

## Rapid Response and Public Health Measures of COVID-19 Infection Among Asian Countries

### Asya Ülkelerinde COVID-19 Enfeksiyonuna Hızlı Yanıt ve Halk Sağlığı Önlemleri

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#### ABSTRACT

**Objective:** The spread of COVID-19 disease which had been declared as pandemic on 11<sup>th</sup> March 2020 currently already affected 212 countries around the world. Thus, the prevention and control measures are being established at national level thru the combined action of containment and mitigation. The aim of this study, to summarize on the rapid response and the public health measure among the Asian countries.

**Method:** A systematic search was conducted using PubMed and Web of Science which is published in advanced of 29<sup>th</sup> April 2020. The keywords search used 'Rapid response' OR 'public health measures' OR 'public health policies' OR 'preventive measures' AND 'Coronavirus Disease 2019' OR 'COVID-19' OR 'novel coronavirus' OR 'SARS-COV2'. The inclusion criteria were English language articles with the availability of full text.

**Results:** There were 43 articles included in this review. Eleven main domains were identified as the public health measures done among the Asian countries, which are screening, quarantine, isolation, contact tracing, repeated sampling, personal protective equipment, personal hygiene and symptom-based screening, social distancing, movement control, border control and disinfection at public places.

**Conclusion:** The rapid response and public health measures are different from one another of these Asian Countries. Thus, which of the prevention and control are effective and feasible can be applied to the other countries in controlling the spread of COVID-19 disease.

**Key Words:** COVID-19, SARS-COV2' Rapid Response, Public Health measure and Asian Countries

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#### ÖZET

**Amaç:** 11 Mart 2020'de salgın olarak ilan edilen COVID-19 hastalığının yayılması halihazırda dünya çapında 212 ülkeyi etkilemiştir. Böylece önleme ve kontrol önlemleri, sınırlama ve hafifletmenin birleşik eylemi yoluyla ulusal düzeyde oluşturulmaktadır. Bu çalışmanın amacı, Asya ülkeleri arasındaki hızlı tepki ve halk sağlığı ölçüsünü özetlemektir.

**Yöntem:** 29 Nisan 2020'de yayınlanmış olan PubMed ve Web of Science kullanılarak sistematik bir araştırma yapıldı. Anahtar kelime aramasında 'Hızlı yanıt' VEYA 'halk sağlığı önlemleri' VEYA 'halk sağlığı politikaları' VEYA 'önleyici tedbirler' VE 'Coronavirus Hastalığı' kullanıldı 2019 'VEYA' COVID-19 'VEYA' yeni koronavirüs 'VEYA' SARS-COV2 '. Dahil edilme kriterleri tam metin bulunan İngilizce makalelerdir.

**Bulgular:** Bu incelemeye 43 makale dahil edilmiştir. Asya ülkeleri arasında tarama, karantina, izolasyon, temas takibi, tekrarlı örnekleme, kişisel koruyucu ekipman, kişisel hijyen ve semptom bazlı tarama, sosyal mesafe, hareket kontrolü, sınır kontrolü ve halka açık yerlerde dezenfeksiyon gibi onbir ana alan belirlendi.

**Sonuç:** Hızlı müdahale ve halk sağlığı önlemleri bu Asya ülkelerinden farklıdır. Böylece, COVID-19 hastalığının yayılmasının kontrolünde diğer ülkelere önleme ve kontrolün etkili ve uygulanabilir olduğu uygulanabilir.

**Anahtar Sözcükler:** COVID-19, SARS-COV2 'Hızlı Yanıt, Halk Sağlığı önlemi ve Asya Ülkeleri

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## INTRODUCTION

In December 2019, there was the unknown cause of pneumonia that later became an outbreak at Wuhan City, the capital of Hubei province in China. On 7 January 2020, a new strain of coronavirus was isolated at the lower respiratory tract of 4 patients which were the same family of viruses with severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and four human coronaviruses that related to common cold symptoms (1). This virus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which initially known as 2019-nCoV (2). Subsequently, in Feb 2020, the World Health Organization designated as coronavirus disease 2019 (COVID-19) (WHO 2020). Because of cases that were spreading rapidly, the Director-General of WHO had declared COVID-19 as pandemic on 11<sup>th</sup> March 2020(WHO 2020). Thus the situation until 29 April 2020 shown, there are 3 216 808 confirmed cases with recovery 999 231 and total death were 227 906 worldwide (Worldometer 2020). The countries with higher confirmed cases till the same date are the United States, Spain and Italy and the least cases were Caribbean Netherlands, Anguilla and Saint Pierre Miquelon.

The COVID-19 disease patients can be asymptomatic or either with mild to severe symptoms that may need ventilation (6). In a study conducted in China, among 181 confirmed COVID-19 patients outside the Hubei Province, the median incubation period mentioned were 5.1 days (95% CI, 4.5 to 5.8 days). Most of them with 97.5% will start symptoms within 11.5 days (CI, 8.2 to 15.6 days) after been exposed to the possible source of infection (7). In term of transmission, a study reported can occur at the terminal stage or known as presymptomatic transmission (8). On the other hand, the route of infection transmission, namely with contact or droplets from person to person, fomite transmission and as well from the asymptomatic patients(9). Subsequently, the epidemiological characteristics on the basic number ( $R_0$ ) for COVID-19 are 3.28 with a median of 2.79, which is higher than SARS infection (10). The case fatality rate estimation is equally reported in both countries with among the higher confirmed cases, which is China and Italy with a total of 2.3 (11). However, both of these characteristics will be established once the pandemic stabilizes worldwide. It is important to understand the nature of the virus, which later the prompt prevention and control action can be established.

On the other hand, the response of the COVID-19 infection among many countries using the combo action of containment and mitigation in delaying the spread and major surges of infection (12).

Thus, most of the national strategies among the affected countries are enhancing on the public health measure namely, self- isolation and quarantine, contact tracing, personal hygiene, social distancing, cancellation of mass gathering among public events, border and movement control order and disinfection of the public places. This measure may differ from one another due to many contributing factors such as human resources, financial and as well the government support in combating the disease. Thus, in this study, we will summarize on the rapid response and the public health measure among the Asian countries.

## METHODS

*Search methods and strategies*

A narrative literature review was conducted to answer the study objective. The literature search was performed in "PubMed" and "Web of Science" using these following keywords: 'Rapid response' OR 'public health measures' OR 'public health policies' OR 'preventive measures' AND 'Coronavirus Disease 2019' OR 'COVID-19' OR 'novel coronavirus' OR 'SARS-COV2', published 29 April 2020 backward. The inclusion criteria were English language articles with the availability of full text. We excluded any outbreak COVID-19 report in Asia countries.

*Identification and selection of relevant studies*

A total of 696 articles were retrieved from the literature search, and after removed duplicate 664 articles underwent title screening. To identify studies meeting the inclusion criteria, four review authors screened the titles and abstracts of all retrieved records. Eventually, 46 academic publications were included in this analysis. Figure 1 presents a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram showing the process of searching and selecting the research articles.

*Data extraction and management*

After the articles were selected, data were extracted and recorded in an excel spreadsheet. The extraction of data was performed by the same four review authors who conducted the study selection independently, using a structured form that contained study characteristics including the year of publication, the title of the article, name author and the affiliation, author's country, study design, objective and sample size, key findings regarding the response, control and prevention measures, and also lastly authors conclusion.

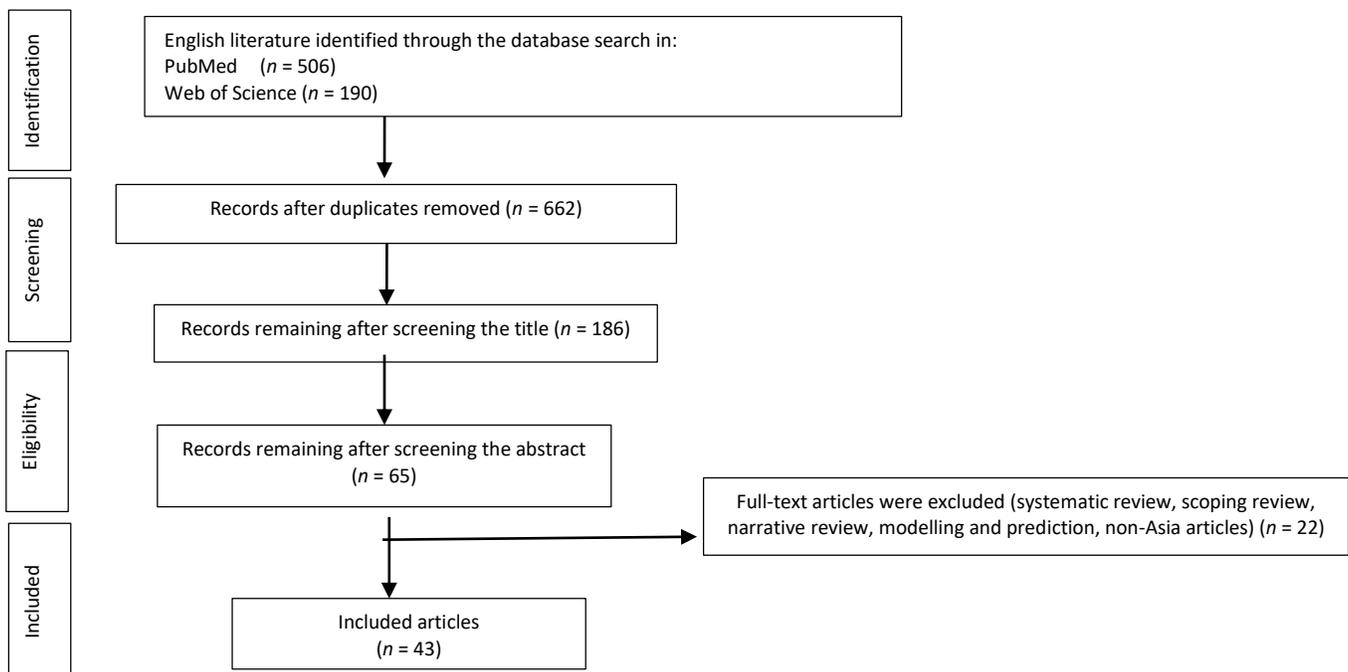


Figure 1. PRISMA flow diagram for the narrative review process

*Summarizing the findings*

Based on the primary research objectives, articles were classified into one of the following two research domains: rapid response and prevention and control. Authors' affiliations were used to categorize the countries of the article origin. The rapid response, prevention and control were summarised into (i) personal hygiene and symptom-based screening, (ii) social distancing, movement control and border control, (iii) disinfection at public places, (iv) screening and contact tracing (v) quarantine and isolation, (vi) second sampling, and (vii) personal protective equipment. All the findings were compared with the response and action taken by Malaysia Government through review of government guidelines (13–18).

**RESULT and DISCUSSION**

Among the 43 articles included in this study, 41% were from China (n=18), followed by South Korean (14.0%, n=6), Singapore (9.3%, n=4), India and Taiwan three articles each and two articles were from Hong Kong. Meanwhile, articles from Indonesia, Iran, Malaysia, Pakistan, Thailand and Vietnam produced were one for each country. In general, all of the articles described their own country experienced and how they respond and control the COVID-19.

**Result Domains***Personal hygiene and symptom-based screening*

Personal hygiene is among the earliest, basic public health measure to prevent and control the outbreak of infectious disease (19). Although previously it has become obsolete, with the current situation of COVID-19, all healthcare authorities and relevant bodies are advocating this basic measure as one of the methods to prevent the spread of the outbreak (20)(21). All countries are promoting, and educating their citizen(22)(23)(24); not only limited to healthcare personnel (25) but also members of the public on proper hygiene and self-care in combating the COVID-19. WHO (2020) through the Interim Guidance, recommend for a frequent and correct technique of hand hygiene, not limited to the use of soap and water only, but as well by using alcohol-based hand rub. However, hand hygiene is not the only measure need to be taken care of, publics are reminded of not touching their face area without cleaning their hand first and proper cough etiquette (25). For healthcare worker, there are measures such as the provision of clean scrub to change before each shift and showering facilities at the end of their shift (26). In Malaysia, the measures that should be taken by the travellers and flight crew that came from overseas are the need to cover their mouth and nose using a tissue whenever cough and sneezing, regular hand washing using soap and water or hand sanitizer, cough etiquette, applied face mask in the public places or close contact with people and always maintained good personal hygiene. There have to monitor any symptoms within 14 days from the days of returning and to seek treatment from the nearby health care facilities as soon as possible (18).

Symptom-based screening is being recommended by most of the countries. Many countries practice body-temperature screening prior entering any facilities (27)(21) or even transportation (28) since fever is easily detectable and quantify, compare to other symptoms, which need cooperation from the individual himself. Hospitals in Singapore are practising twice-daily temperature check for all staffs and proper record monitoring electronically by administrative personnel, with web-based forms for easy entry of symptoms through smartphone (27). However, as the outbreak progress and more findings on the disease reveals a person could be in the incubation period or concealing their status, temperature screening alone is not enough to prevent the transmission of the virus, thus the recommendation of travel restriction with the quarantine of traveller for 14 days (29).

*Social Distancing, Movement Control and Border Control*

Social distancing or physical distancing (30) is among the primary measure being suggested in the initial phase of the outbreak until now. Various modelling studies have shown the impact of social distancing in controlling the outbreak (31)(32). Social distancing not only save lives and prevent the spread of infection but also economically beneficial (32). Taiwan, China, Malaysia and Indonesia's government are advocating social distancing to the public in the effort of controlling COVID-19 outbreak (33)(34)(35)(24)(36).

The social distancing measures range from a simple measure of keeping a distance of at least one metre between people, up to cancellation of various social events, restriction of public transportation and suspension of school activities (37) and to the closure of border or total lockdown (38). In Singapore's healthcare facilities, a different group of staff were assigned to care for COVID-19 patient only (27). Iran's government prohibited all religious ceremonies, including Friday prayers, and all educational institutions were closed (39).

During the initial phase of COVID-19 outbreak, Malaysia's government started to educate the public on social distancing of at least one metre. Specific guideline on social distancing was made known to the public on 12 March 2020 on social distancing measure for schools and childcare, workplaces, assisted or senior living facilities and even between family members. E-learning and working from home were among the suggestions made (5).

Wuhan, China becomes the first city to implement movement control order or lockdown, in which the public was prohibited from being on the street without a valid reason (21). Some of the countries practice total lockdown (21), whereas others implement partial or limited lockdown, in which some of the essential services were allowed to be operated, and people still can go out for their daily essentials (24)(40)(41). In some of the area in China, they imposed a "grid close management". It is a system in which only one person from each household was permitted to go outside of the community every two days, and the foreign individual was strictly prohibited from entering the community. Only one entrance and exit point available, and each person moving in and out will need to go through checkpoints for identification and temperature screening (42).

Upon the spread of COVID-19, many countries have started to close their countries border. With the total lockdown of Wuhan, indirectly the authority has imposed border control for the city. Any unauthorised movements were prohibited (42). In Singapore, short-term visitors with travel in the past 14 days to selected countries or regions (initially mainland China and later expanded to South Korea, northern Italy, and Iran) were denied entry; but, for Singaporean returning from these areas were placed under a mandatory 14-day self-quarantine (23). Thailand too has started to step up their surveillance and perform screening of travellers from affected countries (23).

As for Malaysia, border control was implemented first against flights incoming from Wuhan, which later extended Hubei province, and finally, with the implementation of movement restriction order on 18 March 2020, all international's borders are close (14). Foreign visitors and travellers are prohibited from entering Malaysia, and as for returning Malaysians, they are required to undergo screening and quarantine for 14-days (13). However, Malaysia not imposing total lockdown nationwide, stores selling essential goods are still allowed to operate (14).

*Disinfection at public places*

Although disinfection is quite a common method in public health but based on the search, not many articles touched on this issue. The first case in Vietnam, disinfection was done on the transportation used by the case (43). Although it is proven the used of a biocidal agent such as alcohol and hydrogen peroxide effectively clean the surface against coronavirus, WHO recommended correct and consistent disinfection and environmental cleaning process (44). For Malaysia, the recommended places are places of worship, community centre, public market, public transport station, parks, playgrounds. Other than that, as well the area that been used by public regularly such as bus stop and the pedestrian walkways to the outer wall of the premises (16).

*Screening and Contact Tracing*

Some of the effective public health measures needed to be taken to slow and reduce the transmission of disease and stop the chain of the spread of Covid 9 infection include screening, quarantine, isolation, contact tracing, second sampling and personal protective equipment.

Globally, the current most reliable diagnostic method to diagnose COVID-19 is real-time reverse transcription-PCR (45). The specimens used commonly are the upper respiratory tract specimen that includes both nasopharyngeal and oropharyngeal swab. Those in who are symptomatic and has close contact with positive cases of COVID-19 should be screened using RT-PCR (46).

A study was done in Korea which compared RT-PCR and CT scan result among patients who are COVID-19 pneumonia suspicion, revealed out RT-PCR with initial sensitivity of 83.3% in which out of 36 positive cases, the first sample was taken only 30 cases were positive, 3 cases positive after 2 to 3 days and another 3 were positive after 5 to 8 days (47).

The CT sensitivity of 97.2% in which out of 36 confirmed cases, 35 were had abnormal CT findings and 1 had a normal CT finding. Therefore, screening is crucial, especially those who are highly suspicious of contracting COVID-19 and not to be taken lightly. Rt-PCR should be repeated in highly suspicious cases with strong evidence of epidemiological linkages to avoid misdiagnosis.

Once a positive case is identified, contact tracing is initiated. Health teams will map the patient's movement for the past 14 days before diagnosis. A thorough investigation would be done, and close contacts person identified. A decision was then made whether to admit if the screening test were positive or to self-quarantine for 14 days under strict home surveillance should the result is otherwise.

As for Malaysia, any person who develops symptoms of acute respiratory infection with or without fever AND travelled/resided in a foreign country within 14 days before the onset of illness OR had close contact in 14 days before illness onset with a confirmed case of COVID-19 OR attended an event associated with known COVID-19 outbreak should be screened (13). Upper respiratory tract specimen including both nasopharyngeal and oropharyngeal swab to be taken on presentation and send for RT-PCR. For symptomatic patients, serum serology to be taken at day five until day eight for first serum sample and upon discharged for the second serum sample. For asymptomatic close contact rapid serology test to be taken at Day 13 of home surveillance.

Once a confirmed case is detected, contact tracing is initiated. Closed contact of the confirmed case includes those who work together, travelled together and living in the same household as COVID-19 patient. The contact tracing is done by the Rapid Assessment Team (RAT) and the Rapid Response Team (RRT) on the field (13). They are screened for COVID-19. Should the result is positive, they will be admitted to the hospital. If they do not fulfil the criteria for admission, they are allowed to go home with a strict home surveillance order for 14 days. The team from the health district office will call them twice daily to ask for symptoms. Should they develop symptoms, a sample will be taken and the result to be traced urgently. Serology test is done at day 13 from the last contact with positive cases and to be discharged from home surveillance should IgM is negative (13).

#### *Quarantine and isolation*

The incubation period of the disease is generally 3-7 days, but no longer than 14 days. Globally, countries take 14 days of the quarantine period for those who are asymptomatic but had a history of close contact with positive cases. Example in Singapore, those who returned from high-risk countries need to take 14 days of leave absence (27), and those who are asymptomatic were quarantined for 14 days under active monitoring (23). By practising isolation among the general population, reduction of transmission of COVID-19 could be achieved.

According to guidelines by the Ministry of Health Malaysia, under section 14 of Prevention and Control of Infectious Disease Act 1988 (Act 342), quarantine station is established (13). The station to be used to separate those who are infected or potentially infected any healthy individual, and to restrict their movement to break the chain of transmission until the person is discharged without posing any risk to the public. There are four groups of the person under quarantine centre which are asymptomatic of close contact, a person under investigation but unsuitable for home surveillance at home, mild symptomatic positive cases and recovering positive cases. The quarantine stations could be both in hospitals or non-hospitals setting which are declared and gazetted by the Ministry of Health. Those who are quarantined and isolated are deemed for discharge with three criteria which are the person being asymptomatic at day 14 from the last contact with positive cases and serology test negative at day 13 for those who are asymptomatic close contact (13).

#### *Second sampling*

Second sampling is crucial before allowing positive cases which have been treated to be discharged home. Two consecutive negative results are needed on top of patients' symptoms resolved for 24 hours (48). The two consecutive samples to be taken with 24 hours apart (28). Second sampling on screening those who had close contact but asymptomatic is also vital for early diagnosis and early intervention (47). Malaysia is also practising second sampling, not only for positive cases but also for close contact and patient under investigation (49).

#### *Personal Protective Equipment*

Healthcare workers are the frontliners and the most vulnerable population, constantly exposed to uncertainties in terms of contracting the disease.

The usage of personal protective equipment is vital to protect themselves and prevent transmission in the healthcare setting. They need to be given education and training on how to put on, remove and dispose of the PPE (26). These include the inner and outer gloves, N95 respirator, eye-shield, face shield, goggles and hooded coverall/gown (50). All the medical staffs should be well trained on proper usage, including donning and doffing of PPE (51).

Globally, the world is facing a shortage of PPE. For instance, in Iran, their healthcare workers are in short supply of PPE, putting them at risk of contracting the disease when in contact with patients, especially the high-risk group (52). Meanwhile, in Malaysia, the proper use of PPE was put in the guidelines as it is mandatory to obliged (13). The shortages of PPE in Malaysia were not an issue however, there were logistical challenges in distributing them (53). Many private companies and non-governmental organisations (NGOs) contributed to the PPE, including China that contributed 50,000 PPEs and half a million masks to Malaysia.

#### *Other measures*

In handling outbreaks, it requires a coordinated approach from all authorities, government and non-governmental agencies. For instance, China has coordinated its response throughout all agencies and with funding and resources support from the government. A sum of 66.74 billion RMB with more than 10,000 medical staff nationwide has been deployed to assist in the epidemic prevention and control by February 2020 (40). Besides that, a group of specialised medical experts were made available to diagnose and treat suspected case among healthcare worker (51). A multisectoral coordinated response (15) too, was done by the Government of Malaysia in handling COVID-19 outbreak through its National Security Council, with Ministry of Health as the leading agency (17), with daily input and updates announced to the public through the mass media and social media platform.

#### **CONCLUSION**

As a conclusion, the rapid response and public health measures differ from each of the countries perhaps due to their economy and political will. Since the majority of the countries are still in the early phase of this pandemic, it is difficult to say who's preventive and control measure is the best. We still need to learn from each other in controlling the spread of COVID-19 disease. Effective and feasible control and prevention can be applied to other countries accordingly. Regardless, the integration of this information is important in learning new experience of this novel coronavirus. Lastly, we hope all the containment and mitigation activities can be strengthened at all the countries involved in this pandemic.

#### **Conflict of interest**

No conflict of interest was declared by the authors.

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