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Introduction

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has reached pandemic level since it was first detected in China at the end of December 2019. As of 11 August 2020, close to 20 million cases were reported worldwide, of which 9,094 were detected in Malaysia¹. Due to the presence of asymptomatic and mild clinical manifestation, the actual number of COVID-19 infections is higher and can be quantified through a seroprevalence study². This study aims to estimate the overall and age-stratified COVID-19 seroprevalence among the general population in Malaysia.

Materials and methods

This study is a component of National Health and Morbidity Survey (NHMS), which happens to focus on communicable diseases in year 2020. NHMS is a community-based cross-sectional survey conducted by the Institute for Public Health (IKU) in the general population every year with different health topics using two-stage stratified random sampling. The sampling frame is a list of arbitrarily defined geographically contiguous areas called enumeration blocks (EB), each of which contains 80 to 120 living quarters (LQ) with 500 to 600 people. A total of 100 EB, and 20 living quarters (LQ) within each EB, were selected nationwide. All non-institutionalised individuals ≥ 1 -year-old in the selected LQ will be recruited. We expect 1622 children (<18 years) and 3378 adults (≥ 18 years) to participate in this study.

Data collection will be conducted from August to October 2020 throughout the country by 12 teams of trained data collectors, a third of which is deployed to East Malaysia. Scouters will first visit selected LQ upon arrival at an EB to recruit eligible individuals. Willing respondents will be given an appointment to go to a pre-determined health facility or a temporary data collection station for face-to-face interview and blood sampling. Socio-demographic characteristics including housing and environment, comorbidities with past and current smoking status, as well as factors associated with COVID-19 and its signs and symptoms will be captured using mobile tablets. A trained nurse or medical assistant will collect 5 ml (3.5 ml for children < 7 -year-old) of venous blood from each respondent in gel tube with clot activator.

Clotted blood specimens will be centrifuged on-site and chilled at 2-8 °c until they reach a virology laboratory in the Institute for Medical Research (IMR) within 72 hours. Temperature will be monitored using electronic logger with its dedicated software. All specimens will be tested in IMR by trained laboratory personnel on SARS-CoV-2 immunoglobulin M and G (IgM/IgG) enzyme-linked immunosorbent assay (ELISA), and positive specimens will be further tested with surrogate virus neutralisation test (sVNT). Complex sample analysis will be used to produce descriptive and inferential statistics representative of Malaysian population. The study is given ethical approval by the Medical Research and Ethics Committee, Ministry of Health Malaysia (NMRR-20-1166-55133 (IIR)).

Results

We expect an overall COVID-19 seroprevalence in Malaysia of up to 3.0% by IgM or IgG ELISA, and $<1.0\%$ by sVNT. The prevalence might be slightly higher than the above figures among adults.

Discussion / Conclusion

To date, many COVID-19 seroprevalence surveys were performed around the world, some of which were community-based. Among the latter, COVID-19 seroprevalence ranged from 0.6% in Chengdu city, China³, to 33.0% in Guilan province, Iran⁴. Most studies reported a seroprevalence of $<10\%$. In Malaysia, no community-based study has been reported yet. A study conducted in the University Malaya Medical Centre, Kuala Lumpur, on archived residual serum samples, found 7.8% of them positive on SARS-CoV-2 IgG ELISA and 0.5% - on sVNT⁵.

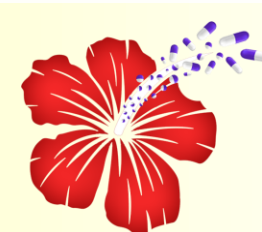
NHMS is the first survey in Malaysia that investigates COVID-19 seroprevalence in the general population. Knowledge of the actual burden of COVID-19 representative of Malaysian population allows better estimation of various epidemiological parameters. It also provides better understanding on the role of mild and asymptomatic infections in disease transmission. Public health responses and policy decisions in the prevention and control of COVID-19 will be better informed and be more effective in breaking the chain of COVID-19 transmission in Malaysia.

Reference

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