

# Estimates of Suicide Trends Among Males in the Association of Southeast Asian Nations (ASEAN) From Year 2000 to 2019 Using WHO GHE Data

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## Abstract

This study aimed to analyze the estimated suicide trends among males in the Association of Southeast Asian Nations (ASEAN) countries from year 2000 to 2019 and their relationship with unemployment rates. Age-standardized suicide rate and unemployment data of 10 ASEAN countries (Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam) were analyzed using Joinpoint regression. Results showed that ASEAN countries (except the Philippines and Myanmar) recorded an increase or a plateau in the decline of age-standardized suicide rates in males during the second half of the 2010s. This was in contrast with global trends for males, which has been steadily decreasing. Unemployment was significantly associated with suicide rates. Our study found generally increasing or plateauing suicide trends in ASEAN countries between years 2013 and 2017. However, limitations in data quality highlight the importance of improved suicide surveillance to effectively support prevention efforts.

## Keywords

age-standardized suicide rate, WHO global health estimates, ASEAN, joinpoint

## What We Already Know

1. The global prevalence of suicide.
2. The suicide rates (male to female ratio) of every WHO member state.
3. The correlation between suicide and unemployment rates, globally.

## What This Article Adds

1. A detailed analysis of suicide trend focusing only on males in the ASEAN member states.
2. Insights into possible regional-specific factors associated with suicide rates.
3. Data on the average annual percentage change (AAPC) of age-standardized suicide rates among males in the ASEAN member states.

## Introduction

Understanding trends in suicide rates is important as it serves as a benchmark for future evaluations of suicide prevention strategies. By understanding past trends, stakeholders can assess the effectiveness of past interventions, and adjust future strategies accordingly. The global average for suicide rates has decreased from 14.0 per 100 000 population in year 2000 to 9.0 per 100 000 population in year 2019 (World Health Organization [WHO]).<sup>1</sup> Suicide rates are consistently higher for males than females in every WHO member state, with few exceptions (eg, Grenada in year 2019). This is in contrast with the prevalence of suicidal ideation and suicide attempt, for which females have a higher prevalence.<sup>2</sup> The global age-standardized suicide ratio of males against females is 2.3:1 in 2019. This ratio is wider in high-income countries, and narrower in low- and middle-income countries.<sup>1</sup>

As regional studies can reveal specific trends that might be obscured in broader global analyses, we chose to focus on suicide rates in the Association of Southeast Asian Nations (ASEAN) region. Association of Southeast Asian Nations is a political and economic union comprising 10 culturally and religiously diverse countries or member states in Southeast Asia. The mental health infrastructure varies across ASEAN countries, with some having well-developed systems and others lacking adequate resources. In 2019, suicide rate was the highest in Singapore (9.7 per 100 000) and the lowest in Brunei and the Philippines (2.5 per 100 000).<sup>1</sup> The male to female suicide ratio ranges 6:1 in Thailand to 2:1 in Singapore. Detailed analysis of suicide trend among males during year 2000 to 2019 in this region, and its relationship with unemployment rates, has not been conducted.

Accordingly, our objectives are: (1) to identify significant changes in annual percentage change (APC) of age-standardized suicide rates; (2) to identify overall significance in average annual percentage change (AAPC) of age-standardized suicide rates among males of each ASEAN member state throughout 2000 to 2019; and (3) to examine the relationship between suicide and unemployment rates.

## Methods

### Sample

Ten ASEAN member states (Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam) were included in this investigation. All are WHO member states.

### Data Source

Age-standardized suicide rates during 2000 to 2019 were extracted from the WHO Global Health Estimates.<sup>3</sup> Unemployment rates among the male labor force were extracted from the World Bank Open Data.<sup>4</sup>

## Data Analysis

Joinpoint Trend Analysis<sup>5</sup> (Version 5.0) was used to identify the occurrence of changes in trend. Annual percentage change and AAPC were reported. We employed linear regression to examine the relationship between suicide rate and unemployment rates using IBM SPSS for Windows (Version 27.0). Linear regression was employed in a previous study examining bladder cancer incidence, mortality, Human Development Index, and Gross Domestic Product per capita.<sup>6</sup>

## Results

Table 1 shows the age-standardized suicide and unemployment rates of ASEAN member states from 2000 to 2019. The unemployment rate was positively associated with higher levels of suicide rate ( $r = 0.450$ ,  $r^2 = 0.202$ , adjusted  $r^2 = 0.198$ ,  $P < .001$ ).

Table 2 and Figure 1 provide information on the male age-standardized suicide trends.

## Discussion

With the release of the WHO estimates on age-standardized suicide rates between 2000 and 2019, an opportunity was presented to examine the estimated suicide trends among males in ASEAN countries.<sup>1</sup> We found that seven countries (Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Singapore, and Thailand) recorded a significant AAPC decrease. The decreasing overall trend in suicide is consistent with global trends for males, which had decreased from 16.7 to 12.6 per 100 000 population during the same period.<sup>1</sup> It is possible that as we move away from more traditional gender roles ascribed to males, they are more likely to seek for support or professional help as a preventive strategy toward suicide.

However, two countries (the Philippines and Vietnam) recorded a significant overall increase in AAPC over the past 20 years. A study tracking the suicide trend between the

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**Table 1. Age-Standardized Suicide Rates and Unemployment Rates of 10 Association of South East Asian Nation (ASEAN) Member States.**

Year	Brunei		Cambodia		Indonesia		Laos		Malaysia		Myanmar		Philippines		Singapore		Thailand		Vietnam	
	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)	Suicide rate (per 100,000 population)	Unemployment rate (%)
2000	3.0	4.65	9.2	0.66	5.5	5.69	11.0	2.04	9.1	2.97	8.1	0.58	3.5	3.46	15.2	3.85	16.4	2.44	9.4	2.37
2001	2.4	4.75	9.1	0.78	5.5	5.31	11.0	1.91	8.7	3.39	7.6	0.58	2.9	3.50	13.6	3.68	15.2	2.69	9.5	2.27
2002	2.6	4.89	9.0	0.90	5.4	5.89	10.6	1.78	8.6	3.32	7.5	0.59	3.3	3.43	13.8	5.56	15.4	1.98	9.3	1.92
2003	2.8	4.98	9.0	0.97	5.3	5.71	10.4	1.64	8.9	3.60	7.3	0.58	3.4	3.33	14.2	5.75	15.4	1.62	9.4	1.88
2004	2.9	5.06	9.3	1.04	5.2	6.24	10.3	1.50	8.7	3.40	7.2	0.58	3.4	3.35	13.5	5.59	15.5	1.62	9.6	1.86
2005	3.0	5.17	9.7	1.09	5.0	6.77	10.3	1.35	8.5	3.44	7.0	0.58	3.7	3.55	13.9	5.28	13.4	1.47	9.6	1.94
2006	3.7	5.35	10.0	1.22	4.8	6.58	10.2	1.20	8.2	3.28	7.0	0.58	3.9	3.88	12.5	4.15	13.0	1.30	9.9	2.05
2007	3.0	5.39	10.2	1.32	4.8	6.95	10.0	1.11	7.9	3.11	6.7	0.59	3.3	3.25	11.8	3.61	12.1	1.28	10.3	2.12
2008	2.5	5.47	10.0	0.79	4.6	6.66	9.9	0.99	8.1	3.14	6.3	0.60	3.7	3.54	12.0	3.65	11.7	1.30	10.6	2.05
2009	2.0	5.59	9.7	0.60	4.5	5.74	9.6	0.89	8.2	3.61	6.3	0.61	4.1	3.69	12.6	5.40	11.5	1.52	10.7	1.89
2010	1.7	5.78	9.6	0.75	4.4	5.13	9.4	0.76	7.9	3.29	6.2	0.61	4.3	3.49	10.8	3.92	11.7	0.62	10.7	1.14
2011	3.2	5.92	9.5	0.67	4.3	4.90	9.3	1.17	7.9	2.90	6.1	0.63	5.1	3.44	10.1	3.59	11.6	0.65	10.9	1.09
2012	3.0	5.98	9.3	0.52	4.2	4.28	8.9	1.58	7.8	3.03	6.0	0.64	4.3	3.36	11.6	3.37	11.5	0.62	11.1	1.12
2013	2.1	6.03	9.1	0.37	4.1	4.38	8.9	1.99	7.3	2.96	5.9	0.64	4.4	3.29	12.0	3.48	10.8	0.26	11.1	1.49
2014	1.8	6.14	8.8	0.69	4.0	4.15	8.7	2.42	7.7	2.67	5.8	0.64	4.3	3.52	11.8	3.48	11.4	0.59	11.3	1.40
2015	2.6	7.04	8.8	0.33	3.9	4.56	8.8	2.86	7.9	2.92	5.7	0.68	4.3	2.97	10.0	3.66	12.1	0.59	11.3	1.99
2016	3.9	7.85	8.8	0.60	4.0	4.57	8.8	3.30	8.2	3.14	5.7	0.81	4.2	2.60	9.3	3.79	13.0	0.67	11.2	1.99
2017	5.4	8.82	8.6	0.11	4.0	3.97	8.9	3.73	8.6	3.15	5.3	1.07	4.1	2.46	9.5	4.03	12.8	0.82	11.1	2.03
2018	4.9	7.71	8.6	0.11	4.0	4.52	8.9	3.72	8.7	3.09	5.1	0.64	4.0	2.13	10.4	3.48	13.6	0.79	10.8	1.28
2019	4.2	5.96	8.4	0.12	4.0	3.75	8.6	3.71	9.0	3.17	5.1	0.37	3.9	2.05	12.7	2.94	13.9	0.71	10.6	1.76

**Table 2.** Suicide Trends in Association of South East Asian Nation (ASEAN) Member States From 2000 to 2019.

Brunei					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2014	-1.84	-14.65	2.01
2	2014	2019	19.64*	2.42	68.89
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	3.41	-0.52	6.29
Cambodia					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2003	-0.56	-2.40	0.46
2	2003	2007	3.21*	2.27	4.32
3	2007	2014	-1.98*	-2.75	-1.73
4	2014	2019	-0.98	-1.50	0.34
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	-0.42*	-0.54	-0.29
Indonesia					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2002	-0.91	-2.25	0.14
2	2002	2014	-2.56*	-2.94	-2.44
3	2014	2019	0.16	-0.46	1.07
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	-1.68*	-1.80	-1.56
Lao People's Democratic Republic					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2014	-1.63*	-2.28	-1.42
2	2014	2019	-0.08	-1.11	2.34
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	-1.23*	-1.45	-1.06
Myanmar					
Segment	Lower endpoint	Upper endpoint	APC/AAPC	Lower CI	Upper CI
1	2000	2019	-2.23*	-2.39	-2.067
The Philippines					
Segment	Lower endpoint	Upper endpoint	APC/AAPC	Lower CI	Upper CI
1	2000	2019	1.92*	0.91	2.60
Singapore					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2017	-2.43	-5.89	0.06
2	2017	2019	12.84	-2.36	22.51
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	-0.93*	-2.47	-0.13

(continued)

**Table 2. (continued)**

Thailand					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2004	-1.48	-3.68	3.07
2	2004	2007	-7.33*	-9.1674	-2.95
3	2007	2013	-1.22	-3.00	2.68
4	2013	2019	4.05*	2.20	8.04
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	-0.65*	-1.05	-0.14
Vietnam					
Segment	Lower endpoint	Upper endpoint	APC	Lower CI	Upper CI
1	2000	2005	0.46	-0.30	0.86
2	2005	2008	3.39*	2.47	3.90
3	2008	2015	1.02*	0.67	1.26
4	2015	2019	-1.64*	-2.55	-1.01
Range	Lower endpoint	Upper endpoint	AAPC	Lower CI	Upper CI
Full range	2000	2019	0.68*	0.57	0.77

Abbreviations: AAPC, average annual percentage change; APC, annual percentage change.

\* $P < .05$ .

years spanning 1974 to 2005 in the Philippines found a similar trend of increasing suicide rates among males, and attributed it to persistent poverty and labor competitiveness in the midst of economic development.<sup>7</sup>

With regard to the APC, Brunei, Malaysia, Singapore, and Thailand recorded a joinpoint which marked an upward trend in suicide rates since year 2013 to 2017. In 2014, a plateau in the decrease of suicide rates was recorded in Cambodia, Indonesia, and Lao People's Democratic Republic, reversing the decreasing trend in the 2000s and early 2010s.

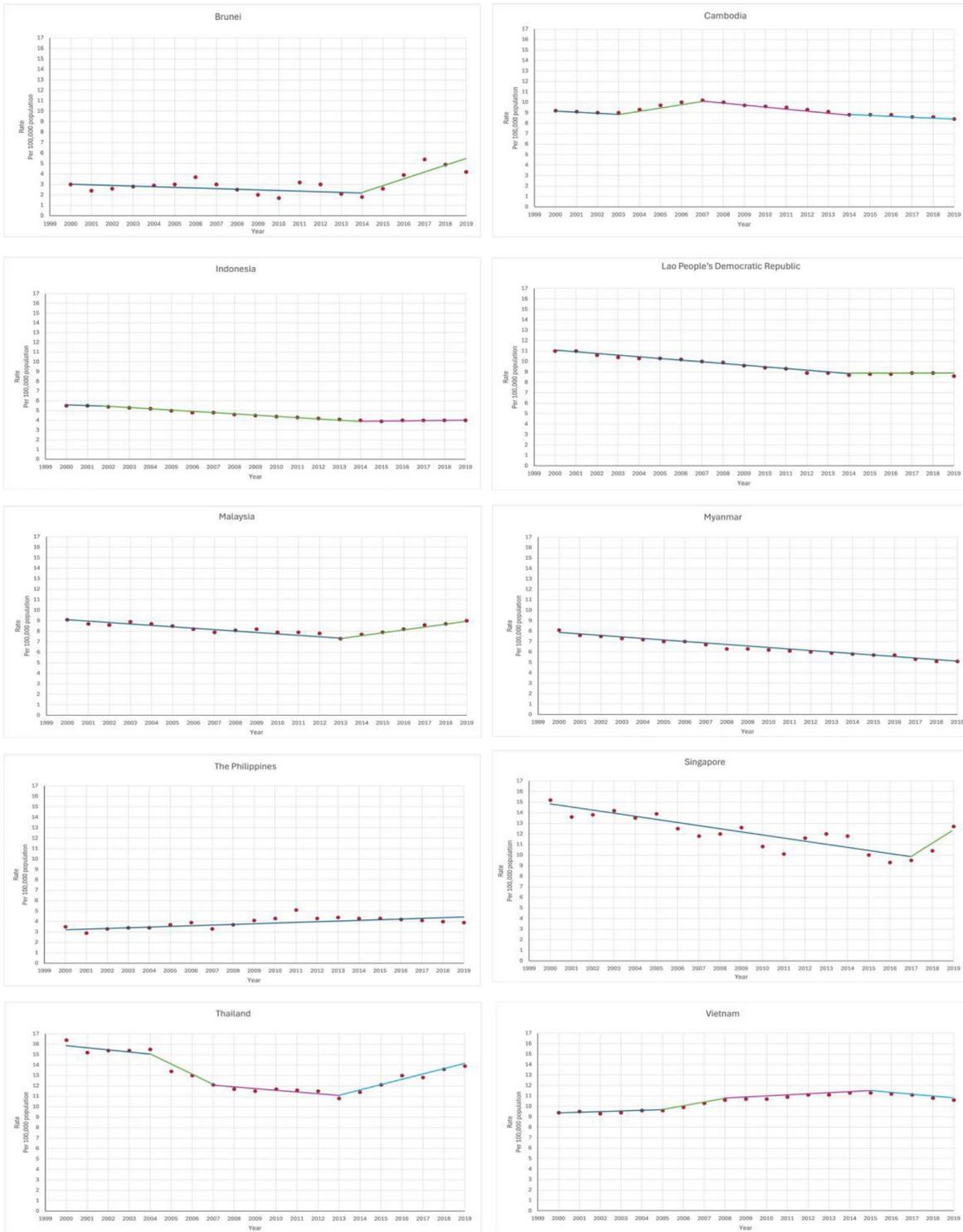
In Vietnam, even though the AAPC recorded an increase, it is worth mentioning that the APC recorded a decrease from 2014 onward, which is in contrast with the increasing trends in Brunei, Malaysia, Singapore, and Thailand during the same period. Governmental efforts in Vietnam, such as "Decision 1215," provided the legal framework for improving the care of people with serious mental illnesses and may have helped in reducing suicide rates.<sup>8</sup>

We found suicide rates were positively correlated with unemployment rates. This is consistent with a global study which found a 20% to 30% elevation in suicide rates in relation to unemployment.<sup>9</sup> Another study found that the association between unemployment and suicide among males is stronger than that of females, possibly due to males being affected worse by poor financial conditions.<sup>10</sup> Generally,

men in ASEAN countries are expected to be the main financial provider for the family, and being unemployed may have negative psychological, practical, and social consequences, such as facing difficulty in meeting daily sustenance needs and being perceived negatively by others.

This study is limited by the use of linear regression to analyze the relationship between suicide rate and unemployment, rather than a lagged design. More studies are needed to understand the uptick in suicide rates in these countries in order for preventive efforts targeting males to be implemented. In addition, data from six countries (Cambodia, Indonesia, Lao People's Democratic Republic, Myanmar, Thailand, Vietnam) were deemed to be very poor,<sup>1</sup> with implications that findings of this paper alone cannot reliably estimate country-level trends.

This should not, however, detract from the key finding of this study which showed that beginning from 2013 to 2017, age-standardized suicide rates for males in seven ASEAN member states had either increased or plateaued. Our focus on ASEAN countries provides valuable insights into possible regional-specific factors affecting suicide rates and supports the development of more gender-targeted strategies for prevention and intervention. Poor suicide data quality in some countries highlights the need for improved suicide surveillance to effectively support prevention efforts.



Legend:  
• Observed age-standardized suicide rate  
 Modelled trend

Figure I. Male suicide rates in the Association of South East Asian Nation (ASEAN) member states between 2000 and 2019.

### Data Availability Statement

Data are available from the corresponding author upon reasonable request. The data sets generated during and/or analyzed during the current study are available from the WHO Global Health Estimates.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Ethics Approval

Ethical approval was not required due to the archival status of the data.

### Consent to Participate

Informed consent was not required.

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