

# 10-year risk for cardiovascular diseases using the WHO prediction chart: findings from the National Health and Morbidity Survey 2019

Halizah Mat Rifin<sup>1</sup>, Mohd Azahadi Omar<sup>2</sup>, Kim Sui Wan<sup>1</sup>

<sup>1</sup>Institute for Public Health, National Institutes of Health, Ministry of Health

<sup>2</sup>Biostatistic & Repository Data Sector, National Institutes of Health, Ministry of Health



## Introduction

Cardiovascular risk remains a pressing global health concern, affecting millions of people worldwide. In Malaysia, the prevalence of cardiovascular diseases has witnessed a concerning surge and poses a significant challenge to public health. The prevalence of cardiovascular disease (CVD) in Malaysia has experienced a notable increase, posing a substantial public health concern. The growing prevalence of cardiovascular disease (CVD) can be attributed to the rapid process of urbanisation, the adoption of sedentary lifestyles, and changes in dietary patterns [1]. Hypertension, diabetes, and high cholesterol levels have been identified as significant risk factors [2] which are further compounded by restricted healthcare accessibility in specific geographical areas [3].

## Results

Among 5,635 respondents included in the analysis, the mean age was 55.22 years.

**Table 1** Background characteristics of Malaysia adult participants (n=5635)

Characteristics	Total (n=5635)	Men (n=2498)	Women (n=3137)
	Mean (SD), n (%)	Mean (SD), n (%)	Mean (SD), n (%)
Age (years)	55.22 (9.3)	55.3 (9.3)	55.1 (9.3)
<b>Education</b>			
No formal education	399(7.1)	95(3.8)	304(9.7)
Primary education	1711(30.5)	718(28.9)	993(31.7)
Secondary education	2710(48.3)	1277(51.4)	1433(45.8)
Tertiary education	795(14.2)	396(15.9)	399(12.8)
<b>Locality</b>			
Urban	3299 (58.5)	1473(59.0)	1826 (58.2)
Rural	2336 (41.5)	1025 (41.0)	1311 (41.8)
<b>Occupational status</b>			
Employed	2866 (50.9)	1780 (71.3)	1086(34.6)
Unemployed	2764 (49.1)	715 (28.7)	2049(65.3)

### Distribution of cardiovascular risk

Table 2 displays the percentage of CVD risk factors in the study population. Almost two-thirds of the respondents had hypercholesterolaemia and more than one-third were hypertensive.

**Table 2** Distribution of Risk factors of CVD among study participants (n=5635)

Risk factors	Total (n=5635)	Men (n=2498)	Women(n=3137)
	n(%)	n(%)	n(%)
Current smoker	991 (24.2)	967(61.0)	24 (0.8)
Body mass index			
Obese	1260 (23.4)	377 (84.2)	883 (29.5)
Non obese	4116 (76.6)	2004(15.8)	2112(70.5)
Hypertension	2180(38.7)	937(37.5)	1243(39.6)
Diabetes	1503(28.0)	654(27.7)	849(28.2)
Hypercholesterolaemia	3383(60.1)	1298(52.0)	2085(66.5)
Physically inactive	1289(22.9)	732(23.5)	557(22.7)

Table 3 provides a summary of the distribution of CVD risk in the population as a whole and stratified by gender. About 41.7%, 30.9% and 22.5% had very low (<5%), low (5% to 10%) and moderate risk (10% to <20%). Meanwhile, 4.9% was classified as having high (20% to <30%) and very high CVD risk (≥30%), which was more common in men (7.3%) than women (2.5%; p <0.001).

**Table 3** Ten-year risk of combined myocardial infarction and stroke (fatal and non-fatal) by gender, using the 2019 WHO cardiovascular disease risk laboratory-based charts for South-East Asia (n=5503)

	Total (n=5503)			Men (n=2434)			Women (n=3069)			P value*
	n	%	CI	n	%	CI	n	%	CI	
<b>Very low risk (&lt;5%)</b>	1932	41.7	39.5 to 43.9	626	33.3	30.3 to 36.5	1306	50.1	47.3 to 52.8	<0.001
<b>Low risk (5%–10%)</b>	1720	30.9	29.2 to 32.7	794	34.0	31.2 to 36.9	926	27.9	25.6 to 30.3	<0.001
<b>Moderate risk (10% to &lt;20%)</b>	1488	22.5	21.0 to 24.1	760	25.4	23.0 to 27.9	728	19.6	17.8 to 21.6	<0.001
<b>High risk (20% to &lt;30%)</b>	316	4.3	3.7 to 5.0	210	6.2	5.2 to 7.5	106	2.4	1.8 to 3.0	<0.001
<b>Very high risk (≥30%)</b>	47	0.6	0.4 to 0.9	44	1.1	0.7 to 1.7	3	0.1	0.0 to 0.2	<0.001

\*P value based on  $\chi^2$  test.

## Material and Methods

This study aimed to assess the distribution of 10-year CVD risk among adults aged 40 to 74 in Malaysia. The study utilised secondary data from the National Health and Morbidity Survey 2019, a national cross-sectional population-based study. Sociodemographic information, smoking status, total blood cholesterol, anthropometric measurements, systolic blood pressure, and fasting blood glucose were collected. The respondents' CVD risk was estimated using 2019 WHO CVD Risk laboratory-based charts for the Southeast Asia region, which predict the 10-year risk of a major cardiovascular event. The charts predicted the 10-year risk of a fatal or non-fatal major cardiovascular event such as myocardial infarction or stroke based on age, sex, BP, BMI, smoking status, total blood cholesterol, and the presence or absence of diabetes mellitus.

The CVD risk is graded using the following categories: age (1: 40–44 years; 2: 45–49 years; 3: 50–54 years; 4: 55–59 years; 5: 60–64 years; 6: 64–69 years; 7: 70–74 years); sex (men and women); smoking (smoker or non-smoker); systolic blood pressure (SBP): 120 mm Hg, 120–139, 140–159, 160–180. The risk categories for 10-year combined acute myocardial infarction and stroke (fatal and non-fatal) are as follows: <5%, 5% to <10%, 10% to 20%, 20% to <30%, and ≥30%.

The data were analysed using IBM SPSS version 21. We present sociodemographic variables using the mean (SD) or median (IQR) for continuous variables and proportion for categorical variables.

## Discussion/ Conclusion

In our study using nationally representative data, we found that two-thirds of adults (72.6%) have low (<10%) CVD risk. Our results are comparable to regional data, which showed that most of the countries in Southeast Asia have a CVD risk level of less than 10% [4]. This is higher than the countries of Central Asia, Eastern Europe, and Oceania, which have fewer people with low CVD risk [4].

It is also important to find that 4.9% of adults (estimated at around 677,533 people projected in 2030) have a high (20% to <30%) and very high (30%) risk of a CVD event within the next 10 years, and it is more common in men (7.3%) than women (2.5%; p <0.001). Based on regional data by the WHO CVD Risk Chart Working Group, there are two countries in the South-East Asia region with an almost 5% risk of having a high (20% to <30%) and very high (30%) risk of a CVD event within the next 10 years [4]. Their study also revealed a similar finding to ours: that the CVD risk in men is higher than in women [4].

There is an urgent need to implement effective interventions for the targeted population to reduce the preventable burden of cardiovascular diseases in Malaysia, as it is projected that around 677,533 people will have a high and very high risk of CVD events within 10 years. Noncommunicable diseases (NCDs) have been identified as the primary cause of 67% of premature deaths in Malaysia, with cardiovascular disease emerging as the major contributor to mortality. Thus, to prevent the burden of cardiovascular diseases, it requires a comprehensive approach that addresses various risk factors, promotes healthy lifestyles, and improves healthcare systems. Premature death devastates economies, healthcare systems, and families, with far-reaching consequences for productivity, equity, and social well-being [5]. It underscores the urgency of holistic interventions to mitigate economic losses, ensure healthcare access, and promote overall societal resilience [6].

## References

- World Health Organization. (2017). Noncommunicable diseases country profiles 2017. Retrieved from [https://www.who.int/nmh/countries/mys\\_en.pdf](https://www.who.int/nmh/countries/mys_en.pdf)
- Institute for Public Health Malaysia. (2019). National Health and Morbidity Survey (NHMS) 2019: Non-Communicable Diseases, Risk Factors & Other Health Problems. Retrieved from [http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2019/4\\_NCD\\_Risk\\_Factors\\_2019.pdf](http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2019/4_NCD_Risk_Factors_2019.pdf)
- Ismail, N., Sulong, S., & Hairi, N. N. (2016). Access to medicines and out-of-pocket payments for primary care: Evidence from household surveys of urban Malaysia. BMC Health Services Research, 16(1), 1-13.
- World Health Organization cardiovascular disease risk charts: revised models to estimate risk in 21 global regions. Lancet Glob Health 2019;7:e1332-45
- Health at a Glance 2021 - OECD Indicators. Retrieved from <https://www.oecd-ilibrary.org/sites/ec2b395b-en/index.html?itemId=/content/component/ec2b395b-en#:~:text=The%20age%20threshold%20of%20premature,oe.cd%2Fmortality>
- World Health Organization. (2022). Noncommunicable diseases. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>