
High (M $90-102$ F $80-88$ cm) (n = 346)	2.30	$<0.001^*$			2.37	$<0.001^*$	2.95	$<0.001^*$
	(1.55 – 3.42)				(1.57 – 3.57)		(1.85 – 4.71)	
Very high (M ≥ 102 F ≥ 88 cm) (n = 313)	3.15	$<0.001^*$			3.14	$<0.001^*$	2.95	$<0.001^*$
	(2.12 – 4.69)				(2.03 – 4.86)		(1.85 – 4.71)	
History of cardiovascular disease								

Yes (n = 95)	1.48 (0.95 – 2.29)	0.080	1.01 (0.60 – 1.69)	0.955
No (n = 820)	Ref		Ref	-
History of stroke^h				
Yes (n = 35)	0.57 (0.29 – 1.12)	0.105	0.78 (0.35 – 1.77)	0.566
No (n = 878)	Ref	-	Ref	-
Lipid profile				
Total cholesterol (TC) ^j	0.40 (0.33 – 0.48)	<0.001*	-	-
HDL cholesterol (HDL-c) ^j	0.27 (0.18 – 0.40)	<0.001*	0.29 (0.17 – 0.49)	<0.001*
LDL cholesterol (LDL-c) ^k	0.43 (0.35 – 0.53)	<0.001*	0.42 (0.34 – 0.54)	<0.001*
Triglycerides ^k	1.17 (0.98 – 1.40)	0.074	0.74 (0.55 – 0.99)	0.042 [#]

*P-value≤0.05 indicated statistically significant association between variable and T2DM.

[#]P-value<0.05 but P-value>0.0125 indicating that the association between variable and T2DM did not meet the significance level for multiple testing.

^aModel 1 included age (40-65 years old and >65 years old), gender (men, women), ethnicity (Chinese, Malay, Indian, others) and unweighted composite SES score (low SES, medium SES, high SES).

^bModel 2: Model 1 plus cigarette smoking (past or current smoker, never smoked before), physical activity (high levels, low levels), dietary habits in the past month (dining at hawker center, never dined at hawker center) and dietary quality (poor, good).

^cModel 3: Model 2 plus waist circumference (desirable, high, very high).

^dModel 4: Model 3 plus history of heart disease (yes, no), history of stroke (yes, no), lipid profile (HDL-c, LDL-c, triglycerides).

^eType 3 P-value was computed for categorical variables with >2 categories (ethnicity, unweighted composite SES score, body mass index [BMI] and waist circumference) and indicated with a “+”.

^f17 missing value due to non-response.

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^h2 missing values due to non-response.

ⁱ3 missing values due to non-response.

^j9 missing values due to non-response.

^k15 missing values due to non-response.