VAC_06 - Immunita-001: Cross-sectional study of immunogenicity, safety and infection by SARS-CoV-2 in adults vaccinated with the inactivated virus vaccine (CoronaVac) in a two-dose protocol and heterologous booster doses

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Introduction: Vaccines are essential for preventing and controlling diseases, as well as monitoring the immunological response generated by them. During the covid-19 pandemic, CoronaVac was one of the pioneering vaccines in vaccination campaigns in Brazil and worldwide.

Objectives: The present study aimed to evaluate the immunogenicity and safety for 2 years of the CoronaVac vaccine followed by heterologous booster doses in 1675 volunteers from Hospital da Baleia and Hospital Metropolitano Dr Célio de Castro, Belo Horizonte, MG.

Methodology: Peripheral blood samples were collected from participants at 6, 9, 12, 15, 18, 21 and 24 months, using the date of the second dose of the CoronaVac primary protocol as a reference. The collected blood samples were used for the ELISA assay, with the antigen being the S protein of SARS-CoV-2. A viral neutralization test (VNT50) was performed for the Omicron (BA.1) variant and Luminex was used to determine the biomarker profile of the cellular response.

Results: The IgG anti-S total antibody response was robust at all times analyzed and there was an increase in this response with the introduction of the first booster dose between 6 and 9 months after the primary CoronaVac protocol, going from 72% to 96% of participants presenting detectable levels of IgG anti-S. Over 24 months, the value was 99%. In relation to neutralizing antibodies to the Ômicron (BA.1) variant, the response of those who became infected with SARS- CoV-2 prior to vaccination was greater between 6 and 12 months after the primary vaccination protocol. The introduction of the first booster significantly increased this response in both groups analyzed. The second booster dose was responsible for maintaining the response generated in the group with previous covid-19 and increased the response in the group without covid-19. After the second booster, the response in both groups was equivalent for up to 24 months. The levels of immunological biomarkers in participants who became infected with SARS- CoV-2 before vaccination were higher than those without covid-19. This difference was eliminated with the introduction of the second booster dose between 15 and 18 months, a period in which there was a significant increase in biomarkers in both groups. The interaction between biomarkers, which represents a more robust cellular response, was greater at all times in individuals who were not infected with covid-19, except at 18 months.

Conclusion: This study reinforces the importance of vaccination in a complete primary protocol with the introduction of heterologous booster doses for the development and maintenance of an immune response against covid-19.

Keywords: Covid-19; Vaccines; Immunology