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Introduction

Smoking has been a major contributor to morbidity and mortality worldwide including in Malaysia^{1,2}. Every year, more than 8 million people die from tobacco use worldwide¹. In Malaysia, smoking related-diseases have been identified as the major contributor to disability-adjusted life years and lost of years of life among the Malaysian population². The government of Malaysia through the Ministry of Health and other ministries have introduced numerous anti-smoking measures to prevent and control smoking behaviour in the country^{3,4}. Continuous monitoring of smoking status is essential in evaluating the effectiveness of anti-smoking policies



Objectives

This paper aimed to study the trend in prevalence and sociodemographic factors of smoking in Malaysia.

Methodology

The study utilised data from three national household surveys in Malaysia namely the Global Adult Tobacco Survey (GATS) 2011, the National Health and Morbidity Survey (NHMS) 2015 and the National Health and Morbidity Survey (NHMS) 2019. The surveys adopted a multistage stratified sampling design that could represent population in Malaysia. All the three surveys had the same target population (population aged 15 years and above) and smoking questionnaires. Smoking status was measured based on GATS protocol and definitions⁵. Complex sample design analysis was used to estimate the prevalence and complex multivariable logistic regression was used to identify sociodemographic factors of smoking for all the three surveys

Results

A total of 4250, 21,410 and 11,111 respondents aged 15 years and above participated in GATS 2011, NHMS 2015 and NHMS 2019 respectively with the response rate of 85% to 87%. The prevalence of smoking was 23.1% (95% CI; 21.2, 25.2) in 2011, 22.8% (95% CI; 21.9, 23.8) in 2015 and 21.3% (95% CI; 19.9, 22.8) in 2019. The prevalence was consistently higher in males (40.5% - 43.9%), adults aged 25-44 years (25.4% - 29.0%), Malay (22.6% - 24.7%), other ethnics (30.0% - 35.0%), and among the self-employed (33.7% - 44.6%) (Table 1). Multiple logistic regression analysis of the three surveys showed that the adjusted odds ratio (aOR) of smoking was markedly higher in males, higher in younger and middle age groups, Malays and those with lower education attainment (Table 2).

Discussion / Conclusion

Almost 5 million population aged 15 years and above were smokers in Malaysia. A reduction trend was seen in the prevalence of smoking across almost all sociodemographic characteristics from 2011 to 2019 although the reduction was not statistically significant. Based on the trend, it is still far from achieving the target set by WHO which is 30% reduction in the prevalence of smoking by 2025 from the 2010 baseline. The smoking prevalence in Malaysia is also high compared to in developed countries such as Singapore (14.1%)⁶ and Australia (12.8%)⁷. Although there were slight changes in the aOR of the associated factors, the sociodemographic factors associated with smoking were almost consistent in the three surveys. These findings indicate there is a need to strengthen the current anti-smoking policies in terms of their planning, implementation and evaluation.

Table 1: Prevalence of Smokers by Socio-Demographic Characteristics in Malaysia, 2011, 2015 and 2019

Variables	Count	2011			2015			2019				
		Estimated Population	Prevalence (%)	95% CI	Count	Estimated Population	Prevalence (%)	95% CI	Count	Estimated Population	Prevalence (%)	95% CI
Overall	989	4746505	23.1	21.2 - 25.2	4477	4991458	22.8	21.9 - 23.8	2064	4877697	21.3	19.9 - 22.8
Location												
Urban	453	3357187	22.7	20.20 - 25.4	2373	3515923	21.2	20.1 - 22.4	1172	3,569,016	20.1	18.47 - 21.8
Rural	536	1389318	24.3	22.00 - 26.7	2104	1475534	27.9	26.3 - 29.6	892	1,308,682	25.4	22.55 - 28.5
Sex												
Male	955	4642145	43.9	40.6 - 47.3	4351	4847892	43	41.4 - 44.6	2,007	4,742,418	40.5	37.90 - 43.1
Female	34	104359	1.0	0.70 - 1.6	126	143566	1.4	1.1 - 1.7	57	135,280	1.2	0.90 - 1.8
Age Group												
15-24	138	948904	16.7	13.60 - 20.3	793	1068902	19.5	17.8 - 21.3	313	1,049,684	19.2	15.90 - 22.9
25-44	486	2474247	29.0	26.10 - 32.2	2025	2646668	28.3	26.9 - 29.8	913	2,494,333	25.4	23.10 - 27.7
45-64	303	1105145	22.7	19.80 - 25.9	1325	1085008	20.1	19 - 21.3	664	1,126,643	20.0	18.20 - 22.1
65+	62	218209	15.0	11.20 - 19.9	334	190879	11.4	9.9 - 13.3	174	207,037	10.3	8.20 - 12.5
Ethnicity												
Malays	604	2971076	24.6	22.10 - 27.3	2970	2686374	24.7	23.6 - 25.9	1,422	2,671,001	22.6	21.30 - 24.0
Chinese	89	585541	15.4	12.00 - 19.5	460	719222	14.2	12.7 - 15.8	161	653557	13.7	10.6 - 17.6
Indians	51	376235	19.6	14.20 - 26.4	220	244131	16.5	14 - 19.4	83	155188	11.5	8.50 - 15.4
Other Bumiputras					451	613564	25.8	23.4 - 28.4	230	588,400	22.7	19.40 - 26.4
Others	245	813652	30.0	25.20 - 35.3	376	728167	35	31.3 - 38.9	168	809552	33.5	26.96 - 40.7
Marital Status												
Single	288	1801016	25	21.8 - 28.6	1276	1713143	23.6	21.9 - 25.3	585	1774258	22.9	20.37 - 25.7
Married	612	2762503	23.1	20.8 - 25.6	3022	3141651	23.8	22.8 - 24.9	1386	2977006	21.7	19.97 - 23.6
Widow(er)/Divorcee	81	158033	12.1	8.8 - 16.4	179	136663	9.7	8 - 11.8	93	126433	8.4	6.01 - 11.6
Education Level												
No formal Education	122	406951	19.6	15.7 - 24.2	216	258514	21.5	17.7 - 26	72	169992	15.7	10.99 - 22.0
Primary Education	351	1528387	29.3	25.4 - 33.5	1066	1099148	25.2	23.3 - 27.2	455	1104878	24.3	20.71 - 28.3
Secondary Education	442	2392653	26.8	23.7 - 30.1	2475	2740922	25.8	24.5 - 27.1	1207	2844505	24.6	22.65 - 26.6
Tertiary Education	67	393812	18.5	13.90 - 24.1	637	785981	14.9	13.6 - 16.3	317	727219	13.0	11.10 - 15.2
Occupation												
Government Employee	104	472231	25.5	20.8 - 30.9	431	445344	23.1	20.6 - 25.8	185	283434	18.2	14.68 - 22.3
Private Employee	385	2258905	34.3	30.60 - 38.2	1898	2574645	31.7	29.9 - 33.6	874	2469707	30.1	27.39 - 33.0
Self Employed	364	1385514	44.6	39.3 - 50.0	1348	1220582	35.4	33.2 - 37.6	575	1263487	33.7	29.38 - 38.3
Unpaid worker / Housewife	9	27892			68	61011	2.1	1.5 - 2.9				
Retiree	38	156962	5.4	4.10 - 7.6	168	117467	19.3	16 - 23.1	39	84767	2.3	1.40 - 3.8
Household Income level												
Quintile 1					456	420633	16.5	14.6 - 18.5	433	955640	22.9	20.24 - 25.7
Quintile 2					941	999915	26.8	24.8 - 28.9	455	1104878	25.3	21.78 - 29.2
Quintile 3					1091	1138031	25.1	23.4 - 26.9	398	950099	22.0	19.48 - 24.7
Quintile 4					1017	1221198	25.5	23.7 - 27.4	378	885741	22.2	19.20 - 25.5
Quintile 5					972	1211681	19.3	17.7 - 21.1	354	882270	18.7	15.72 - 22.2

Table 2: Trend of association between socio demographic factors and smoking among adults aged 15 years and above in Malaysia

Variables	2011			2015			2019		
	Adjusted Odds Ratio	Lower	Upper	Adjusted Odds Ratio	Lower	Upper	Adjusted Odds Ratio	Lower	Upper
Location									
Urban	Ref			Ref			Ref		
Rural	0.755	0.576	0.990	1.08	0.93	1.26	1.10	0.88	1.37
Sex									
Male	67.2	43.4	104.2	57.42	41.25	79.94	48.68	30.96	76.53
Female	Ref			Ref			Ref		
Age Group									
15-24	1.047	0.510	2.152	3.10	2.11	4.56	3.18	1.90	5.31
25-44	2.254	1.272	3.993	3.92	2.94	5.24	3.50	2.38	5.13
45-64	1.472	0.860	2.518	2.05	1.56	2.70	2.32	1.64	3.29
65+	Ref			Ref			Ref		
Ethnicity									
Malays	2.747	1.838	4.104	2.43	2.02	2.93	2.17	1.50	3.14
Chinese	Ref			Ref			Ref		
Indians	1.302	0.754	2.247	1.11	0.81	1.53	0.82	0.48	1.40
Other Bumiputras				2.00	1.55	2.59	1.90	1.21	2.97
Others	3.244	2.095	5.022	1.86	1.41	2.47	1.98	1.15	3.40
Marital Status									
Single	1.760	1.220	2.540	1.02	0.84	1.22	0.91	0.66	1.24
Married	Ref			Ref			Ref		
Widow(er)/Divorcee	1.569	0.885	2.782	1.09	0.76	1.57	0.92	0.56	1.51
Education Level									
No formal Education	4.650	2.459	8.793	3.28	2.27	4.75	1.73	0.88	3.39
Primary Education	3.468	2.062	5.832	3.33	2.66	4.16	2.74	1.84	4.07
Secondary Education	2.500	1.597	3.915	2.53	2.14	2.99	2.61	1.99	3.43
Tertiary Education	Ref			Ref			Ref		
Occupation									
Government Employee	2.021	0.000		1.38	1.02	1.88	0.89	0.54	1.46
Private Employee	2.573	0.000		1.80	1.36	2.37	1.46	0.95	2.22
Self Employed	3.488	3.488	3.488	1.87	1.42	2.45	1.52	0.97	2.40
Unpaid worker / Housewife	0.502	0.502	0.502				0.74	0.38	1.45
Retiree	Ref			0.73	0.46	1.14			
Household Income level									
Quintile 1				1.24	0.93	1.64	1.34	0.92	1.96
Quintile 2				1.30	1.07	1.59	0.97	0.67	1.40
Quintile 3				1.22	1.01	1.47	0.90	0.64	1.28
Quintile 4				1.33	1.11	1.59	1.00	0.69	1.45
Quintile 5				Ref			Ref		

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