



Death from COVID-19 in Thailand 2020-2021

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Abstract

The disease COVID-19 outbreak began in Thailand in May 2020 in Bangkok. And spread too many provinces across the country, resulting in Thailand having 2,361,702 cases and 22,000 deaths (as of January 21, 2022), with the highest number of deaths reported on August 18, 2021, of 312 people. Most of the deaths were aged 70 years or more, accounting for 46.17 percent, followed by the age of 60-69 years, accounting for 22.63% and aged 50-59 years, accounting for 16.94%, respectively, and found that most of the deaths were 84.8% each not vaccinated. From the past studies, it was found that patients infected with the COVID-19 with risk factors are having underlying disease, overweight and smoking behavior are more likely to die than those without those risk factors. And patients vaccinated against COVID-19 are less likely to die than unvaccinated patients. Although vaccines are currently being developed to prevent disease and the production of therapeutic drugs. But still the number of deaths raises continuously, so care, prevention of infection and maintaining health is the best way to deal with the coronavirus disease 2019. Thus, promoting good food intake, exercise and refraining from smoking or unhealthy habits is paramount in the fight against COVID-19.

Keywords: COVID-19; Population; Morbidity rate; Antibody; Infection; Pneumonia

Abbreviations: SARS-CoV-2: Severe Acute Respiratory Syndrome Virus 2; COVID-19: Coronavirus Disease 2019; PUI: Patient under Investigation; NHSO: National Health Security Office.

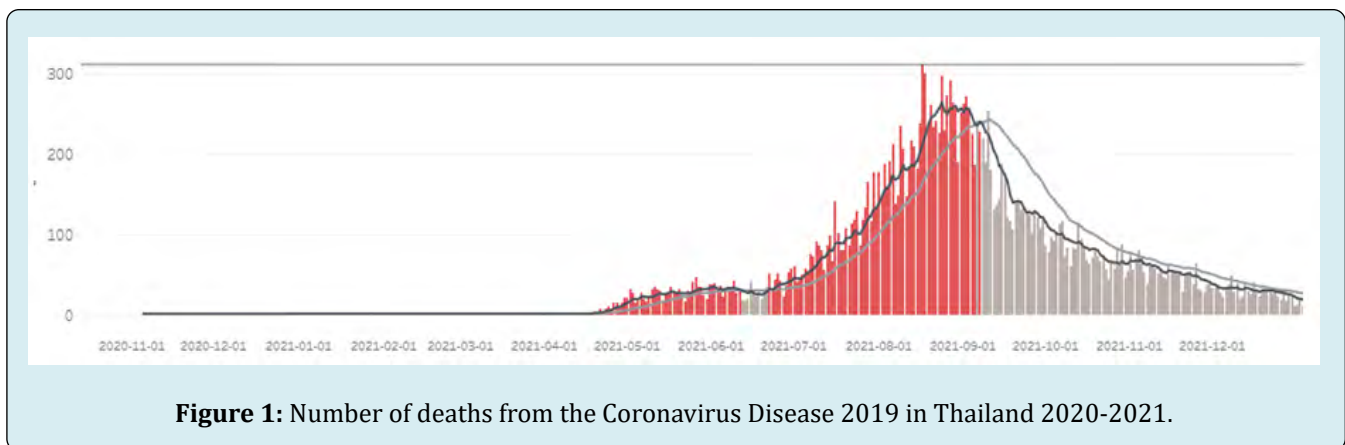
Introduction

COVID-19, a disease caused by a new strain of Corona Virus, is severe acute (SARS-CoV-2). The coronavirus disease 2019 epidemic began in December 2019 in Wuhan, China

and spread around the world, including Thailand [1]. The epidemic in Thailand started in May 2020 from the situation in the boxing stadium Bangkok and started the second round of outbreaks from Burmese migrant workers who travel to find work in Thailand a lot. This has resulted in outbreaks in provinces where these workers work. And the biggest outbreak was a ripple in April 2021 from an entertainment venue in Thonglor. This wave of outbreaks has spread rapidly across the country. Department of Mental Health [2] resulting in a large number of patients and deaths. Bangkok area which is a large crowds and congestion. In addition, during the said period, there was an announcement of the closure of the city in the Bangkok area. Caused the movement of the population out to different provinces causing the infected people to spread out to the provinces [3]. Compared to the

number of deaths, it was found that in 2020 there were only 61 deaths, but in 2021, 21,604 deaths were found, 354 times more than in 2020. In line with the countries continuing rise in the number of cases in the critically ill population [4].

When comparing the number of deaths from the first wave of epidemic (January 01-December 15, 2020) number 60, new wave (December 16, 2020-March 31, 2021) number of 34 cases and April wave (April 1, 2021-August 20, 2021) of 8,492 cases, which accounted for 98.90 percent of the number of deaths, as shown in Figure 1 of all since the start of the outbreak, 76.97% of which were people with underlying diseases such as high blood pressure, heart disease, respiratory disease, chronic diseases and obesity, etc [5].



Outbreaks and Deaths of Coronavirus Disease 2019 Patients

Information about the coronavirus disease 2019 situation, as of January 21, 2022, there are 340,543,962 cases, with deaths a total of 5,570,163 lives, representing a morbidity rate of 1.64%. United States followed by Brazil and India [6]. The situation in Thailand has 2,361,702 cases and 22,000 deaths, representing a mortality rate of 0.93%. Bangkok, Samut Prakan and Samut Sakhon, respectively. The number of deaths in July 2021 and the highest increase was in August and decreases in October 2021, consistent with the epidemic situation in Thailand. With the highest number of deaths reported was on August 18, 2021, with 312 people. The age range of most deaths was 70 years and over, accounting for 46.17%, followed by 60-69 years, accounting for 22.63% and age 50-59 years, representing 16.94%, respectively [7]. The April 2021 outbreak has resulted in an increase in the number of cases as the British B.1.1.7 strain spreads rapidly through family and colleagues. As a result, the spread of the disease is widespread (wide community spreading) and in May 2021, the outbreak of the Indian strain B.1.617 in construction workers in Bangkok and its vicinity began.

Later, the government has measures to temporarily close the camp to control the disease. And prohibiting workers from moving to other provinces. However, some of the migrant workers have slipped back to their homeland. Causing the spread of germs to families and communities until the infection spreads throughout the country. As a result, the health system began to have problems with insufficient medical personnel. Hospital beds are inadequate to support critically ill patients [8].

Symptoms of Coronavirus Disease 2019

The severity of the disease depends on the underlying disease and the patient's immune system. Most people infected with SARS-CoV-2 have a fever. Accounted for 87.9%, followed by dry cough (67.7%), fatigue (38.1%), cough with mucus (33.4%) and breathing difficulties (18.69%), respectively (World Health Organization, 2020). Some severe symptoms can cause complications such as lung, inflammation, pneumonia, kidney failure, and possibly death. Symptoms classified by species of mutation can be classified as follows:

- Delta strain, flu-like, rarely loss of taste, headache, sore

throat, and runny nose.

- Alpha strain, fever, sore throat, aches, cough, chills, headache, runny nose, vomiting, loss of taste, diarrhea, abnormal smell.
- Beta strain, sore throat, conjunctivitis, headache, diarrhea, muscle pain, skin rash, abnormal taste or smell.
- Omicron species, fatigue, aches, muscle pain [9]. In some cases, severe symptoms may include difficulty breathing or shortness of breath. Respiratory failure and septic shock or organ failure. For high-risk groups older than 60 and with co-morbidities, the symptoms are more severe [10]. Pneumonia occurs one to two weeks after onset of symptoms, and 10 percent of these cases require mechanical ventilation and are admitted to the ICU. It is reported that the death rate will increase in the elderly. People with underlying diseases and co-morbid diseases [11].

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Surveillance Screening and Diagnosis of Coronavirus Disease 2019

The Ministry of Public Health has set the criteria for confirmation of patients infected with the novel coronavirus disease 2019 (COVID-19) must have laboratory results for SARS-CoV-2 viral genetic material confirmed by RT-PCR or sequencing or culture, confirmed by a laboratory certified by the Department of Medical Sciences. The three main parts of surveillance are: 1. International communicable disease control checkpoints 2. A group of suspected cases of COVID-19 who meet the criteria for investigating the disease (Patient under Investigation: PUI) and 3. Investigating the disease among people in contact with infected people. At the same time, suspected cases of COVID-19 There are 3 major groups that undergo laboratory examinations:

- PUI group, diagnosed at the discretion of the physician or in the case of a person who has symptoms but does not meet the PUI criteria, but the doctor considers sending a test can be sent for testing as well. The criteria are body temperature of 37.5°C or more, or any of the following respiratory symptoms: cough, runny nose, sore throat, shortness of breath, or difficulty breathing, along with risk factors, and a history of traveling to or from or living in the area. Has contracted coronavirus disease 2019 or is a patient with pneumonia in conjunction with any

of the following, unknown cause? If treatment does not improve within 48 hours, has severe symptoms, or has died without a known cause or lung radiographs are compatible with COVID-19, the PUI criteria may change according to the situation of the disease.

- Groups of high-risk contacts are divided into high-risk close contacts who must collect samples for examination even without symptoms, comprising all family members, medical or public health personnel who are in close contact with patients without wearing PPE that are suitable and people who are clearly close to the patient without wearing a protective mask. As for the touch group that is in the scope to collect samples when having symptoms, it consists of travellers joining the group, public transport passengers sitting in the same row + two front rows + two back rows, flight attendants, patient zones, checkpoint staff, another patient in the same room and a co-worker attending the school meeting with the patient.
- Those suspected to be sick or infected in this group, if they do not meet the PUI criteria, they can still reimburse expenses from the National Health Security Office (NHSO) if the infection is detected and treated at the hospital. But if not detected, symptoms must be quarantined for 14 days [12].

Diagnosis of Death of Coronavirus Disease 2019 Patients

In the case of the patient's death with a test to confirm the infection found to be infected with coronavirus it is considered a natural death. A coroner's autopsy is not required. Criminal Procedure Law Refrain from surgery to examine the body or touch the body put a red label indicating the name or number of the body and identified as infected with the corona virus and can move perform religious ceremonies, except in the case of unexplained death and a history of risk areas (out-of-hospital) or death from acute pneumonia of unknown cause (In a medical setting) The doctor must perform a preliminary autopsy, put on PPE, and collect a lung tissue biopsy in a sterile container with saline. If the 2019 coronavirus is found, inform the investigative team for further investigation. General Communicable Disease Division [13] and the doctor summed up the death certificate a) Severe Pneumonia (due to) b) Covid19 Infection code U07.1 2019 nCoV virus disease as the cause of death [14].

Vaccines

There are 280 vaccines for the prevention of coronavirus disease 2019, of which 100 are currently being studied in humans and 184 are currently being tested on animals. And these vaccines come in a variety of manufacturing technologies, with most vaccines aiming to boost the body's

immune response to Spike protein. It has been found that those who have recovered from COVID-19 have higher levels of antibodies to Spike protein, especially in for RBD (Anti-RBD Antibody). We use RBD antibody levels as a measure of the level of immunity and response to vaccines. The technology for producing vaccines that have been studied in humans is divided into 4 main processes:

- Genetic vaccines are DNA (DNA) or mRNA (mRNA) vaccines such as Moderna and Pfizer.
- Recombinant viral vector vaccines such as AstraZeneca
- A vaccine made from part of the protein (protein subunit vaccine), such as Novavax.
- Inactivated vaccines such as Sinopharm and Sinovac.

Vaccines can prevent severe symptoms of the disease and death. A Sinovac company study found that the vaccine was 50.70 percent effective in preventing disease among all patients and 83.70% effective in preventing moderate and severe disease. It was effective in preventing hospitalization and severe disease by 100.00%. Sinopharm found its efficacy in a phase 3 study in several Middle Eastern countries and China. The effectiveness of preventing hospitalization was 78.72% and prevention was 78.10% [15]. Moderna found that it could reduce the severity of the disease by 100% and reduce the mortality from infection. 100% of COVID-19 and from the latest laboratory data it was found that the immune stimulation was high enough to suppress the strains B.1.17 from England and B.1.351 from South Africa [16]. Five types of vaccines are available in Thailand are Sinovac, Sinopharm, AstraZeneca, Moderna and Pfizer. Thailand had the first dose of vaccination on February 28, 2021.

Previous studies of mortality risk factors

Underlying Diseases

Past studies have shown that people with underlying diseases are at risk for death compared to healthy people. Namely, patients with coronary artery disease (OR = 7.34, 95% CI was 0.23-87.02), hypertension (OR = 5.52, 95% CI = 0.26-65.03) and myocardial infarction (OR = 7.32, 95% CI = 0.28-95.02) risk of death in severe and critically ill COVID-19 patients during hospitalization [19], including diabetes (pooled ORs. = 2.41: 95%CI = 1.05–5.51) Chronic obstructive pulmonary disease (COPD) (pooled ORs = 3.53: 95%CI = 1.79–6.96) and cancer (pooled ORs = 3.04: 95%CI = 1.80–5.14) have a higher risk of death than COVID-19 patients with no history of underlying disease and a study in Italy [20] found that patients with chronic obstructive pulmonary disease were associated with the loss of patients with COVID-19. Statistically significant, patients with COPD were 1.68 times more likely to die than patients without COPD ($p < 0.001$: HR = 1.68 ; 95% CI = 1.28 -2.19) and patients with heart disease are associated with the loss of patients with COVID-19 at no

statistically significant ($p=0.38$), patients with heart disease were 1.09 times more likely to die than patients without heart disease (HR=1.09; 95%CI=0.91-1.29) [21].

BMI

A study in the United States found that BMI was associated with death in coronavirus patients with statistical significance ($p < 0.05$), that is, patients with COVID-19 and BMI of 30 to 39 kg/m² were 1.02 times as likely to die as those with a BMI < 23 kg/m² (OR = 1.02; 95% CI =1.02-1.04) [22], consistent with the study in Iran. BMI is related to death in COVID-19 patients. Statistically significant, that is, patients with COVID-19 and BMI > 35 kg/m² were 4.22 times more likely to die than those with a BMI ≤ 35 kg/m² ($p < 0.001$; OR= 4.22 : 95% CI= 2.01- 8.85) and Rast City Studies Iran [23]. BMI was statistically associated with mortality among patients with COVID-19 highest BMI of 33 kg/m² were 2.49 times more likely to die compared to those with the lowest BMI of 28 kg/m² ($p=0.01$; ORadj=2.49:95%. CI=1.15-5.41) [24].

Smoking

A study of risk factors associated with death in COVID-19 patients. A systematic review and meta-analysis study, collected from the COVID-19 resource centers of The Lancet, found that COVID-19 patients with a history of smoking were significantly associated with hospital deaths, that is, COVID-19 patients with a history of smoking were 1.26 times more likely to die than those without a history of smoking ($p < 0.001$; RR=1.26; 95% CI=1.20-1.32) [25]. In Ethiopia COVID-19 patients with a history of smoking is associated with death statistically significant ($p=0.02$), that is, patients with COVID-19 with a history of smoking were 2.55 times more likely to die compared to those without a history of smoking (ORadj=2.55 ;95%CI=1.15-5.65) [26].

Treatment

Currently, there is a drug to treat coronavirus disease 2019. The first drug called Molnupiravir is manufactured by Merck and Ridgeback BioTerapeutics, and the second drug, Paxlovid, is made by Pfizer. However, these two drugs are new drugs. And still need to study further. And be careful before using it in the clinical practice [27]. In Thailand, favipiravir is used as the main drug to treat COVID-19 patients according to the COVID-19 care guidelines by the Department of Medicine Ministry of Health. This is because the drug is very effective in reducing the viral load. And from the historical analysis of COVID-19 patients in Thailand, it was found that favipiravir treatment is an important factor that reduces the risk of severe cases of COVID-19 [28-31].

Summary

Coronavirus disease 2019 is an emerging infectious disease that has been spreading for 2 years and still can't control the epidemic in many countries around the world, including Thailand. Although vaccines and drugs to treat coronavirus have been produced, deaths are still being reported. Many studies on risk factors in the past have found that risk factors contributing to the death of coronavirus disease 2019 patients are caused by the patient's own health behaviors. Thus, promoting good food intake, exercise and refraining from smoking or unhealthy habits is paramount in the fight against COVID-19.

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