SARS-CoV-2 Positivity Rate and Vitamin D Levels

Background
Low levels of vitamin D have been linked to higher risk of upper respiratory virus infections. However, few studies have specifically evaluated whether SARS-CoV-2 positivity rates are associated with vitamin D levels.

Study Population and Results
- >190,000 patients
- All 50 states represented

<table>
<thead>
<tr>
<th>Vitamin D Level</th>
<th>SARS-CoV-2 Positivity Results, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;12 months before SARS-CoV-2 test</td>
<td>March 9-June 19, 2020</td>
</tr>
<tr>
<td>Deficient &lt;20 ng/mL</td>
<td>12.5%</td>
</tr>
<tr>
<td>Adequate 30-34 ng/mL</td>
<td>8.1%</td>
</tr>
<tr>
<td>Highest &gt;55 ng/mL</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

SARS-CoV-2 positivity is still associated with vitamin D levels when controlling for race/ethnicity, sex, age, and latitude.

Are SARS-CoV-2 positivity rates associated with circulating vitamin D levels?

SARS-CoV-2 positivity rates are higher among people with low vitamin D levels and lower among people with high levels of vitamin D.

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SARS-CoV-2 Positivity Rate And Vitamin D Levels

Article Title: SARS-CoV-2 Positivity Rates Associated With Circulating 25-Hydroxyvitamin D Levels

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Background

- Studies suggest that 25-hydroxyvitamin D (25(OH)D) may protect against flu and other respiratory infections by interacting with certain immune cells and suppressing harmful immune responses. 1,2
- However, the role of 25(OH)D in SARS-CoV-2 infection is uncertain. Recent studies report contradictory findings and are based on small study populations outside the United States. 3,4

Objective: In this study, investigators examined the relationship between SARS-CoV-2 positivity rates and circulating 25(OH)D levels in a large population in the United States.

Methods

- Using a Quest Diagnostics database, investigators analyzed deidentified results from patients who were tested for SARS-CoV-2 March 9 to June 19, 2020 and for 25(OH)D levels in the preceding 12 months; the most recent 25(OH)D result was used if multiple results were available.
  - SARS-CoV-2 positivity was defined as any positive test result.
  - Results from patients with missing zip code data or inconclusive SARS-CoV-2 test results were excluded.
- The relationship between SARS-CoV-2 positivity and serum 25(OH)D levels was examined in the total study population and among demographic groups stratified by region (northern, central, southern latitudes), age, sex, and race/ethnicity (Black, Hispanic, White).

Results

- The total study population included 191,779 patients, who represented all 50 states and the District of Columbia.
- SARS-CoV-2 positivity rates declined with increasing 25(OH)D levels in the total population (odds ratio [OR] = 0.979 per ng/mL 25(OH)D). The decline in positivity rates leveled off as 25(OH)D levels approached 55 ng/mL.
- SARS-CoV-2 positivity rates were higher among patients with “deficient” 25(OH)D levels (<20 ng/mL) than among those with “adequate” levels (30 to 34 ng/mL): 12.5% (95% CI 12.2-12.8%) vs 8.1%; (95% CI 7.8-8.4%).
  - Rates were even lower among patients with 25(OH)D levels ≥55 ng/mL: 5.9% (95% CI 5.5-6.4%).
- SARS-CoV-2 positivity rates were higher among patients from predominately Black and Hispanic zip codes, as well as among patients <60 years old and male patients.
- After adjusting for all demographic factors, the association between lower SARS-CoV-2 positivity rates and higher 25(OH)D levels remained significant (OR=0.984 per ng/mL 25(OH)D; P<0.001).

Conclusions

- These findings provide evidence for the relationship between lower SARS-CoV-2 positivity rates and higher circulating 25(OH)D levels.
- They may also support future research into the utility of vitamin D supplementation in reducing the risk of SARS-CoV-2 infection and disease.

References