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### Antibody Response to Covid-19 Vaccine (AstraZeneca) amongst Healthcare Workers in a Tertiary Hospital in Nigeria

#### *Réponse des anticorps au vaccin Covid-19 (AstraZeneca) parmi les travailleurs de la santé dans un hôpital tertiaire au Nigeria.*

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#### ABSTRACT

**BACKGROUND:** With no known cure, accelerated development of vaccines became pertinent to contain the COVID-19 pandemic.

**OBJECTIVES:** To assess the IgG antibody response to the viral spike protein and determinants of developing IgG antibodies after vaccination with two doses of the AstraZeneca vaccine.

**METHODS:** This was a prospective cohort study amongst healthcare workers. Serum samples were obtained before vaccination and at 4 and 12 weeks after the first and second doses of the vaccine respectively. Qualitatively testing for the presence of IgG antibodies to the viral spike protein was conducted using the Vidas SARS-CoV-2 IgG and IgM analyser while IgG antibodies were quantitatively assessed by antibody titre estimation using a stepwise two-fold serial dilution method.

**RESULTS:** A total of 155 subjects between the ages of 25 to 64 years were studied. 85 (54.8%) had positive anti-spike IgG antibodies before vaccination. Out of the remaining 70 subjects, 87.3% and subsequently 96.2% developed IgG antibodies to the viral spike protein 4 and 8 weeks after the first and second doses of the vaccine respectively. The AstraZeneca vaccine was found to stimulate antibody response more than natural infection. Prior positive IgG antibodies from natural infection was found to boost antibody response to vaccination. The antibody titre levels rose with vaccination but however waned overtime after the second dose of the vaccine.

**CONCLUSION:** The AstraZeneca COVID-19 vaccine elicits an immunogenic IgG antibody response that is augmented by prior infection but however declines a few weeks after the second dose of the vaccine. **WAJM 2023; 40(11) : 1181 - 1191**

#### Keywords:

COVID-19, Healthcare Workers, Vaccination, AstraZeneca Vaccine, Immunogenicity, Antibody, Antibody Response, Antibody titre;

#### RÉSUMÉ

**CONTEXTE:** En l'absence de remède connu, le développement accéléré de vaccins est devenu pertinent pour contenir la pandémie de COVID-19.

**OBJECTIFS:** Évaluer la réponse des anticorps IgG à la protéine de pointe virale après vaccination avec deux doses du vaccin AstraZeneca.

**MÉTHODES:** Il s'agissait d'une étude de cohorte prospective parmi les travailleurs de la santé. Des échantillons de sérum ont été obtenus avant la vaccination et à 4 et 12 semaines après la première et la deuxième doses du vaccin respectivement. Des tests qualitatifs pour la présence d'anticorps IgG dirigés contre la protéine de pointe virale ont été effectués à l'aide de l'analyseur Vidas SARS-CoV-2 IgG et IgM, tandis que les anticorps IgG ont été évalués quantitativement par estimation du titre d'anticorps à l'aide d'une méthode de dilution en série en deux étapes.

**RÉSULTATS:** Au total, 155 sujets âgés de 25 à 64 ans ont été étudiés. 85 (54,8 %) avaient des anticorps IgG anti-pic positifs avant la vaccination. Sur les 70 sujets restants, 87,3 % puis 96,2 % ont développé des anticorps IgG contre la protéine de pointe virale 4 et 8 semaines après la première et la deuxième doses du vaccin respectivement. Le vaccin AstraZeneca s'est avéré stimuler la réponse anticorps plus que l'infection naturelle. Des anticorps IgG antérieurement positifs d'une infection naturelle ont été trouvés pour stimuler la réponse des anticorps à la vaccination. Les niveaux de titre d'anticorps ont augmenté avec la vaccination mais ont cependant diminué avec le temps après la deuxième dose du vaccin.

**CONCLUSIONS:** Le vaccin AstraZeneca COVID-19 suscite une réponse immunogène en anticorps IgG qui est augmentée par une infection antérieure mais qui décline cependant quelques semaines après la deuxième dose du vaccin.

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#### Mots clés:

COVID-19; Travailleurs de la santé; Vaccination; vaccin AstraZeneca; Immunogène; Anticorps; réponse d'anticorps; Titre d'anticorps;

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Abbreviations: COVID-19: Corona Virus Disease 2019; FCT: Federal Capital Territory; GDP: Gross Domestic Product, GMT: Geometric Mean Titre; ELFA: Enzyme Linked Fluorescence Assay;

IDC: Infectious Disease Centre; IgG: Immunoglobulin G; IgM: Immunoglobulin M; IMF: International Monetary Fund; IQR: Inter Quartile Range; RFV: Relative Fluorescence Value; SARS CoV 2: Severe Acute Respiratory Syndrome Corona Virus 2; SD: Standard Deviation; UATH: University of Abuja Teaching Hospital; VIF: Variance Inflation Factor; WHO: World Health Organization