

SARS-COV-2 VACCINATION AND IMMUNE TRENDS FROM A PORTUGUESE UNIVERSITY COHORT STUDY: ONE-YEAR OF HEMATOLOGICAL FINDINGS

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INTRODUCTION

Healthcare workers face an increased risk of contracting COVID-19 due to their close and direct contact with patients. In dental clinical settings, procedures frequently involve aerosol-generating procedures, which poses a bigger threat. Data on oral-health professionals remain limited, and the identification of individual/professional risk at academic community, may be important to promote periodic diagnostic assays for occupational purposes.

OBJETIVE

To assess SARS-CoV-2 infection, vaccination status, immune response, and hematological changes among dentists/academic professors, over one year.

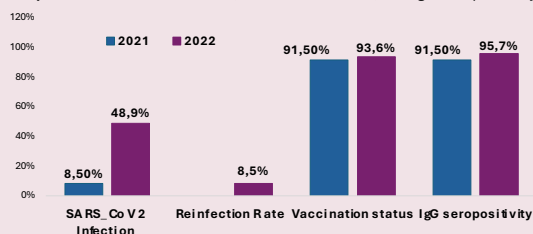
METHODS

This prospective research protocol was approved (FCS/PI-501/23-3) by the Ethics Committee of the University Fernando Pessoa (UFP). The population of this research involved both Dentists and University Fernando Pessoa Professors, (N= 62), that were at the time (July of 2021) the workforce in the Dental pedagogical clinical setting of the Dentistry Master program-UFP. Those who completed a brief on-line self-report survey, and accepted to provide plasma samples for IgG and IgM antibodies titration in two-time frames (July 2021 and June 2022.) were eligible. The Atellica® IM SARS-CoV-2 IgG (sCOVG) assay (Siemens Healthcare Diagnostics) was used for the qualitative and quantitative detection of IgG antibodies, including neutralizing antibodies against SARS-CoV-2. Serum levels <1.00 AU/mL were considered non-reactive, indicating negativity for SARS-CoV-2 IgG/IgM antibodies; Serum levels ≥1.00 146 AU/mL were considered reactive, indicating positivity for SARS-CoV-2 IgG/IgM antibodies

RESULTS

Forty-seven participants (95% CI; 7.09% margin of error), aged 27-52 years completed a self-reported survey on SARS-CoV-2 exposure, vaccination, and provided plasma samples for ELISA-based quantification of anti-S1-RBD IgM and IgG antibodies (reactive ≥1 AU/mL).

Graph 1 – SARS-Cov 2 infection, vaccination status, and igG seropositivity evolution in one year



IgG seropositivity was significantly associated with younger age (<50 years; p=0.019) and number of vaccine doses (1–3; p=0.003) (Table 1)

Table 1. Inferential analysis of participants' age, gender, SARS-CoV-2 exposure (infection history), number of vaccine doses and prevalence of IgG (AU/mL) positivity/reactivity or negativity/nonreactivity final plasma sample (June 2022).

Participant's gender, age, SARS-CoV-2 exposure and number of vaccine doses	IgG (AU/mL) Reactive n (%)	IgG (AU/mL) Non reactive n (%)	P-value
Age (years)			
<50 years	40 (88.9%)	0 (0%)	0.019 ¹
≥50 years	5 (11.1%)	2 (100%)	
Gender			
Female	30 (66.7%)	2 (100%)	1.000 ¹
Male	15 (33.3%)	0 (0%)	
SARS-CoV-2 Infection			
No	22 (48.9%)	1 (50%)	1.000 ¹
Yes	23 (51.1%)	1 (50%)	
Number of vaccine doses			
0	1 (2.2%)	2 (100%)	0.003 ¹
1 to 3	44 (97.8%)	0 (0%)	

*IgG Pos/neg – Categorization for Positive/Reactive antibody IgG for values ≥ 1 AU/mL; Categorization for negative/nonreactive antibody IgG for values <1 AU/mL.; 1- Fisher test; 2- Mann-Whitney U test

In females, haemoglobin and related erythrogram parameters decreased (-0,04 g/dL; laboratory reference units) whereas in males they increased (0,07 g/dL). Both genders exhibited mean declines in leukocyte count (males: -19,5x10⁹ g/L; females: -209,38x10⁹ g/L), platelet count (males: -5,6x10⁹ g/L; females: -16,9x10⁹ g/L) and mean platelet volume (males: -0,2 U/mL; females: -0,153 U/mL) (Table 2).

Table 2. Mean variations between blood analyses performed in 2021 and 2022, according to haematological parameters (erythrogram, leukogram and platelets profile)

ERYTHROGRAM

Gender	Hemoglobin (g/dL)	Erythrocytes (x10 ¹² /L)	MCV (%)	MCV (fL)	MCH (pg)	MCHC (g/dL)	RDW (%)
Male	0.07	0.02	0.31	0.6	0.20	0.00	0.00
Female	-0.04	-0.04	-0.37	-0.02	0.128	0.137	-0.10

MCV – Mean Corpuscular Volume; MCH – Mean Corpuscular Hemoglobin; MCHC – Mean Corpuscular Hemoglobin Concentration; RDW – Red Cell Distribution Width

LEUKOGRAM

Gender	Leukocytes (x10 ⁹ /L)	Neutrophils (%)	Eosinophils (%)	Basophils (%)	Lymphocytes (%)	Monocytes (%)
Male	-19.5	0.6 %	0.3 %	0	-0.7 %	-0.3 %
Female	-209.38	1.59 %	0.16 %	-0.02 %	-19.9 %	0.66 %

PLATELETS

Gender	Platelet Count (x10 ⁹ /L)	Mean Platelet Volume (U/mL)
Male	-5.6	-0.2
Female	-16.9	-0.153

CONCLUSIONS

Oral-health professionals exhibited high and increasing rates of SARS-CoV-2 exposure, vaccination, and IgG seropositivity over 12 months. Age and vaccine dosage were associated with immune response. Observed hematological trends suggest physiological adaptations that warrant further investigation into the dynamics of immune response in occupationally exposed populations.