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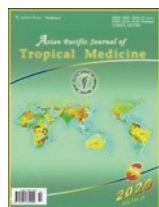
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The COVID-19 pandemic in the ASEAN: A preliminary report on the spread, burden and medical capacities

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ABSTRACT

Objective: To provide preliminary descriptions of the spread, burden and related medical capacity characteristics of the ASEAN countries.

Methods: We utilized the data from four main official databases, including WHO reports, the Statistics and Research of the Coronavirus Disease, and the Southeast Asia Program of the Center for Strategic and International Study. The spread of the COVID-19 pandemic, current burden and the COVID-19 medical response capacities were extracted before April 11, 2020.

Results: As of April 13, 2020, the ASEAN countries reported 19 547 COVID-19 positive cases with 817 deaths (case-fatality rate of 4.2%). Thailand was the first country in the region that reported having the COVID-19 cases, while Laos was the last to report confirmed COVID-19 cases. Durations for the number of deaths to double were between 8-12 days. For the testing and treatment capacities, the number of PCR tests provided to the populations was the highest in Vietnam, followed by Singapore, Malaysia, and Thailand. Meanwhile, the percentage of the population being tested was the highest in Brunei (2.31%), followed by Singapore (1.30%).

Conclusions: A wide range of interventions were taken into practice in response to the outbreak with an effort of curbing the rise of this pandemic. However, special care should not be overlooked as the pandemic is placing a huge impact on the population and becomes increasingly unpredictable. To tackle the spread of the pandemic in the region, the ASEAN countries should work together as one community to provide better responses to future pandemics and other transboundary public health challenges.

Asia; Epidemiology

1. Introduction

The world is battling with the impacts of new coronavirus disease (COVID-19). The World Health Organization (WHO) announced COVID-19 as a pandemic on March 11, 2020. In Asia, China, South Korea, Iran, and Japan were the first nations where the COVID-19 pandemic poses great dangers. Due to the interconnections in terms of trade, economy, tourism, countries in the South East Asian region are being impacted. The Association of Southeast Asian Nations (ASEAN), including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar (Burma), the Philippines, Singapore, Thailand, and Vietnam, was established in 1967 and has accomplished several notable achievements in socio-economic development[1,2]. The ASEAN countries, home to about 650 million people, highly diverse region in terms of geography, political systems, socio-economic development, and health outcomes (Table 1). Given such diversity between its members, however, these ASEAN nations aim toward a community with resources mobility, reducing social disparities, and a non-conflict way of addressing problems together[1]. Nevertheless, these diversities have also driven into the difference in each national response in the fight of the health threats including the COVID-19 pandemic. Like other parts of the world, the ASEAN has been

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KEYWORDS: COVID-19; SARS-CoV-2; ASEAN; South-East

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(<https://ourworldindata.org/coronavirus#how-longdoes-covid-19-last>), and the Southeast Asia Program of the Center for Strategic and International Studies (CSIS) (<https://www.csis.org/>)

Table 1. Selected socio-demographic and health indicators in the ASEAN countries in 2018.

Country	Total population (000s)	Median age of population (years) ^a	Population aged > 65 years (%)	Urban population (%)	Adult literacy rate ^b (%)	Crude birth rate ^c	Crude death rate ^d	Life expectancy at birth	Universal healthcare coverage index ^e	GDP per capita (US\$)
Brunei	442.4	30.4	4.6	77.6	97.1	14.0	3.8	77.5	80	30 668.3
Cambodia	15 981.8	24.3	5.3	23.4	82.5*	23.3*	6.1*	70.6	55	1 539.8
Indonesia	265 015.3	28.8	7.4	55.3	95.7	18.2	6.5	71.2	49	3 923.8
Lao PDR	6 887.1	23.1	4.2	35.0	84.7*	23.9*	6.7*	67.0*	48	2 627.5
Malaysia	32 385.0	28.6	6.5	75.6	94.9	15.8	5.1	75.0	70	11 067.2
Myanmar	53 625.0	27.8	6.1	30.6	75.6*	19.9*	8.9*	65.5*	60	1 440.8
Philippines	106 598.6	24.4	5.2	46.9	96.5*	23.2*	6.5*	69.2*	58	3 086.9
Singapore	5 638.7	40.2	13.7	100.0	97.3	8.8	5.0	83.2	80	64 567.3
Thailand	67 831.6	38.3	12.0	49.9	92.9*	10.1*	7.0*	75.5*	75	7 446.5
Vietnam	94 666.0	30.9	8.9	35.7	94.8	14.6	6.8	73.5	73	2 546.2
ASEAN	649 071.5	29.1	7.5	48.9	NA	NA	NA	NA	NA	4 577.5

Source: ASEAN Statistical Yearbook 2019 & World Health Organization Global Health Observatory Data Repository. NA: not available. ^aEstimated at 2018 from Worldometer; ^bAdult literacy rate refers to 15+; for Brunei Darussalam age 10+; ^cNumber of live births per 1 000 mid-year total population, per 1 000 residents for Singapore; ^dNumber of deaths per 1 000 mid-year total population, per 1 000 residents for Singapore; ^eAdapted from World Health Organization Global Health Observatory Data Repository. The index is based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access in 2015. The index is presented on a scale of 0 to 100. Values greater than or equal to 80 are presented as 80 as the index does not provide fine resolution at high values. ^fData is not available in 2018, data availability was defined by the latest year that had a measurement of indicators.

severely hit by the COVID-19 pandemic. As of April 13, 2020, the ASEAN countries reported 19 547 COVID-19 positive cases and 817 deaths due to the disease[3]. The differences in political systems, socio-economic conditions, and health system capacity have led to greatly different national responses to the COVID-19 pandemic. Given the enormous danger of the COVID-19 and its serious adverse impacts, research on COVID-19 related aspects is important for shaping the next responses to fight against the pandemic. In this paper, we aim to provide preliminary descriptions of the spread, burden and related medical capacity in characteristics of the ASEAN countries. The lessons learned through this fight could be useful for designing appropriate intervention actions both in the region and in other similar settings globally.

2. Materials and methods

2.1. Data source

Data used in this paper were obtained from different sources: the official databases, including the World Health Organization reports [Coronavirus disease (COVID-2019) situation reports: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situationreports>], the Statistics and Research of the Coronavirus Disease (COVID-19)

programs/southeast-asia-program/southeast-asia-covid-19-tracker). All the COVID-19 cases detected before April 11, 2020, were included in our analyses.

2.2. Measurements

In this paper, using available data, we included the following variables as proxies of the spread, burden and medical-related capacity:

The spread of the COVID-19 pandemic in each ASEAN country was described by 1) The first date of the COVID-19 pandemic (when the first or index COVID-19 case was reported); 2) Reporting period (number of days from the first date of the COVID-19 pandemic); 3) The duration (number of days) for the number of confirmed cases to double; 4) The average number of new cases detected per day; 5) The number of new cases detected on the last day, and 6) The highest number of new cases detected per day.

The current burden of the COVID-19 pandemic each ASEAN country was estimated by 1) The cumulative number of cases detected; 2) The total number of deaths; 3) The duration (number of days) for the number of deaths to double; 4) The case fatality rate, and 5) The total number of currently positive (prevalence) cases. The COVID-19 medical response (testing and treatment) capacities in the ASEAN region was preliminarily assessed by 1) The total number of Polymerase Chain Reaction (PCR) tests provided; 2) The percentage of the population tested; 3) The total number of recovered cases, and 4) The recovery rate. The total number of recovery and the recovery rate could be considered as rough proxies for the treatment capacities only as these indicators

were also significantly associated with the patients' other characteristics such as age, disease severity, comorbidities, health-seeking and utilization behaviors, etc.

2.3. Data management and analysis

A research team from Hanoi University of Public Health reviewed and abstracted the data. Data were entered into a computer using Excel software. Descriptive statistics were carried out using Stata 16 software (Stata Corporation). Means of continuous variables, count and proportions of categorical data were calculated.

2.4. Ethical approval

The protocol of this study was approved by the Scientific and Ethical Committee in Biomedical Research, Hanoi University of Public Health.

3. Results

Table 2 describes the spread of the COVID-19 pandemic in the ASEAN region. Thailand was the first country in the region reported having the COVID-19 (index case was reported on January 13, 2020), while Laos was the last to announce it (index case was reported on March 25, 2020). The duration for the number of total confirmed cases to double was shortest in Singapore and Indonesia (8 and 9 days, respectively) and longest in Brunei (24 days). During the reporting period, the average number of new cases detected per day was the highest in Indonesia (96 cases), followed by the Philippines (62 cases) and Malaysia (59 cases). The lowest number of new cases detected per day was found in Laos (1 case) and Myanmar (2 cases). Figure 1 demonstrates the spread of the COVID-19 pandemic in the region.

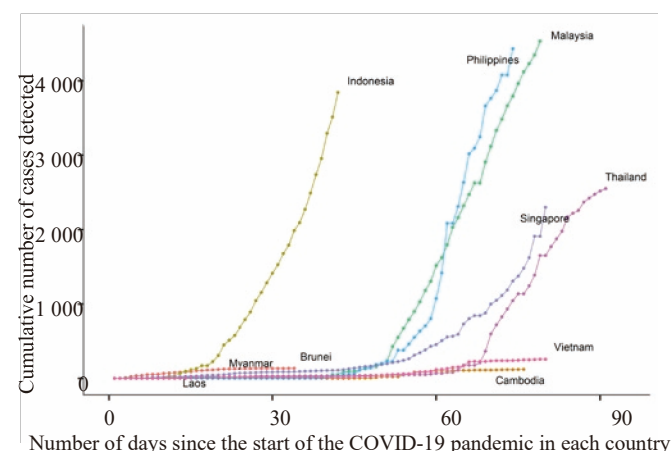


Figure 1. The spread of the COVID-19 pandemic in the ASEAN region.

Table 2 also shows the current burden of the COVID-19 pandemic in the ASEAN region (As of April 13, 2020). The total number of cumulative confirmed COVID-19 cases in the ASEAN region was 19 547 and the number of deaths was 817 (case-fatality rate of 4.2%). Durations for the number of deaths to double were between 8-12 days. The Philippines led the region in terms of the total number of confirmed cases (nearly 5 000 cases), followed by Malaysia (nearly 4 700 cases), and Indonesia (nearly 4 300 cases).

Table 2. The spread, burden of the COVID-19 pandemic and related medical capacity in the ASEAN region (As of 13 April 2020).

Country	The date when the index COVID-19 case reported	Spread				Burden			Medical capacity					
		Reporting duration (No. of days)	Days for the number of confirmed cases to double	Average No. of new cases detected per day on the last day	The highest No. of new cases detected per day	Cumulative No. of cases detected	Total No. of deaths	Days for the number of deaths to double	Case fatality rate(%)	Total No. of currently positive cases	Total No. of test provided	Percentage of the population tested (%)	Total No. of recovery	Recovery rate (%)
Brunei	09/03/2020	34	24	4	0	14	136	1	NA	0.7	9 884	2.31	106	78
Cambodia	28/01/2020	75	21	2	0	35	122	0	NA	0.0	5 768	0.04	77	63
Indonesia	02/03/2020	41	9	103	0	337	4 241	373	9	8.8	27 075	0.01	359	8
Laos	25/03/2020	18	15	1	0	4	19	0	NA	0.0	1 140	0.02	0	0
Malaysia	25/01/2020	78	11	60	0	282	4 683	76	12	1.6	77 491	0.25	2 108	45
Myanmar	24/03/2020	19	11	2	0	6	41	4	NA	9.8	1 406	0.003	2	5
Philippines	30/01/2020	73	11	68	284	666	4 932	315	8	6.4	33 814	0.03	242	5
Singapore	24/01/2020	79	8	32	0	286	2 532	8	11	0.3	72 680	1.30	560	22
Thailand	13/01/2020	90	14	29	28	263	2 579	40	9	1.6	71 860	0.10	1 288	50
Vietnam	24/01/2020	79	19	3	0	19	262	0	NA	0.0	121 821	0.13	145	55
ASEAN	13/01/2020	NV	NV	NV	NV	NV	19 547	817	NV	4.2	427 939	0.01	4 887	25

NA: not available; NV: not valuable.

The numbers of cases were still relatively low in Brunei (136 cases), Cambodia (122 cases), Myanmar (41 cases), Laos (19 cases). Indonesia had the highest number of death (373), followed by the Philippines (315) and Malaysia (76). No death was reported in Cambodia, Laos, and Vietnam. Figure 2 exhibits the mortality speed due to the COVID-19 in the region.

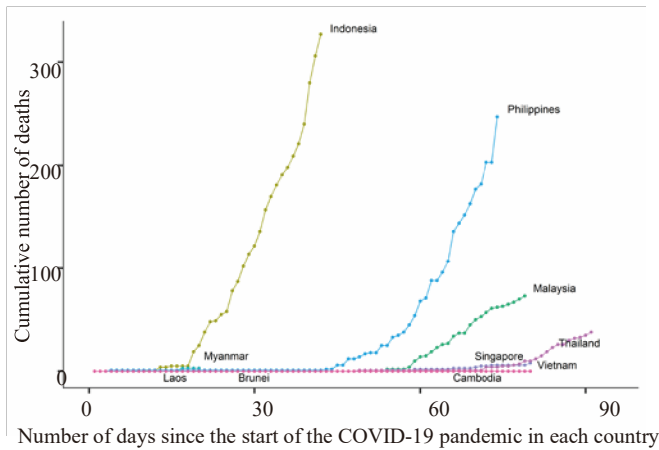


Figure 2. The mortality speed due to the COVID-19 in the ASEAN region.

Results in Table 2 also illustrates the COVID-19 testing and treatment capacities in the ASEAN region. The number of PCR tests for COVID-19 provided to the populations was the highest in Vietnam, followed by the figures in Singapore, Malaysia, and Thailand. The percentage of the population being tested was the highest in Brunei (2.31%), followed by Singapore (1.30%). The figure was very low in Myanmar (0.003%), Indonesia (0.01%), Laos (0.02%) and Philippines (0.03%). The overall recovery rate of the ASEAN was 25%. The recovery rate was the highest in Brunei (78%), followed by Cambodia (63%) and Vietnam (55%) (no death was reported in Cambodia and Vietnam). The recovery rate was low in Laos (0%), Philippines (5%), Myanmar (5%) and Indonesia (8%).

4. Discussion

While the populations in the ASEAN community made up about 8.54% of the total global inhabitants[2], the number of confirmed COVID-19 cases (19 547) and the number of deaths due to the disease (815) in the region accounted for 1.1% and 0.7% of the global figures, respectively[3]. The COVID-19 case-fatality rate of the ASEAN (4.2%) was similar to that of China (4.0%) and lower than the global figure (6.2%). The recovered rate of the ASEAN (25%) was somewhat higher than the global figure (23%). However, the case-fatality rate and recovered rates are also

significantly associated with the patients' other characteristics such as age, disease severity, comorbidities, health-seeking and utilization behaviors, etc.

The differences in the distribution of reported cases which vary from a few to thousands, together with the discrepancy in the political systems, socio-economic development, and health capacities, led to greatly different national responses to the COVID-19 pandemic. However, generally, all ASEAN members applied similar interventions but the difference in the speed of national response and level of the interventions. The sooner and faster the government issued their response to this pandemic and the higher the level of this intervention applied, the smaller the spread of this disease was. Additionally, the efficacy of each national response also somehow depends on the belief and mobilization of their citizens.

A wide range of interventions were taken into practice in response to the outbreak with an effort of curbing the rise of this pandemic. While the 14-day quarantine policy was required in all ASEAN members for some specific areas or among high-risk groups, a national lockdown was issued in some members including Vietnam, Brunei, Laos, and Malaysia[4]. School and workplace closures were banned in almost all nations including Singapore (its policy issued on April 7)[4,5]. However, it should be noted that these policies do not seem to fully apply in reality since some essential departments or factories still operate with a safe working distance[6,7]. The public gathering events are also canceled in all ASEAN members with the difference in the maximum member could gather in each nation. Generally, it varies from 10 to 20 people to create and ramp up social distancing[6-8]. In contrast to these policies, closing public transportation was prohibited in several members such as Vietnam, Malaysia, Thailand or Laos[4]. However, this policy further applied during the national quarantine or under the nationwide curfew only. Also, international travel is completely prohibited throughout the region[4]. Whereas, internal movement restriction is still fairly loose in several countries, particularly Singapore and Brunei where this direct policy is inexistent. Some nations have exceeded strict punishment even shooting for violating their policies such as the Philippines and Malaysia[4]. It, however, doesn't seem to bring to a fruitful result.

When it turns to other strengths and weaknesses of the nation's response, Singapore should be first mentioned because of its successful response compared to other neighbors and global. It could be explained by the one-party control, speed action, excellent health care system, and experiences from the previous SARS

epidemic[4]. Another example is Vietnam where the success came from isolating infected people and tracking down their contacts through the public's surveillance and involvement, and three-level of the healthcare system[4]. On the other hand, in the fight with this unprecedented challenge, other ASEAN members ran into trouble due to their issues such as large religious gatherings in Malaysia, the non-existent public health system in Laos and Myanmar or underestimated or sluggish start the pandemic in Indonesia and the Philippines[4].

These all obstacles postponed or decentralized their response to this pandemic and led to the wide-spreading in the society.

Regarding ASEAN as a group, various meetings were convened in its attempt to combat the pandemic starting from the end of January. ASEAN members also shared information on their latest national information, strategies to combat such unprecedented diseases and the challenges they are faced with[9]. Also, the financial and medical supplies from Singapore and Vietnam were delivered to their neighbors. The regional and global experts, especially from China, Japan, South Korea, were also invited in several meetings to timely share the accurate information, update the techniques and discuss how to deal with the challenges in responding to this pandemic[9,10]. However, these meetings were not led into a practical action beyond the national border.

As this study used secondary data sources, results cannot be considered as more than a snapshot of the spread, burden and medical capacity in characteristics of the ASEAN countries. More detailed data need to be collected and more in-depth analyses need to be performed to give further insights into the topics.

In summary, there were differences in the spread, burden of the COVID-19 as well as in the medical capacities to control the pandemic among the ASEAN countries. However, the ASEAN has acted as one group to tackle the spread of the pandemic in the region. Further proactive and comprehensive collaborative actions would result in more effective responses to the pandemic in the coming times.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

Authors' contributions

HMV developed theoretical formalism and conceptualization. KLQ performed the analytic calculations and formal analysis. Both

NPTN and TTPT checked the validation of all calculations. HVM, NPTN and TTPT developed and wrote the original draft. DATM, NHV, DR and THTT contributed to review and edit the manuscript.

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