PREVALENCE OF UNDIAGNOSED DIABETES AND ITS ASSOCIATED FACTORS AMONG URBAN POPULATIONS IN MALAYSIA: THE NATIONAL HEALTH AND MORBIDITY SURVEY 2019

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Introduction

- Diabetes is a severe global health problem.
- The prevalence of diabetes is increasing worldwide.
- Undiagnosed diabetes may have a major impact on public health problem because these individuals are untreated and at risks of long-term complications.

Objective

This study is to determine the prevalence of undiagnosed diabetes and its associated factors among the urban population in Malaysia.

Methodology

- A sub-analysis of secondary data from the National Health and Morbidity Survey 2019, a cross-sectional study involving 6376 respondents with diabetes was conducted.
- Structured and validated questionnaires with face-to-face interviews were used to obtain data from selected respondents aged ≥ 18 and above.
- Undiagnosed diabetes was defined as one who was not known to have diabetes and had a fasting capillary blood glucose (FBG) of ≥ 7.0 mmol or a random blood glucose ≥ 11.1 mmol/l.
- Multiple logistic regression analyses were conducted to identify factors related to undiagnosed diabetes among respondents.

Results

- The overall prevalence of undiagnosed diabetes among urban respondent was 8.5% (95% CI:7.4,9.8) (n=1403).
- The prevalence of undiagnosed diabetes in urban area was higher among male (8.8%), 40-59 years (10.8%), Indians (12.8%), no formal education (11.3%), widow (er)/divorcee (11.6%), not working (8.8%), non-smokers (8.6%), non-drinker (8.8%), inactive (8.6%), overweight and obese (10.9%), high cholesterol (11.9%) and hypertension (11.2%) (Table 2).
- Multiple logistic regression analyses revealed that ethnic group Chinese aOR= 0.65; 95% CI: 0.43, 0.98); Other Bumiputera aOR= 0.45; 95% CI: 0.28, 0.72), overweight and obese aOR= 1.50; 95% CI: 1.17, 1.92) and hypercholesterolemia aOR= 1.55; 95% CI: 1.19, 2.02) were associated with undiagnosed diabetes (Table 3).

Table 1: Socio-demographic characteristics of the respodents (N=6,376)

Socio-demographic characteristic		n	Percentage (%)
Gender	Male	2924	45.9
	Female	3452	54.1
Age group	18 - 39	2809	44.1
	40 - 59	2257	35.4
	60 years and above	1310	20.5
Ethnicity	Malay	3790	59.4
	Chinese	1122	17.6
	Indian	534	8.4
	Other Bumiputeras	513	8.0
	Others	417	6.5
Education level	No formal education	266	4.2
	Primary education	1170	18.4
	Secondary education	3061	48.2
	Tertiary education	1848	29.1
Marital status	Single	1366	21.4
	Married	4409	69.1
	Widow(er)/Divercee	601	9.4
Occupational status	Employed	3793	59.5
	Unemployed	2578	40.5

Table 2: Prevalence of Undingosed Diabetes Among urban Adults in Malaysia by Socio-Demographic Characteristic

Socio-demographic characteristic	Unweighted Count	Estimated Population	Prevalence (%)	95% Confidence Interval Lower	95% Confidence Interval Upper	p-value*
Overall	659	1418708	8.5	7.4	9.8	
Gender						
Male	310	750547	8.8	7.3	10.6	0.500
Female	349	668161	8.3	7.1	9.5	
Age group						
18 - 39	226	623095	6.8	5.5	8.4	<0.001*
40 - 59	284	552636	10.8	9.1	12.8	
60 years and above	149	242977	10.4	8.3	13.1	
Ethnicity						
Malay	434	790864	9.8	8.4	11.5	0.012
Chinese	90	290373	6.5	4.8	8.8	
Indian	71	152369	12.8	7.7	20.6	
Other Bumiputeras	29	59557	4.7	3.2	7.0	
Others	35	125545	7.5	4.6	12.0	
Education Level						
No formal education	29	71035	11.3	6.4	19.2	0.087
Primary education	144	283397	10.0	7.7	12.9	
Secondary education	337	739201	9.1	7.6	10.8	
Tertiary education	149	325075	6.7	5.1	8.7	
Marital status						
Single	81	284897	6.1	4.5	8.2	0.005*
Married	498	1006814	9.3	7.9	10.9	
Widow(er)/Divercee	80	126997	11.6	8.3	15.9	
Occupational status						
employed	380	897552	8.4	7.0	10.0	0.611
unemployed	278	519307	8.8	7.5	10.4	
Smoking						
Smoker	120	290175	8.3	6.5	10.6	0.770
Non-smoker	536	1124141	8.6	7.5	10.0	
Alcohol Drinker						
Drinker	44	130523	6.5	4.0	10.3	0.187
Non-drinker	615	1288186	8.8	7.7	10.1	
Physical Activity						
Active	471	1025440	8.4	7.2	9.9	0.889
Inactive	179	364526	8.6	6.9	10.7	
BMI						
Underweight and normal	213	512710	6.6	5.4	8.2	<0.001*
Overweight and obese	415	846328	10.9	9.3	12.6	
Hypercholesterolemia						
High cholesterol	386	751343	11.9	10.2	13.8	<0.001*
Normal	273	667365	6.5	5.3	7.9	
HPT						
Yes	294	545490	11.2	9.5	13.2	<0.001*
No	365	873218	7.4	6.2	8.9	

Table 3: Factor Associated of with Undignosed Diabetes among urban Adult in Malaysia

Socio-demographic characteristic	Crude OR — OR	Crude OR — 95% Confidence Interval Lower	Crude OR — 95% Confidence Interval Upper	Crude OR — p-value	Adjusted OR — aOR	Adjusted OR — 95% Confidence Interval Lower	Adjusted OR — 95% Confidence Interval Upper	Adjusted OR — p-value*
Gender								
Male	1.074	0.873	1.320	0.500	1.151	0.907	1.460	0.247
Female	1.00				1.00			
Age group								
60 and above	1.600	1.148	2.229	0.006	0.996	0.625	1.588	0.986
40 - 59	1.668	1.290	2.156	0.000	1.183	0.844	1.66	0.328
18 - 39	1.00				1.00			
Ethnicity								
Others	0.745	0.435	1.276	0.283	0.763	0.437	1.333	0.341
Chinese	0.640	0.443	0.925	0.018	0.648	0.427	0.982	0.041*
Indians	1.346	0.745	2.432	0.324	1.288	0.683	2.428	0.433
Other Bumiputera	0.452	0.287	0.711	0.001	0.451	0.282	0.721	0.001*
Malays	1.00				1.00			
Education Level								
No formal education	1.788	0.951	3.359	0.071	1.988	0.972	4.065	0.060
Primary education	1.556	1.039	2.331	0.032	1.429	0.909	2.247	0.122
Secondary education	1.396	1.010	1.930	0.044	1.273	0.928	1.746	0.134
Tertiary education	1.00				1.00			
Marital status								
Widow widower divorce	2.011	1.218	3.319	0.006	1.44	0.818	2.534	0.206
Married	1.570	1.123	2.195	0.008	1.269	0.846	1.904	0.248
Single	1.00				1.00			
Occupational status								
Not working	1.063	0.840	1.344	1.063	0.972	0.743	1.274	0.838
Working	1.00				1.00			
Physical Activity								
Inactive	1.020	0.768	1.356	0.889	1.075	0.784	1.472	0.653
Active	1.00				1.00			
BMI								
Overweight and obese	1.709	1.340	2.180	0.000	1.503	1.175	1.924	0.001*
Underweight and normal	1.00				1.00			
Hypercholesterolemia								
High cholesterol	1.946	1.517	2.497	0.000	1.552	1.194	2.017	0.001*
Normal	1.00				1.00			
HPT								
Yes	1.577	1.240	2.005	0.000	0.972	0.690	1.369	0.869
No	1.00				1.00			

Highlight in yellow - significant different at α = 0.05.
Analysis was done using complex sample logistic regression analysis. Classification table (91.2%) were used to check model fitness.

Discussion

- This study showed that the prevalence of undiagnosed diabetes among urban respondents was 8.5% (95% CI:7.4,9.8) (n=1403).
- Our study recorded a relatively higher prevalence of undiagnosed diabetes among urban respondent compared to a similar population in Iranian (5.1%) [1] and Ethiopia (6.2%) [2] but lower than Ghana at 9.4% [3] and Germany 9.7% [4]
- These undiagnosed diabetes in Malaysia could be due to lack of awareness of diabetes symptoms and the necessity of early health screening.
- There were significant associations between undiagnosed diabetes among adults with overweight, obese and hypercholesterolemia which concurred with finding from studies in Iranian[1] Ethiopia[2] and Ghana[3]
- Our study also showed significant associations between undiagnosed diabetes with ethnic among Chinese and other Bumiputera this is similar with previous study NHMS 2006 and 2011 but with difference ethnic. [5]
- In the Malaysian context, this may be attributed to differences in the food consumption pattern, dietary behavior, lifestyle and genetic susceptibility between the three major races in Malaysia

Conclusion

- This study showed the prevalence of undiagnosed diabetes among the urban population in Malaysia remains high
- This study also found the fact that risk factors like ethnic group, overweight and obese and cholesterol were associated with undiagnosed diabetes.
- Appropriate actions, such as creating community awareness about screening regular blood sugar, are crucial, especially among young adults, to prevent more complications of this disease.

Acknowledgements

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