



Nationwide Population Based Seroprevalence Study of SARS-COVID-19

Journal Article, Original article

Pallan M, Gómez BP, Pastor-Barriuso R, et al. Prevalence of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based seroepidemiological study. *Lancet* published online July 6, 2020. doi: 10.1016/S0140-6736(20)31483-5

Summary

Methods

- The Spanish Ministry of Health launched the Seroepidemiological Survey of SARS-CoV-2 Virus Infection in Spain (ENE-COVID), which was a nationwide population-based cohort study to investigate seropositivity for SARS-CoV-2 in the non-institutionalised Spanish population
- It involved coordination and training of 4400 health professionals and 29 laboratories in 1409 health care centres throughout the Spanish National Health System
- 35,883 households were selected from municipal rolls using 2-stage random sampling stratified by province and municipality size; all residents in these households were invited to participate.
- 61,075 (75.1% of all contacted individuals) answered a questionnaire on history of symptoms compatible with COVID-19 and risk factors.
- Two serological tests were done: a point-of-care rapid test from finger prick blood by lateral-flow immunochromatographic assay; and a subsequent laboratory based chemiluminescent immunoassay for those who agreed to blood sampling.
- Finally, 51,958 were included in point-of-care and immunoassay analyses
- Prevalence of IgG antibodies was calculated after suitable adjustments
- Using results for both tests, they calculated a seroprevalence range maximising either specificity (positive for both tests) or sensitivity (positive for either test)

Results

- Seroprevalence was 5% (95% CI 4.7-5.4) by the point-of-care test and 4.6% (4.3-5.0) by chemiluminiscent immunoassay with a specificity-sensitivity range of 3.7%-6.2% with no differences by sex and lower seroprevalence in children younger than 10 years
- Seroprevalence among 195 participants with positive PCR more than 14 days prior to study ranged from 87.6% to 91.8%.
- Approximately one-third of seropositive participants were asymptomatic
- Seroprevalence was greater in those who had a confirmed case in their household (ranging from 31.4% to 37.4% between the two tests), in their workplace (9.9%–10.6%), among their non-cohabitating family members and friends (13.2%–13.7%), or among their caregivers and cleaning staff (12.4%–13.5%) or clients (11.2%–11.7%).
- Seroprevalence was higher in individuals who reported anosmia or three or more symptoms compatible with COVID-19—49.1% (46.2%–51.9%) for the point-of-care test and 54.2% (51.0%–57.2%) for the chemiluminiscent immunoassay.
- The prevalence in hotspot areas such as Madrid was more than five times higher than that observed in low-risk regions such as most provinces along the coasts.

Conclusion



COVID-19: Making sense of the literature

- Majority of the Spanish population was seronegative to SARS-CoV-2 infection, even in hotspot areas
- About 90% of individuals develop antibodies two weeks after a positive PCR test
- Performance of the point-of-care immunochromatographic test was comparable to that of the chemiluminescent assay in terms of SARS-Cov2 IgG and IgM detection.
- The low prevalence estimate suggests that herd immunity may be a distant goal in spite of the impact of COVID-19 in Spain.
- These results emphasise the need for maintaining public health measures to prevent a new epidemic wave

Appraisal:

- Strength
 - To-date ENE-COVID is the largest population-based SARS-CoV-2 seroprevalence study in Europe, and the data analysis was performed both at the national as well as provincial level thereby giving an insight into the distribution of the infection.
 - Two different antibody-based tests (point-of-care lateral flow immunochromatographic assay applied on fingerprick blood and chemiluminescent microparticle immunoassay applied on venous blood) were used to validate each other's findings.
- Weakness
 - The results need to be confirmed in other populations
 - Testing by ELISA, which is the gold standard test for antibody testing, was not done

Opinion:

Spain is one of the European countries most severely affected by the ongoing COVID-19 pandemic with about 30,000 deaths to-date. In infectious diseases with large number of asymptomatic cases, serological surveys are the best tool to estimate community spread of the disease, and development of herd immunity. In spite of widespread infection the very low seroprevalence in Spain is worrying for all of us. Another seroprevalence study done at 10 sites in the USA till early May (*JAMA Intern Med online 21 July 2020, doi: 10.1001/jamainternmed.2020.4130*) too has shown similar low antibody prevalence rates ranging from 1% in the San Francisco Bay area to 6.9% in New York. If confirmed subsequently in other population groups as well, it implies that not only are the chances of natural immunity bleak, chances of a successful vaccination programme are also not too bright. Public health measures to prevent spread of infection in the community need to be continued earnestly and may be our only hope to contain the spread of COVID-19 in the immediate future.

Appraisers

Dipankar Bhowmik, Pragyan Acharya, Seema Kaushal, Megha Brijwal and Animesh Ray, Departments of Nephrology, Biochemistry, Pathology, Microbiology and Medicine, All India Institute of Medical Sciences, New Delhi.