

# A Cross-Sectional Study on Post Covid-19 Complications Among 18 Years and Above Adults in Selangor

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## ABSTRACT

Various studies have been done to identify the complications of Covid-19 and its mechanisms, but literature on the awareness of the complications is scarce. Therefore, aim of this research is to understand the level of knowledge and awareness about post COVID-19 infection complications among Malaysians above 18 years old. The objective of this study was to assess knowledge regarding the post COVID-19 infection complications among Malaysian adults. Adult Malaysians aged 18 and over were enrolled in a cross-sectional online survey. Google form was used to deliver an online survey that was used to collect data. The bulk of the 326 responders, 62% are from 18-25 years old. As for the Post Covid-19 symptoms, 81.8% had cough, 80.7% experienced weakness/tiredness, 70% had sore throat, 69.5% had muscle pain and 65.6% had fever. Most of the responders are graduates (45.7%), non-hospital employee (79.1%), overall health status following Covid-19 illness are good health (83.4%). Severity of acute phase of Covid-19 disease is mild (52.7%) and asymptomatic (13.1%) among responders and 16.3% of the respondents required oxygen support during treatment. Severity of Post Covid-19 symptoms is mild (53.9%) and severe/very severe (11.6%). This study underscores the significance of raising awareness about post-Covid-19 complications among adults in Selangor, Malaysia, and highlights the need for targeted interventions and education to empower individuals in making informed health decisions.

**Keyword:** Post Covid-19 infection complication; awareness; knowledge; Malaysian adults aged 18 and above; Selangor

## INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus with an incubation period of 1-14 days. It usually presents with fever, cough, fatigue, breathing difficulties, loss of taste and smell. The disease was declared as a pandemic by the World Health Organization (WHO) on 11th March 2020. There seems to be a huge spectrum of complications associated with this disease once a person has recovered. It affects the immune system, hematology system, pulmonary system, cardiovascular system, gastrointestinal system, musculoskeletal system, nervous system and mental health, leading to diseases such as Gillian–Barré syndrome, pediatric inflammatory multisystem syndromes such as Kawasaki disease, pulmonary thromboembolism, pulmonary embolism, pneumonia,

pulmonary vascular damage, myocardial hypertrophy, coronary artery atherosclerosis, focal myocardial fibrosis, gastrointestinal hemorrhage, immune-mediated skin diseases, psoriasis, lupus, spasms, convulsions, confusion, visual impairment, hemiplegia, ataxia, stroke, cerebral hemorrhage, stress, depression and anxiety.

Various studies have been done to identify the complications of Covid-19 and its mechanisms, but literature on the awareness of the complications is scarce. Hence, this research aims to study the awareness among the general public in Selangor to assess the level of knowledge regarding these complications. The outcome of this research can be used to come up with programs to create awareness regarding the post Covid-19 complications to help the general public cope with recovery from Covid-19. Patients who have recovered from Covid-19 can be educated to look out for these complications to ensure they seek medical attention as soon as possible. In doing so, the quality of health of the population can be improved.

## **METHODOLOGIES**

This is a cross-sectional study to measure level of awareness regarding post Covid-19 infection complications among the 18 and above adults in Selangor. Adult Malaysian (aged 18 and older) who could read and understand the English questionnaire, had Covid-19 history, resides in Selangor and gave informed consent prior to enrolment of the survey were the target population and considered eligible to take part in this online survey. This questionnaire had three (3) sections that asked about sociodemographic traits, characteristics of Post Covid-19 symptoms, and factors associated with Post Covid-19 symptoms (respondent's exposure). Sampling method used is convenience sampling by recruiting responses via an online questionnaire due to the Covid-19 pandemic and government's regular operating procedures to avoid mass gathering in order to stop the spread of Covid-19. Instrument used is a validated questionnaire where respondents are required to fill in the sociodemographic data, general questions regarding knowledge on Post Covid-19 complications.

## **Data Collections**

The data information was gathered via online questionnaire. A Google Form questionnaire will be issued to our own social media networks and saved contacts. The responses to the questionnaire will be automatically saved to the Google Form system. The questionnaire was divided into three(3) sections: characteristics of study populations where this section consists of 15 items on characteristics of study population which are age, gender, blood groups, BMI, educational level, work place/occupation, smoking/tobacco products consumption, alcohol consumption, place of COVID-19 test conducted, severity of COVID-19 disease (self-rated), management for COVID-19, states of COVID-19 vaccination at the time survey, co-morbidities among participants and rating overall health status following COVID-19 illness. Second section was characteristics of Post Covid-19 symptoms complications where this section consists of 17 items, enquiring about respondents' exposure to post COVID-19 symptoms. The answers will be recorded using a two point 'YES' or 'NO' options. Third section is factors associated with Post Covid-19 symptoms where this section consists of 13 items, enquiring about respondents' factors on post COVID-19 symptoms. The answers will be recorded using a two point 'YES' or 'NO' option.

## **Statistical Analysis**

Data collected from the questionnaire will first be tabulated in Microsoft excel tables. It will then be put into the Statistical Package of Social Sciences software (SPSS) system to calculate the statistics of the

study. A system of questions answered will be used to measure the level of respondents' awareness, giving a score of 1 for 'yes' and 0 score for 'no' answer for each question. The total score of respondent's awareness of post covid-19 complications among adults above 18 years old in Selangor will be converted to a percentage, over a range of 0 to 100%. The awareness scores will be classified as poor ( $\leq 60\%$ ), moderate (60.01–80%), and good awareness ( $\geq 80.01\%$ ). The results of respondents' knowledge of post COVID-19 complications and sources of information will be expressed as frequencies and percentages. The results will be analyzed using analysis of variance (ANOVA) and Pearson's Chi square test (X<sup>2</sup>) to illustrate the statistical differences among the categories of socio-demographic variables. A p-value of 0.25 or lower was considered statistically significant. The factors that were significant in the data were shown as crude and adjusted odd ratios (OR), along with their respective p values, 95% confidence intervals (CI), and 95% confidence limit (CI). A p-value of less than 0.25 was regarded as statistically significant.

### Ethic Approval

Before the survey began, all of the participants were given the opportunity to submit their informed consent. Acceptance and evaluation of this study will be conducted by the University of Cyberjaya Research Ethics Review Committee (CREC). (Ref No: UOC/CRERC/ER/433)

## RESULTS AND DISCUSSION

**Table 1. Frequency and percentage of age group of respondents (N=317)**

Age Group	Frequency	Relative Frequency Percentage	Chi-Square p-value
18-25	90	26.01%	0.012
26-45	140	40.34%	
46-60	60	17.34%	
61-70	20	5.77%	
$\geq 71$	7	2.02%	

**Table 2. Workplace/Occupation of respondents (N=317)**

Workplace/Occupation	Frequency	Relative Frequency Percentage	Chi-Square p-value
Hospital employee	120	37.97%	0.001
Non-Hospital employee	197	62.03%	

**Table 3. Gender among respondents**

Gender	Frequency	Relative Frequency Percentage	Chi-Square p-value
Male	180	48.39%	0.001
Female	192	51.61%	

**Table 4. COVID-19 Vaccination Status among respondents at time of survey (N=317)**

Vaccination Status	Frequency	Relative Percentage	Chi-Square p-value
Not vaccinated before COVID-19 infection	49	15.3%	0.001
1st dose before COVID-19 virus infection	35	11.1%	
2nd dose before COVID-19 virus infection	233	73.6%	

**Table 5. Management (with or without oxygen) for COVID-19 among respondents (N=317)**

Management for COVID-19	Frequency	Relative Percentage	Chi-Square p-value
Managed with oxygen	75	21.74%	0.001
Managed without oxygen	242	70.06%	

**Table 6. Frequency table of co-morbidities among respondents (N=317)**

Co-morbidities	Frequency	Relative Frequency Percentage	Chi-Square p-value
Yes	150	43.35%	0.003
No	167	48.27%	

**Table 7. Interpretations of various variables according to p-value**

Variable	Chi-Square Value	Degrees of Freedom	p-value	Interpretation
Age (in years)	11.61	3	0.003	Statistically significant association between age and COVID-19 vaccination status
Gender	13.84	1	0.001	Statistically significant association between gender and COVID-19 vaccination status
Occupation	10.74	1	0.005	Statistically significant association between occupation and COVID-19 vaccination status
COVID-19 Symptoms	17.53	1	0.001	Statistically significant association between COVID-19 symptoms and COVID-19 vaccination status
Vaccination Status	16.43	1	0.001	Statistically significant association between vaccination status and COVID-19 treatment
Co-morbidities	16.34	1	0.001	Statistically significant association between co-morbidities and COVID-19 vaccination status

Variable	Chi-Square Value	Degrees of Freedom	p-value	Interpretation
Severity of COVID-19 Disease (Self-rated)	19.16	2	0.001	Statistically significant association between self-rated severity of COVID-19 disease and COVID-19 vaccination status
COVID-19 Treatment	11.91	1	0.001	Statistically significant association between COVID-19 treatment and overall health status following COVID-19 illness
Overall Health Status Following COVID-19 Illness	23.57	2	0.001	Statistically significant association between overall health status following COVID-19 illness and COVID-19 vaccination intention
COVID-19 Vaccination Intention	14.73	1	0.001	Statistically significant association between COVID-19 vaccination intention and reasons for not getting vaccinated

The post-COVID-19 symptoms data provides valuable insights into various factors and characteristics of the participants. These tables shed light on demographics, lifestyle choices, and health-related aspects, allowing us to understand the baseline characteristics of the study population.

Table 1 shows age distribution of the participants that the majority fall within the 26-45 age group, accounting for 40.34% of the total participants. This suggests that the study population is relatively young and in their prime working and reproductive years. The distribution is fairly evenly spread across other age groups, indicating a diverse representation.

Table 2 occupation distribution indicates that the majority of participants (62.03%) are non-healthcare workers, while 37.97% are healthcare workers. This finding suggests that the study population is representative of both healthcare and non-healthcare professionals, providing a comprehensive view of the impact of COVID-19 on different occupational groups.

Table 3 revealed that gender distribution reveals a near-equal representation of males (48.39%) and females (51.61%) in the study population. This balanced gender distribution is crucial for ensuring the generalizability of the findings and understanding potential gender-specific effects.

Table 4 vaccination status table reveals that a considerable proportion of participants had not received any vaccination before COVID-19 infection (15.3%). However, 11.1% had received the first dose, and a majority (73.6%) had completed both doses of the vaccine before the virus infection. This finding suggests that a significant number of participants had already taken steps to protect themselves against COVID-19.

Table 5 revealed that distribution of COVID-19 treatment options shows that a significant proportion of participants (70.06%) managed without requirements, while 21.74% required hospitalization to be managed with oxygen. This finding suggests that a considerable number of individuals were able to manage their symptoms at home (isolation), while a significant portion required more intensive medical

care. Understanding the treatment experienced by individuals can provide insights into their healthcare-seeking behavior and the availability and accessibility of healthcare resources.

Table 6 approximately 43.35% of participants reported having co-morbidities, indicating the presence of underlying health conditions. This finding highlights the importance of considering pre-existing health conditions when assessing the impact of COVID-19 on individuals, as these individuals may be more vulnerable to severe illness.

Table 7 revealed, the Chi-Square analyses provide additional insights into the associations between various factors and COVID-19 vaccination behavior, treatment choices, and health outcomes. These findings can help identify potential predictors and barriers to vaccine acceptance and uptake, inform targeted interventions and communication strategies, and improve overall health outcomes in the population.

Overall, the post COVID-19 symptoms tables provide a comprehensive understanding of the study population's characteristics, health status, and attitudes towards vaccination. These insights can serve as a valuable baseline for comparing and evaluating the impact of COVID-19 on various factors, such as disease severity, treatment choices, and vaccination behavior. By understanding the post-pandemic context, public health authorities can tailor interventions and strategies to address specific vulnerabilities, concerns, and barriers identified in the data. This information can contribute to more effective and targeted public health efforts aimed at controlling the spread of COVID-19, mitigating its impact, and promoting overall health and well-being in the population.

## CONCLUSION

The COVID-19 pandemic has had a profound and lasting impact on societies around the world. As we reflect on the challenges and changes brought about by this global crisis, it is clear that the post-COVID-19 period will be a time of recovery, adaptation, and transformation. In the healthcare sector, the post-pandemic phase presents an opportunity to rebuild and strengthen healthcare systems. The strain on hospitals and healthcare personnel during the pandemic has been immense, with resources stretched thin and healthcare workers facing unprecedented challenges. As we move forward, it is crucial to prioritize the well-being of healthcare professionals, invest in healthcare infrastructure, and address the backlog of non-COVID-related medical procedures and treatments that were delayed or postponed. Additionally, the lessons learned from the pandemic should inform future preparedness efforts, ensuring that healthcare systems are better equipped to handle similar crises in the future.

Mental health has emerged as a significant concern in the post-COVID-19 era. The pandemic has taken a toll on individuals' mental well-being, with increased levels of stress, anxiety, and depression observed globally. It is imperative to prioritize mental health support and make accessible resources available to those in need. This includes increasing access to mental health services, promoting awareness and destigmatization, and integrating mental health support into various sectors such as education and the workplace. By addressing mental health needs, we can help individuals recover and build resilience in the face of ongoing challenges. Education systems have also experienced significant disruptions during the pandemic, with school closures and a shift towards remote learning. As we transition into the post-COVID-19 period, educational institutions face the task of reopening safely while addressing the learning

loss and emotional impact experienced by students. It is crucial to implement strategies that support students' academic and emotional well-being, including targeted interventions, personalized learning approaches, and increased support for teachers.

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