



A Survey of Persisting Symptoms After COVID-19 Infection in Teenage 15 – 18 Years Old in Chiang Rai Municipality School 6

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Abstract

Aim: To report the incident of persisting symptoms after COVID-19 infection in teenage group (15-18 Years old)

Methods: This survey had collected data of persisting symptoms after COVID-19 infection in Chiang Rai Municipality School 6 by questionnaire (Google Form) with 321 samples. The questionnaire consists of eight fields of symptoms and period that the students had been having those symptoms, which are:

1. Changes in sensation (perception), including decreasing of taste; decreasing of olfaction; decreasing in touch sensation; decreasing of hearing; and change in temperature tolerance e.g., Chill easily, heat easily.
2. Changes in Neurological system, which includes recognizing and memorizing ability.
3. Changes in respiratory system, including easily lack of air; and increase in frequency of having air obstruction.
4. Changes in gastrointestinal system, including change in the frequency of defecation; fluctuation of weight; and increase of the frequency of having indigestion.
5. Changes in eyesight
6. Changes in hormones and emotional system, including easily becoming irritable or emotional; more frequent menstruation periods; delayed or less frequent menstruation; increase in quantity of menstrual blood; and easily stressed.
7. Sleep system, which includes changes in depth of sleeping; and snoring.
8. Other symptoms such as easily having muscle ache; easily having paroxysmal heart palpitation; and chest pain

Conclusions:

1. 97.5% of the students were fully vaccinated dosages and 72% had been infected with COVID-19. Some students haven't been infected by COVID-19.
2. The system that had been attacked the most by COVID-19 is the respiratory system and followed by neurological system, sensation system, sleep system, and hormonal system.
3. Most people who had passed COVID-19 infection still had 0-10 symptoms after having recovered for 1-6 months although they had already been vaccinated 2-3 dosages.
4. The most 5 symptoms found are:
 1. Feeling exhausted when walking upstairs (N=118)
 2. Forgetting the thing to get while walking to get it (N=100)
 3. Feeling exhausted when walking while talking at the same time (N=93)

4. Chill easily and/or heat easily (N=85)

5. Having muscle aches more frequently and easily (N=84)

Keywords: Persisting Symptoms; COVID-19 Infection; long COVID; Teenage

Introduction

COVID-19 or SARS-CoV-2 is a pandemic which started since late 2019 and has now become an endemic. People who got infected by COVID-19 can recover; however, many of them still have symptoms though they have fully recovered, these people are known to have *post-COVID syndrome* or *long COVID*. People who have post-COVID syndrome are those who have signs and symptoms that develop during or after an infection consistent with COVID-19, continue for more than 12 weeks, and are not explained by an alternative diagnosis, as The National Institute for Health and Clinical Excellence, the Scottish Intercollegiate Guidelines Network, and the Royal Collage of General Practitioners have jointly developed the definition for post-COVID syndrome.*¹ Ana Luiza et al. had reviewed in June 2021 that the frequency of long COVID-19 ranged from 4.7%-80% which is a wide range. The most prevalent signs/symptoms were chest pain (up to 89%), fatigue (up to 65%), dyspnea (up to 61%), and cough and sputum production (up to 59%). The World Health Organization defines long COVID in adults a little differently from NICE and SIGN as “people with history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of the COVID-19, with the symptoms that last for at least 2 months and cannot be explained by alternative diagnoses.”*² The criteria used to define long COVID-19 varied from 3-24 weeks after acute phase or hospital discharge.*³ In October 2021, Ali A.Asadi-Pooya Et al. had found that the 1680 people (62.3 % from 2696 COVID-19 diagnosed patients ever been IPD) reported long COVID syndrome. And long COVID syndrome associated brain fog was reported by 194 (7.2%) patients.*⁴

COVID-19 may damage several organs and leave symptoms that are difficult to heal and form troubles in daily lives. Currently, the cause and rehabilitation guideline are not yet to be sure; however, there still are interesting continuing study projects about COVID-19 and we should keep an eye on them.

Methods

Participants

In this study, data of 15-18 years old students were collected. These students study high school at Chiang Rai Municipality School 6 in Chiang Rai, Thailand. They went to school as usual except when they got an ATK positive. When they were diagnosed COVID-19, they had to stay at home until they got an ATK negative.

Data Collection

The data of this study had been collected via an online questionnaire (Google form) which ask the sample students to tell us if they have these following symptoms or not:

1. Changes in sensation (perception), including decreasing of taste; decreasing of olfaction; decreasing in touch sensation; decreasing of hearing; and change in temperature tolerance e.g. Chill easily, heat easily.
2. Changes in Neurological system, which includes recognizing and memorizing ability.
3. Changes in respiratory system, including easily lack of air; and increase in frequency of having air obstruction.
4. Changes in gastrointestinal system, including change in the frequency of defecation; fluctuation of weight; and increase of the frequency of having indigestion.
5. Changes in eyesight
6. Changes in hormones and emotional system, including easily becoming irritable or emotional; more frequent menstruation period; delayed or less frequent menstruation; increase in quantity of menstrual blood; and easily stressed.
7. Sleep system, which includes changes in depth of sleeping; and snoring.
8. Other symptoms such as easily having muscle aches; easily having paroxysmal heart palpitation; and chest pain.

9. They also had been asked about the period they had got those symptoms and numbers of vaccination they had had.

Results

1. Among 321 students collected, most of them are 16 years old (48.6%) and 15 years old (27.1%), 67.65% are female and 32.4% are male (Diagram A and Diagram B)
2. Most students had been vaccinated 2 dosages (57.3%) followed by 3 dosages (38.9%) (Diagram C)
3. 72% of students had had COVID-19 infection. This group of students who had persisting after-COVID-19 symptoms were collected. Among these students, most of them had had the

symptoms up to one month on the day that the data were collected. Moreover, there are 92 students (39.83%) who had the symptoms for more than 3 months. (Diagram D)

4. The system that had been attacked the most by COVID-19 is the respiratory system, followed by the neurological system, sensation system, sleep system and hormonal system. (Table 1)
5. Five symptoms found the most are 1. Feeling exhausted when walking upstairs (N=118) 2. Forgetting the thing to get while walking to get (N=100) 3. Feeling exhausted when walking and talking at the same time. (N=93) 4. Easy to feel warm and cold (N=85) 5. Easy and frequent having muscle aches (N=84).

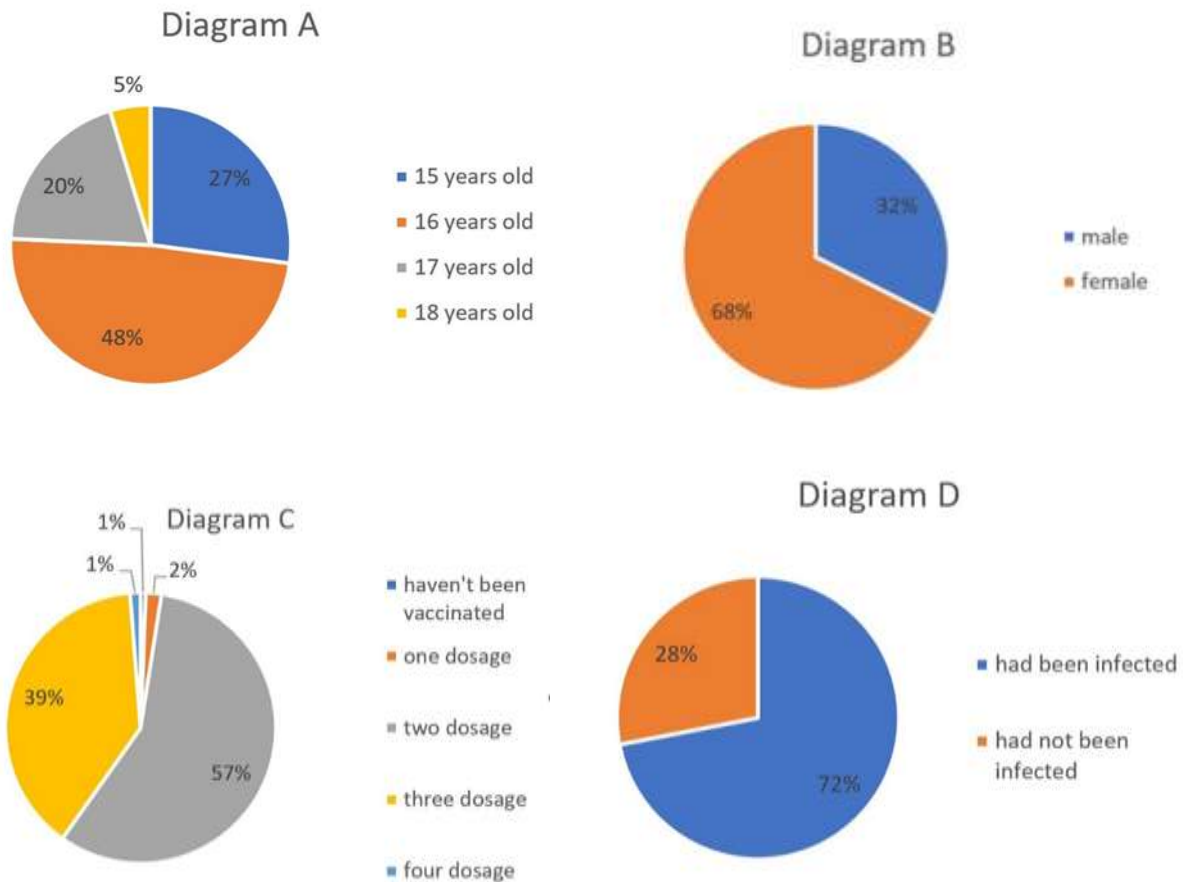


Table 1

Organ system	Number of symptoms persisting after COVID-19 infection
Respiratory	202
Neurology	160
Sensation	145
Sleep	141
Hormones	135

Discussions

The sample students collected do not have severe symptoms. They were isolated from school when the result of the ATK test was positive and are allowed to be back when the result had become negative. This survey was taken during 25-27 December 2022. The ones had been having the symptoms for more than 12 weeks, with the figure being 92 students, should be diagnosed to have post-COVID syndrome. The survey's result has revealed that this group of students, who are the future of the nation, have obstructive problems about memory, physical body, body function, and intelligence in both IQ and EQ. These students will grow up to be the nation's force and these problems would obstruct the way towards the country's development. Therefore, human resource developments should be considered. Currently, there are no specific rehabilitation guidelines, even in long COVID-19 patients as reported by Florent Besnier *et al.* in their recent study.^{*5} However, for the teenagers, their school curriculum should be adjusted to improve their potentials which had been absent after COVID-19 infection properly. For instance, brain training programs and physical training programs should be implemented for the affected students.

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