International Research Journal of Pharmacy and Medical Sciences
ISSN (Online): 2581-3277

Health Point Prevalence of Sars CoV-2 Antibodies in Delta State

Tarurhor, Love Eguonor[1]; Jemikalajah, D. Johnson[2]; Ehwarieme, Ayobola D.[3]
[1]Department of Medical Laboratory Science, Delta State University, Abraka
[2]Department of Medical Laboratory Science, Delta State University, Abraka
[3]Department of Microbiology, Delta State University, Abraka
tarurhoreguonor@gmail.com, jemikalajahjohnson2007@yahoo.com, ayoboladaniel@gmail.com
Corresponding author: tarurhoreguonor@gmail.com

Abstract— *Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) antibodies are virus-specific immunoglobulins produced by the host immune system in response to infection, or vaccination against COVID-19 virus. The aim of this study was to determine the prevalence of Sars CoV-2 antibodies among the patient presenting with respiratory tract infection in the three (3) foci of Delta State namely Central hospital Warri, Central hospital Ughelli, and Federal Medical Centre Asaba. A cross-sectional study was conducted on one hundred and fifty-four (154) blood samples collected from unvaccinated individuals attending these healthcare facilities between January and December 2023. Blood samples were analyzed using Medical Laboratory Science Council of Nigeria (MLSCN)-approved Enzyme-Linked Immunosorbent Assay (ELISA). The overall seroprevalence of 63.64% was obtained for SARS-CoV-2 antibodies. The observed seropositivity varied across the 3 foci of the study in descending order of 75.47%, 60.78% and 54.00% in Central hospital Ughelli, Central hospital Warri, and Federal Medical Centre Asaba respectively. This variation was statistically not-significant ($\chi^2 = 5.39$, $df = 2$, $p > 0.05$).The age distribution showed the highest seroprevalence of 33.77% occurring in the age group 31–45 years. Gender distribution revealed seropositivity of 36.36% in males and 27.27% in females. The association between the gender was not statistically significant ($\chi^2 = 8.43$, $df = 4$, $p > 0.05$). The findings demonstrate a high prevalence of SARS-CoV-2 antibodies among the population screened. There is need for continuous surveillance and strengthened public health preparedness in Delta state.*

Keywords— *Prevalence, Seroprevalence, Antibodies, SARS-CoV-2, Covid-19, Delta, Nigeria.*

I. Introduction

The coronavirus disease (COVID-19) pandemic, caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has posed an unprecedented global health challenge since its emergence in late 2019 (WHO, 2020). The was characterized by a broad spectrum of clinical manifestations from asymptomatic infection to severe respiratory distress and death which has significantly strained healthcare systems and disrupted socioeconomic structures worldwide (Guan *et al*., 2020; Tarurhor and Tarurhor, 2022).

SARS-CoV-2 is a highly transmissible RNA virus of the Coronaviridae family that spreads primarily through respiratory droplets and aerosols, with transmission occurring even among asymptomatic individuals, thereby complicating containment efforts, particularly in resource-limited settings where widespread testing and contact tracing are constrained (He *et al*., 2020; Oran and Topol, 2020). In support of sero-epidemiological findings, a significant proportion of individuals with detectable SARS-CoV-2 antibodies report no prior COVID-19–related symptoms, confirming that antibody positivity does not equate to clinical illness (Oran and Topol, 2020). This phenomenon underpins the utility of antibody testing in identifying silent transmission within populations.

In line with this transmission dynamic, SARS-CoV-2 antibodies (immunoglobulins) produced following natural infection, serve as critical biomarkers of prior exposure and play a central role in immune protection (Long *et al*., 2020). In response, serological testing for SARS-CoV-2-specific antibodies has emerged as a vital tool for evaluating the true extent of viral spread, even in individuals who never exhibited symptoms (Long *et al*., 2020). Accordingly, measuring seroprevalence provides critical insights into the hidden burden of infection, especially in communities where diagnostic testing was limited or delayed during peak transmission periods (Gudbjartsson *et al*., 2020).

Seroprevalence studies are particularly important in under-resourced regions such as sub-Saharan Africa, where chronic underreporting, limited diagnostic capacity, and persistent healthcare inequities obscure the pandemic's actual impact. In line with this, recent investigations have emphasized the need for reliable regional data to inform evidence-based public health policies (Bobrovitz *et al*., 2021; Madhi *et al*., 2021; Rostami *et al*., 2021; Uyoga *et al*., 2021).

This study therefore aims to determine the health point prevalence of SARS-CoV-2 antibodies among asymptomatic, unvaccinated patients attending clinics in Delta State, Nigeria. Delta State, located in southern Nigeria, is characterized by heterogeneous population dynamics and a mix of urban and rural settlements (Deinne and Ajayi, 2018; Nwaki, 2022). By focusing on this diverse population, the research seeks to quantify undetected infections and provide evidence to guide targeted public health interventions in the region.

II. Materials and Method

A cross-sectional study was conducted on One hundred and fifty four (154) patients presenting respiratory tract infections in three (3) hospitals located in Delta State, namely Central Hospital Warri, Central Hospital Ughelli, and Federal Medical Centre Asaba.

Tarurhor, Love Eguonor, Jemikalajah, D. Johnson, and Ehwarieme, Ayobola D., "Health point Prevalence of Sars CoV-2 Antibodies in Delta State," *International Research Journal of Pharmacy and Medical Sciences (IRJPMS)*, Volume 9, Issue 2, pp. 49-53, 2026.

About 5ml of venous blood was collected into 5ml plain container after informed consent using standard venipuncture techniques. Samples were immediately centrifuged and serum obtained for seroprevalance analysis.

Data obtained were analyzed using SPSS version 20.

III. Results

Prevalence of Sars CoV-2 Antibodies in the Study

A total of 154 samples were examined across three location in Delta state: Ughelli, Warri and Asaba. Table 1, Figure 1 show the prevalence of SARS-CoV-2 antibodies across the study sites. Overall seropositivity was 63.64%, highest in Ughelli (75.47%), followed by Warri (60.78%) and Asaba (54.00%). The corresponding prevalence rates were 25.97%, 20.13%, and 17.53%, respectively. Differences across sites were not statistically significant ($\chi^2 = 5.39$, df = 2, $p > 0.05$), indicating relatively uniform exposure throughout Delta State.

Seroprevalence by Age Group

Participants were predominantly adults, with the largest proportions in the 31–45-year age group (44.16%) with the highest prevalence rate of 33.77% and followed by 19–30-year (31.17%) age groups. Seroprevalence increased with age, reaching a peak of 88.46% among those aged 46–60 years, while no seropositivity was detected in participants aged 61+ years (Table 2, Figure 2). This distribution indicates that working-age adults were the most frequently exposed population, possibly due to higher mobility and social interaction.

Seroprevalence by Gender

Among the 98 seropositive subjects, 56 (36.36%) were male and 42 (27.27%) were female (Table 3, Figure 3). Despite slight differences in prevalence between genders, Chi-square analysis ($\chi^2 = 8.43$, df = 4, $p > 0.05$) indicated no statistically significant association between gender and seropositivity. This suggests that SARS-CoV-2 infection occurred broadly across both sexes.

TABLE 1: Distribution of Sars CoV-2 Antibodies in the study

Study Area	No. Tested	No. of Positives (%)	No. of Negatives (%)	% Prevalence	X^2	P-Value
WARRI	51	31 (60.78)	20 (39.22)	20.13		
UGHELLI	53	40 (75.47)	13 (24.53)	25.97	5.39	P>0.05
ASABA	50	27 (54.00)	23 (46.00)	17.53		
TOTAL	**154**	**98 (63.64)**	**56 (36.36)**	**63.64**		

df =2; t- critical = 5.99; P < 0 > 0.05

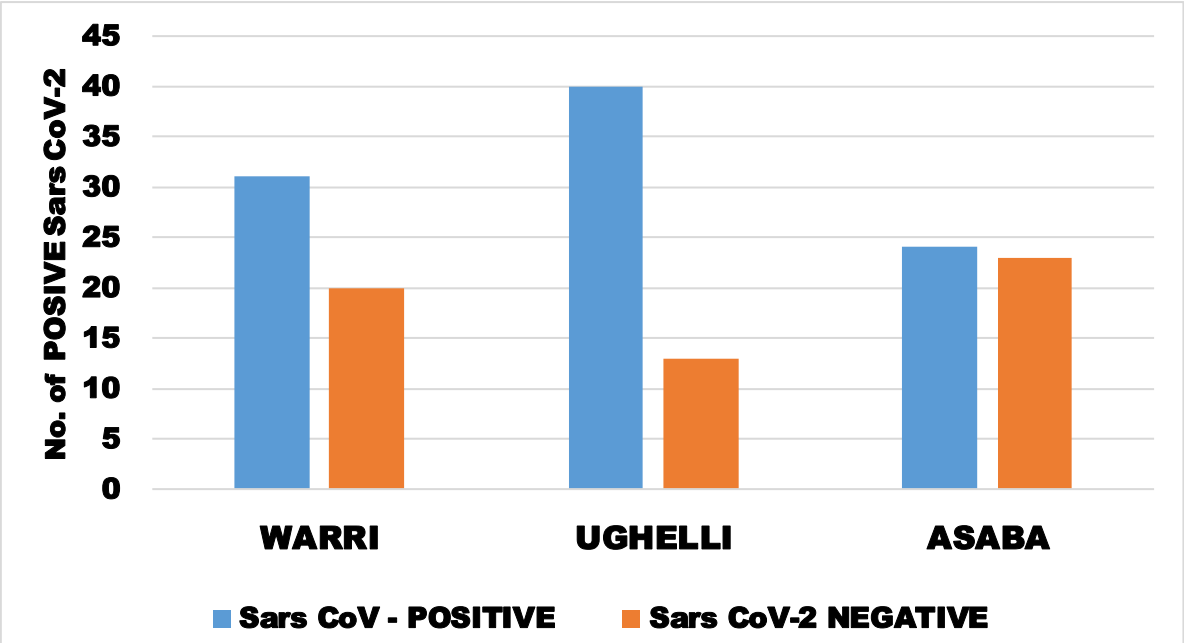

Figure 1: Distribution showing the prevalence of Sars CoV-2 Antiibodies across the three study area of Delta state

TABLE 2: Age Distribution of Sars CoV-2 antibodies in the study

Age Group (Yrs)	No. Tested	No. Positive	No Negative	% Prevalence
10-18	6	2 (33.33)	4 (66.66)	1.30
19-30	48	21 (43.75)	27(56.25)	13.64
31-45	68	52 (76.47)	16 (23.53)	33.77
46-60	26	23 (88.46)	3 (11.54)	14.94
61+	6	0 (0.00)	6 (100.00)	0.00
TOTAL	**154**	**98 (63.64)**	**56 (36.36)**	**63.64**

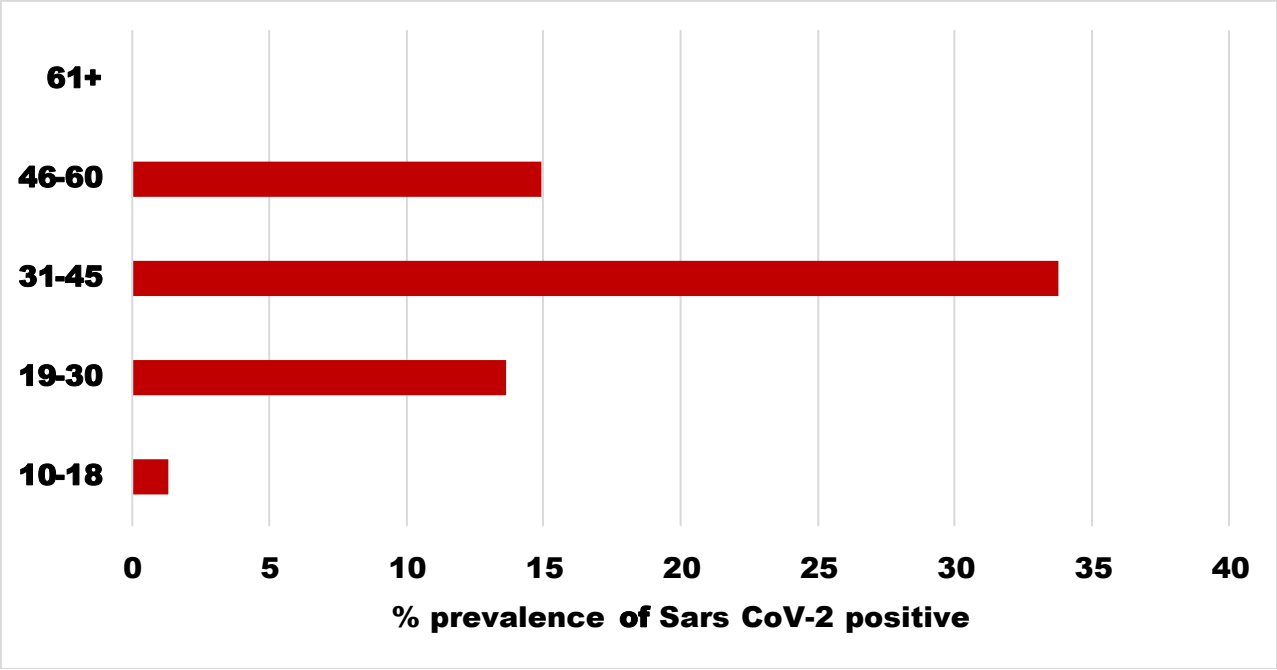

Figure 2: Age Distribution of Sars CoV-2 Antibodies in the study

TABLE 3: Comparative Age- and Gender Distribution of Sars CoV-2 Antibodies in the study.

		No. of SARS COV-2 Positive (%)					
Age group (years)	**No Tested (n)**	**Males**	**Females**	**Total**	**Prevalence rate (%)**	**X^2**	**P-value**
10-18	6	1 (16.67)	1 (16.67)	2 (33.333)	1.30		
19-30	48	14 (29.17)	7 (14.58)	21 (43.75)	13.64		
31-45	68	29 (42.65)	23 (33.82)	52 (76.47)	33.77	**8.43**	**P>0.05**
46-60	26	12 (46.15)	11 (42.31)	23 (88.46)	14.94		
61+	6	0 (0.00)	0 (0.00)	0 (0.00)	0.00		
Total	**154**	**56 (36.36)**	**42 (27.27)**	**98(63.63)**	**63.63**		

df =4; t- critical = 9.49 P < 0 > 0.05

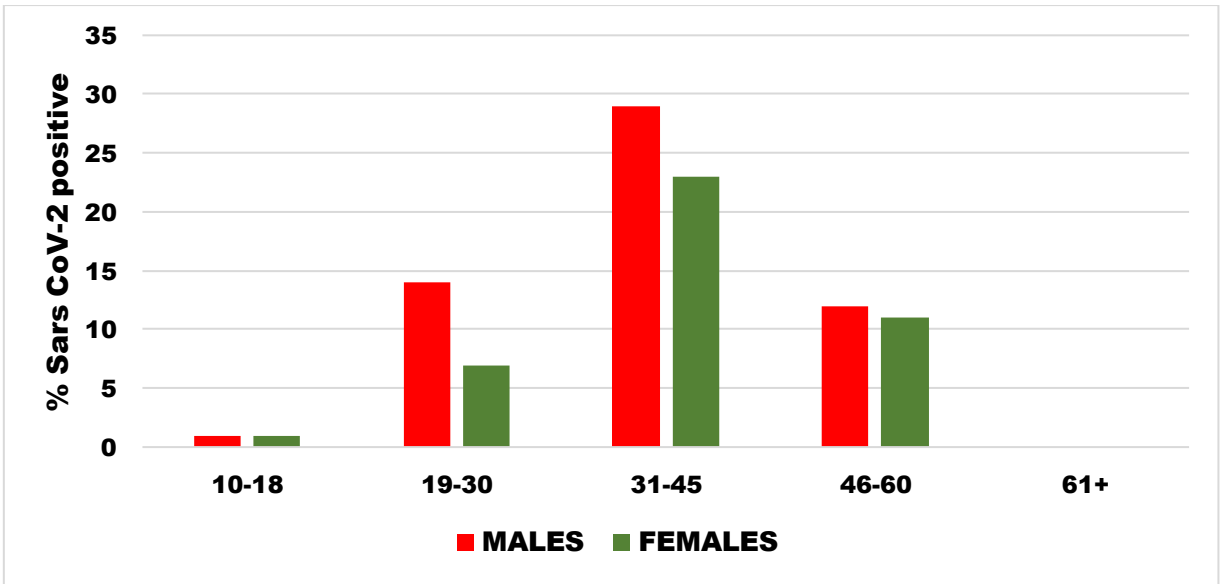

Figure 3: Age and Gender Distribution of Sars CoV-2 Antibodies in the study

IV. Discussion

The present study revealed a high health point prevalence of SARS-CoV-2 antibodies (63.64%) among subjects examined in Delta State, Nigeria. In line with previous Nigerian studies, A multicenter study conducted in several states by Kolawole et al. (2022) revealed a higher seroprevalence of 78.9%, suggesting significant and widespread community exposure to SARS-

CoV-2. The slightly lower prevalence observed in the present study may be attributable to differences in study period, vaccination status, geographical location, population structure, and study setting. Notably, this investigation was restricted to healthcare facilities within Delta State and exclusively assessed unvaccinated individuals presenting with respiratory tract infections. In further support of the present findings, Oyetunde *et al*. (2025) reported a seroprevalence of 58.0% among unvaccinated individuals in Osun State, a value marginally lower but comparable in magnitude. Collectively, these findings underscore sustained SARS-CoV-2 transmission across Nigeria, with regional variations reflecting differences in exposure dynamics and public health context. The high seroprevalence observed in this study further suggests substantial undetected and possibly silent transmission of SARS-CoV-2 within Delta State.

Age-stratified analysis showed that SARS-CoV-2 seropositivity was highest among participants aged 31–45 years, who accounted for 33.77% of the total seropositive cases. This may be attributed to increased mobility, occupational exposure, and social interactions characteristic of economically active adults. In line with established epidemiological patterns, working-age individuals are more likely to experience heightened exposure due to occupational engagement, frequent social contact, and reliance on public transportation, all of which facilitate viral transmission (He *et al*., 2020). In the Nigerian context, Olayanju *et al*. (2023) similarly reported that individuals within this age bracket are more likely to engage in occupations requiring physical presence, thereby increasing their risk of exposure during the pandemic. Comparable findings from previous studies suggest that higher seroprevalence among middle-aged adults reflects greater exposure rather than increased biological susceptibility. Moreover, Oran and Topol (2020) reported that individuals within this age group frequently experience asymptomatic or mild infections, which may contribute to sustained community transmission. These observations highlight the importance of targeted public health interventions and workplace-based infection-prevention strategies for economically active populations.

Conversely, markedly lower seropositivity was observed among participants aged 10–18 years and those aged 61 years and above. This finding likely reflects reduced exposure due to parental protection among younger individuals and increased self-isolation and risk-avoidance behaviors among older adults (Gudbjartsson *et al*., 2020; WHO, 2023). Overall, these findings underscore the pivotal role of economically active adults, particularly those aged 31–45 years, in driving SARS-CoV-2 transmission within the study population.

The study also revealed a higher seropositivity among males compared to females. This pattern has been reported in several sero-epidemiological studies and is largely attributed to gender-specific occupational and behavioral factors rather than inherent biological susceptibility (Bobrovitz *et al*., 2021; Peckham *et al*., 2020). In the Nigerian context, males are more likely to engage in outdoor, informal, and public-facing occupations, thereby increasing their frequency of social interactions and potential exposure to SARS-CoV-2 (Adepoju, 2020). Differences in risk perception and adherence to non-pharmaceutical preventive measures have also been shown to vary by gender, with males generally demonstrating lower compliance (Galasso *et al*., 2020). Consequently, the observed sex difference in seropositivity in this study is more likely to reflect variation in exposure dynamics rather than biological vulnerability, underscoring the importance of incorporating gender-sensitive considerations into public health interventions.

Despite these observed patterns, statistical analysis did not reveal any significant association between SARS-CoV-2 seropositivity and either age or gender, indicating that individuals across all demographic groups were susceptible to infection. However, the absence of statistical significance does not preclude subtle differences in exposure risk or immune response. Rather, it suggests widespread and relatively indiscriminate exposure within the study population. Therefore, public health interventions should not be narrowly targeted at specific demographic groups but should be broadly designed to address the general population.

V. Conclusion

The high seroprevalence of SARS-CoV-2 antibodies reported in this study underscores the substantial, undetected spread of the virus in Delta state. Therefore, continuous serological surveillance should be maintained as a key component of public health strategy and vaccination efforts should increase in order to curtail the spread of Sars CoV-2 virus and improve outbreak readiness in Delta state.

Conflict of interest: None

References

[1]. Adamu, A. and Abebe, T., "Seroprevalence of SARS-CoV-2 antibodies in Ethiopia: findings from the second round of the national population-based survey," *BMC Infectious Diseases*, vol. 23, pp.1–10, 2023.

[2]. Adepoju, P., "Nigeria responds to COVID-19; first case detected in sub-Saharan Africa," *Nature Medicine*, vol. 26, issue 4, pp. 444–448, 2020.

[3]. Adu Gyamfi, B., Owusu, J., Brown, O., "High SARS-CoV-2 seroprevalence in Greater Accra, Ghana during the Omicron wave: evidence from a cross-sectional survey," *Viruses*, vol. 17, issue 4, pp. 487, 2022.

[4]. Azuma, K., Yanagi, U., Kagi, N., "Environmental factors involved in SARS-CoV-2 transmission: effect and role of indoor environmental quality in the strategy for COVID-19 infection control," *Environmental Health and Preventive Medicine*, vol. 25, issue 1, pp. 66, 2020.

[5]. Bergeri, I., Whelan, M., Ware, H., "Global SARS-CoV-2 seroprevalence from January 2020 to April 2022: a systematic review and meta-analysis of standardized population-based studies," *Nature Medicine*, vol. 28, issue 10, pp. 2120–2137, 2022.

[6]. Bobrovitz, N., Arora, R.K., Cao, C., "Global seroprevalence of SARS-CoV-2 antibodies: a systematic review and meta-analysis," *PLOS ONE*, vol. 16, issue 6, pp.e0252617, 2021.

[7]. Deinne, C.E. and Ajayi, D.D., "Spatial dynamics of urban poverty in Delta State, Nigeria," *Journal of Poverty*, vol. 22, issue 3, pp. 269–286, 2018.

[8]. Galasso, V., Pons, V., Profeta, P., "Gender differences in COVID-19 attitudes and behavior: panel evidence from eight countries," *Proceedings of the National Academy of Sciences*, vol. 117, issue 44, pp. 27285–27291, 2020.

[9]. Guan, W.J., Ni, Z.Y., Hu, Y., "Clinical characteristics of coronavirus disease 2019 in China," *The New England Journal of Medicine*, vol. 382 issue 18, pp. 1708–1720, 2020.

[10]. Gudbjartsson, D.F., Norddahl, G.L., Melsted, P., "Humoral immune response to SARS-CoV-2 in Iceland," *The New England Journal of Medicine*, vol. 383, issue 18, pp. 1724–1734, 2020.
[11]. He, X., Lau, E.H.Y., Wu, P., "Temporal dynamics in viral shedding and transmissibility of COVID-19," *Nature Medicine*, vol. 26, issue 5, pp. 672–675, 2020.
[12]. Kolawole, O.M., Anjorin, A.A., Oladunjoye, I.O., "Seroprevalence of SARS-CoV-2 IgG antibodies in selected states of Nigeria during the first year of the COVID-19 pandemic," *PLOS ONE*, vol. 17, issue 7, pp.e0269781, 2022.
[13]. Kubina, R. and Dziedzic, A., "Molecular and serological tests for COVID-19: a comparative review of SARS-CoV-2 coronavirus laboratory and point-of-care diagnostics," *Diagnostics*, vol. 10, issue 6, pp. 434, 2020.
[14]. Long, Q.X., Liu, B.Z., Deng, H.J., "Antibody responses to SARS-CoV-2 in patients with COVID-19," *Nature Medicine*, vol. 26, issue 6, pp. 845–848, 2020.
[15]. Madhi, S.A., Kwatra, G., Myers, J.E., "Population immunity and COVID-19 severity with the Omicron variant in South Africa," *The New England Journal of Medicine*, vol. 386, issue 14, pp. 1314–1326, 2021.
[16]. Nwaki, C., "Socioeconomic transformations and demographic shifts in Delta State, Nigeria," *Journal of African Development Studies*, vol. 14, issue 2, pp. 112–130, 2022.
[17]. Okoye, C.O., Onyekachi, K.E., Ugwuanyi, I.K., "Seroprevalence of SARS-CoV-2 antibodies among patients attending health facilities in Anambra State, Nigeria," *Pan African Medical Journal*, vol. 40, pp. 215, 2021.
[18]. Olayanju, O., Bamidele, O., Olatunji, T., "SARS-CoV-2 seroprevalence in four Nigerian states, October 2020: a population-based household survey," *International Journal of Epidemiology*, vol. 52, issue 1, pp. 12–23, 2023.
[19]. Oran, D.P. and Topol, E.J., "Prevalence of asymptomatic SARS-CoV-2 infection: a narrative review," *Annals of Internal Medicine*, vol. 173, issue 5, pp. 362–367, 2020.
[20]. Oyetunde, O.B., Alao, J.O., Akinsola, O.A., "Seroprevalence of SARS-CoV-2 antibodies and demographic predictors among asymptomatic individuals in Osun State, Nigeria," *Discover Public Health*, vol. 22, p. 289, 2025.
[21]. Peckham, H., de Gruijter, N.M., Raine, C., "Male sex identified by global COVID-19 meta-analysis as a risk factor for death and intensive care unit admission," *Nature Communications*, vol. 11, p. 6317, 2020.
[22]. Rostami, A., Sepidarkish, M., Leeflang, M.M.G., **"**SARS-CoV-2 seroprevalence worldwide: a systematic review and meta-analysis," *Clinical Microbiology and Infection*, vol. 27, issue 3, pp.331-340, 2021.
[23]. Sharma, A., Tiwari, S., Deb, M.K. and Marty, J.L., "Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies," *International Journal of Antimicrobial Agents*, vol. 56, issue 2, p.106054, 2020.
[24]. Shaw, B. and Mena, E., "Seroprevalence of SARS-CoV-2 infection in Africa: a systematic review and meta-analysis of standardised seroprevalence studies, from January 2020 to December 2021," *BMJ Global Health*, vol. 7, issue 8, p.e008793, 2022.
[25]. Tarurhor, M.E. and Tarurhor, L.E., "COVID-19 pandemic and non-financial performance of the hospitality industries in Delta State," *Himalayan Journal of Economics and Business Management*, vol. 3, issue 1, pp. 16–20, 2022.
[26]. Uyoga, S., Adetifa, I.M.O., Karanja, H.K., "Seroprevalence of anti–SARS-CoV-2 IgG antibodies in Kenyan blood donors," *Science*, vol. 371, issue 6524, pp. 79–82, 2021.
[27]. World Health Organization, 2020. Coronavirus disease (COVID-19) pandemic. *World Health Organization*. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.