SARS-COV-2 serological profile in healthcare professionals and a preliminary evaluation of IgG and IgA in saliva samples: a study from a southern Italy hospital

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INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the first pandemic caused by a coronavirus. Assessing the prevalence of anti-SARS-CoV-2 in healthcare workers groups offers a unique opportunity to study the correlation between seroconversion and immunization because of their occupational exposure and higher risk of contagious.

METHODS

Enrollment

The study enrolled 3242 asymptomatic employees of "Policlinico Riuniti," Foggia. The employees' group was stratified in 3 subgroup according to their realtive exposure to SARS-CoV-2:

1. High Risk, Emergency Room (ER), Intensive Care Unit (ICU), Pneumology Unit (PU), Infectious Disease (ID), and Laboratory Staff
2. Low Risk, administrative personnel (Smart Working Offices)
3. Intermediate Risk, remeaning departments (Other Departments)

A control group (Pre-Covid) of 83 samples sera collected before the Italian Covid-19 outbreak was also tested.

Serological Surveillance

We used a chemiluminescent immunoassay (Shenzhen YHLO Biotech, Shenzhen, China) to study the seroprevalence of SARS-COV-2-specific antibodies (IgG and IgM against nucleocapsid and spike proteins). The assay was performed according to the manufacturer's instructions on an iFlash1800 immunoassay analyzer (Shenzhen YHLO Biotech, Shenzhen, China), which automatically calculates the amount of anti-SARS-CoV-2 antibodies (2 separate kits for IgG and IgM) that is correlated with the relative light units (RLUs) resulting from the chemiluminescent reaction.

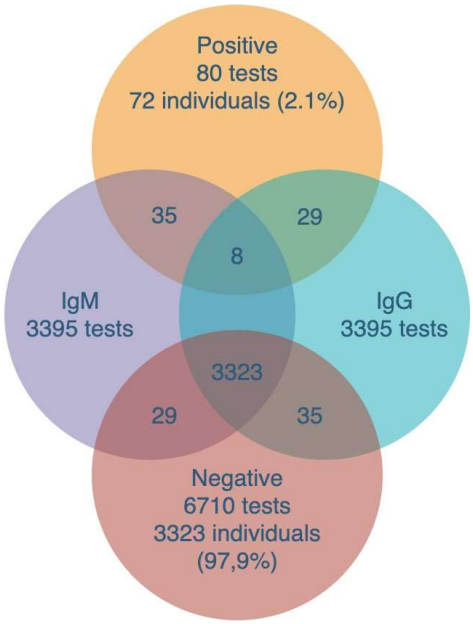
METHODS

Precision was evaluated by measuring daily internal quality controls (IQCs) and a human serum pool of samples with different concentration values of IgG and IgM antibodies (IgG: 4.89 to 17.16 AU /mL (CV% 4.78– 5.87), IgM: 3.86 to 16.27 AU/mL (CV% 5.6–5.49), lower–upper levels, respectively). After the first screening, we collected sequential serum samples up to 23 weeks from the same subjects. In order to perform a longitudinal follow-up study and get information about the titration of IgG level, we analyzed data from subjects (33) with at least two consecutive serological IgG positive tests. We also tested some resting salivary samples analyzing IgG by CLIA method, and IgA by ELISA method.

RESULTS

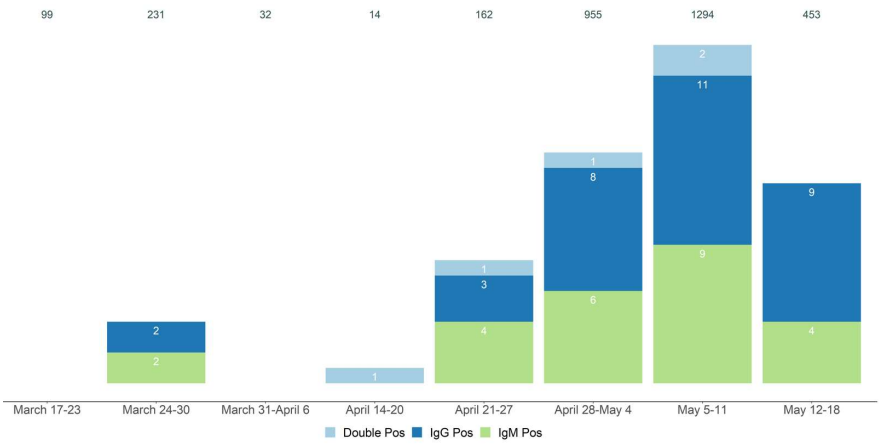
62 subjects were positive (1.9%, 1.4-2.3%, 95% CI) for at least one antibody anti-SARS-CoV-2. The seroprevalence was lower in the high-risk group 1.4% (6/428,0.5-2.6%, 95% CI) vs. intermediate-risk group 2.0 % (55/2736, 1.5-2.5%, 95% CI). Five individuals (8% of the positive) had IgG and IgM positive results.

Overall, within eight weeks, we detected a mean reduction of -17% in the IgG level. Our data suggest a reduction of about 9.27% every week (R2=0.35, p=0.0003). This study revealed a low prevalence of SARS-CoV-2 antibodies among our hospital healthcare staff (1.9%).



Summary of IgG and IgM results aming healthcare workers

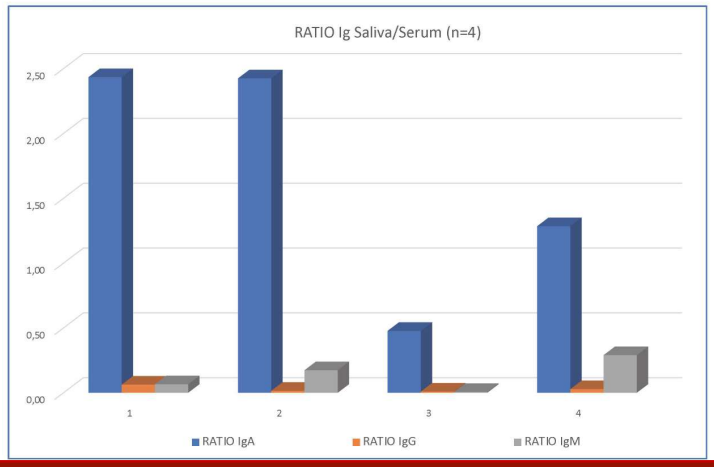
RESULTS



Time-lapse of healthcare seropositivity. Number of positive healthcare workers by weeks of enrollment

The preliminary analysis of saliva, belonging to positive subjects by molecular testing for SARS CoV2, showed that out of 4 saliva samples we observed an Ig ratio (Ig saliva/Ig Serum) corresponding to 0.06, 0.02, 0.01, 0.03 for IgG, while it was 2.43, 2.42, 0.48, and 1.28 for IgA, respectively

RATIO Ig SALIVA/SERUM		
RATIO IgA	RATIO IgG	RATIO IgM
2,43	0,06	0,07
2,42	0,02	0,17
0,48	0,01	0,01
1,28	0,03	0,29



Preliminary data on saliva.

CONCLUSION

The IgG level reduction suggests that the serological response fades fast in asymptomatic infections. Our preliminary data also suggest that the IgA anti-SARS-CoV2 is present also in saliva of positive subjects and its level is higher than IgG.