Seroprevalence of anti-SARS-CoV-2 IgG among adolescents at military fitness-for-duty evaluation

Elena Giuliano,1 V Gennaro,1 G P Milani 2,3 M Bianchetti,1 C Kocher,4 T Buehrer,4 B Mathis,5 G Togni,5 F Muggli1,4

The potential of SARS-CoV-2 to spread is limited by herd immunity, which provides an indirect protection to susceptible subjects.1 Although the seroprevalence against SARS-CoV-2 in the general population has been widely investigated,1,2 no data are available on individuals before starting the military service. These subjects, who will spend together most of the military service, are at risk of infection outbreaks. We undertook a prospective cross-sectional study to investigate the prevalence of subjects with anti-SARS-CoV-2 IgG (and their history in the previous months) at military fitness-for-duty evaluation.

In Switzerland, male citizens 18–19 years of age undergo a medical screening and a status of fit or unfit for military service. These subjects, who will spend together most of the military service, are at risk of infection outbreaks. We invited all adolescents undergoing this evaluation in Southern Switzerland from July to December 2020. After informed consent, subjects filled in a structured questionnaire about their history from February 2020. Finally, blood was collected to identify IgG against spike protein subunit 1 of SARS-CoV-2 (Euroimmun Medizinische Labordiagnostika, Lübeck, Germany).1 The cut-off value for positivity was >1.1.1 Data are presented as absolute number (and percentage). Fisher’s test was used to compare subjects with and without symptoms possibly associated with SARS-CoV-2 infection. We assumed as significant a P value <0.05.

We enrolled 301 (286 men and 15 women) out of 900 subjects. Only 10 (3.3%) male subjects tested positive for IgG against SARS-CoV-2. Table 1 reports the history of the enrolled subjects. About 60% of the subjects presented at least one symptom possibly associated with a SARS-CoV-2 infection. History of hyposmia, asthenia and muscle ache was more common among subjects with positive IgG against SARS-CoV-2.

To the best of our knowledge, this is the first study to investigate the seroprevalence of IgG against SARS-CoV-2 in subjects just before the start of the military service. The majority of these subjects did not present IgG against SARS-CoV-2. Previous data showed that the seroprevalence of IgG against SARS-CoV-2 among the general population in Switzerland was about 8% between April and May 2020.1 Despite not being considered among priority groups for vaccination due to their young age, future conscripts have a significant potential to transmit SARS-CoV-2 infection.4 Taken together, these data suggest that vaccination campaigns should consider conscripts who might be at high risk of SARS-CoV-2 during military service.5 However, we did not evaluate the persistence of IgG, and further serological markers such as IgA or IgM were not assessed.

This study points out that a very low percentage of conscripts present with IgG against SARS-CoV-2 in Southern Switzerland. Future interventions should be addressed to prevent the risk of SARS-CoV-2 spread among conscripts.

In conclusion, we found that only a very low percentage of adolescents at military fitness-for-duty evaluation in Southern Switzerland presented with IgG against SARS-CoV-2. Future interventions should be addressed to prevent the risk of SARS-CoV-2 spread among these subjects.


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Contributors GPM, CK, MGB, TB and GT conceptualised the study. EG, VG and FM collected the data. BM and GT performed the laboratory analyses. GPM and MGB analysed the data. CK, TB and FM significantly contributed to data interpretation. GPM and MGB drafted the letter. EG, BM, TB and FM reviewed the letter. All authors read and approved the final manuscript.

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Table 1 Demographic data, detection of SARS-CoV-2 IgG and clinical history from February 2020 of Swiss adolescents (18–19 years of age) at military fitness-for-duty evaluation

<table>
<thead>
<tr>
<th>Gender, male</th>
<th>n</th>
<th>IgG-positive</th>
<th>IgG-negative</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>286 (95)</td>
<td>10</td>
<td>281 (97)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical history</th>
<th>All</th>
<th>IgG-positive</th>
<th>IgG-negative</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper respiratory symptoms</td>
<td>151 (50)</td>
<td>7 (70)</td>
<td>144 (49)</td>
<td>NS</td>
</tr>
<tr>
<td>Lower respiratory symptoms</td>
<td>9 (3.0)</td>
<td>1 (10)</td>
<td>8 (2.7)</td>
<td>NS</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>23 (7.6)</td>
<td>3 (30)</td>
<td>20 (6.9)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>66 (22)</td>
<td>4 (40)</td>
<td>62 (21)</td>
<td>NS</td>
</tr>
<tr>
<td>Fever</td>
<td>87 (29)</td>
<td>5 (50)</td>
<td>82 (28)</td>
<td>NS</td>
</tr>
<tr>
<td>Asthenia</td>
<td>80 (27)</td>
<td>6 (60)</td>
<td>74 (25)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Muscle ache</td>
<td>41 (14)</td>
<td>5 (50)</td>
<td>36 (12)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>None of the above</td>
<td>121 (40)</td>
<td>2 (20)</td>
<td>119 (41)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Data are presented as absolute frequency (and percentage). NS, not significant.

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