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Prevalent clinical symptoms, comorbidities, and treatment outcomes among COVID-19 patients in Abuja, Nigeria

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Abstract:
Comorbidities are medical conditions that coexist with the disease of interest but are unrelated in causality or aetiology to the primary diagnosis. Until recently, the influence of these coexisting medical conditions on the outcome of care for patients with specific disease conditions has often been ignored. This study aims to determine the prevalent clinical presentation, comorbidities, and treatment outcomes among COVID-19 patients in Abuja, Nigeria. The retrospective study design was employed to select 1056 COVID-19 patients from the three selected isolation centres in Abuja. Results indicate that the most prevalent clinical presentation was dry cough, 960 (91.2%), shortness of breath, 677 (64.3%), and fever, 615 (58.2%). Significant comorbidities in the overall population were Diabetes with Hypertension, with a frequency of 165 out of 547; Hypertension alone represented 123 out of 547, and diabetes alone 96 out of 547. Regarding the outcome of care, cumulatively, of the 1056 patients that participated in this study, 123 (11.6%) mortality was recorded, while the cumulative survival rate was 933 (88.4%). Furthermore, the result indicates that mortality among patients with diabetes and hypertension was highest at 45 (4.3%), followed by patients with diabetes alone at 25 (2.4%). Within fatal cases, an estimated 98.1% had the presence of one or more comorbidities. There is a significant relationship (p-value ≤ 0.01) between the prognosis of COVID-19 patients with comorbidities and those without comorbidities. Therefore, awareness, education, and lifestyle modification are advocated for those at risk of COVID-19.

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INTRODUCTION

The sudden outbreak of coronavirus disease in November 2019 (COVID-19), which originated from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, is a public health emergency that was classified as a global pandemic by the World Health Organization [WHO] in 2020 (Adegboye et al., 2020; Nm et al., 2021; Putri, 2024). COVID-19 started in Wuhan, China, and spread to 215 countries and territories, with 35.5 million people infected and over 1 million deaths (Baradaran et al., 2020). COVID-19 often presents with a respiratory syndrome that ranges in severity from dry cough, malaise, fever, sore throat, and new loss of taste/smell to difficulty in breathing and respiratory distress, with features of hypoxia in severe cases (Adhikari et al., 2020). The study by Nishiura et al. (2020) also reported other symptoms, including vomiting and diarrhea, in the symptomatology of the disease. Because of the high infectivity of the disease and the large population of Nigeria, there are concerns about the rapid spread of the disease (Amzat et al., 2020; Putri, 2024).

According to Aiyegbusi et al. (2021), COVID-19 is a highly contagious respiratory disease caused by the SARS-CoV-2 virus. COVID-19 spreads mainly through droplets of an infected person. According to evidence, not all infected persons exhibit symptoms, as some are asymptomatic

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throughout infectivity, making it more difficult to control (Nishiura et al., 2020). Furthermore, Putri (2024) reported that the illness has a global impact, not only in healthcare disruption but also in social and economic impact on all countries. Preventive measures have been identified as the best measure to control COVID-19. Therefore, evidence recommends measures such as wearing masks, physical distancing, hand hygiene, and vaccination as pivotal to controlling the infection. Although there are emerging variants of the virus, evidence reports that the preventive measures remain critical for control, even among persons with comorbidities (Putri, 2024).

Comorbidities are medical conditions that coexist with the disease of interest but are unrelated in causality or etiology to the primary diagnosis (Patrascu et al., 2023). They may occur prior to or simultaneously with the primary disease (Em et al., 2020). Until recently, the influence of these coexisting medical conditions on the outcome of care for patients with specific disease conditions has often been ignored (Em et al., 2020). According to Adedoyin et al. (2020), a large number of the most frequently used COVID-19 classification systems in clinical practice do not consider critical patient-based prognostic factors such as the general health of the COVID-19 patient, which is dependent on the presence, number, and pathophysiological severity of any coexisting illnesses or conditions. These illnesses or conditions that are not a result of the adverse effects of therapy for COVID-19, which existed before the COVID-19 diagnosis was made, are referred to as comorbidities (Reuben et al., 2020).

According to Sanyaolu et al. (2020), it is imperative to understand the comorbidities associated with COVID-19, which is prevalent in different locations. This is because evidence reveals that patients with comorbidities are at increased risk of developing severe forms of the disease and require intensive care treatment, which subsequently increases the risk of mortality (Singh et al.,2020; Zhao et al., 2020). Besides, Sanyaolu et al. (2020) reveal that COVID-19 patients with comorbidities have more than four times the risk of contracting the disease compared to those who have no underlying medical condition. According to the World Health Organization, this raises more concern, especially for countries with weak healthcare systems.

Nigeria has a poorly developed healthcare system with a central, non-functional health surveillance system. Hence, its capacity to respond to public health emergencies and provide adequate and timely medical care, especially during outbreaks, remains a challenge in the country. The evidence also reported that Nigeria's healthcare system is ranked 142nd out of 195 countries (Balogun, 2022).

Considering the high infectivity of COVID-19 and the reports of evidence that the presence of commodities increases not only the risk of contracting the disease but also mortality, and the weak healthcare system of Nigeria. It becomes imperative to understand this essential aspect of COVID-19 (Sanyaolu et al., 2020; Singh et al., 2020; Zhao et al., 2020). Accordingly, Anjorin et al. (2021) reported that it is important to understand the comorbidities of COVID-19 patients to predict and plan future healthcare utilization of patients.

There are a few studies that examine this aspect of COVID-19 in Nigeria (Osibogun et al., 2021; Akinbolagbe et al., 2021); however, to the researchers' knowledge, none have been conducted in Abuja despite the high population of the city. The study is significant in helping healthcare workers improve their index of suspicion based on the main clinical presentation and, invariably, help manage patients better, because the illness can present differently among different populations. Additionally, it would help the healthcare system and healthcare workers in Abuja, Nigeria, identify patients with a more severe prognosis. This would provide local data for the city and serve as a guide to preventive measures in the future. Lastly, research on treatment outcomes guides the effectiveness of therapy and the evolution of more efficacious therapies, improving survival rates and quality of patient care. In this regard, this study aims to determine the most prevalent symptoms of COVID-19 among patients in isolation centers in Abuja. Determine the prevalent comorbidity among COVID-19 patients in isolation centers in Abuja. Determine the treatment outcome for COVID-19 patients in isolation centers in Abuja.

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METHOD

Research Design

A retrospective study design was used to assess comorbidities and their impacts among the patients admitted into the three selected isolation centers in Abuja.

Research Setting and Target Population

The setting for the study was the National Hospital, Abuja Isolation Centre, and two other isolation centers in Abuja. The target population was all the patients admitted to the three selected isolation centers in Abuja between April 1, 2020, and January 31, 2021. As of January 31, 2021, the total number of admitted cases was 1,332.

Sample and Sampling Technique

A random technique was used to select all 1066 COVID-19 patients admitted to the three isolation centers in Abuja. The selection was made based on the existing medical records in each selected center until the total number for each isolation center was attained. The rule of thumb was applied to select 80% of the target population. Hence, the sample size was calculated to be 1066. However, data were collected from 1056 cases made available to the researcher.

Instrument of Data Collection

Data collection is primarily through the registry of patients/cases admitted as COVID-19 at the selected isolation centers in Abuja. While no laboratory test was carried out by the researcher on the patients, the medical records of the patients available with the management of the isolation centers formed the core of data collection. Relying on both electronic medical records systems and papers in the isolation centers. A checklist was developed to collect data relevant to the study objectives that will aid the researcher in answering the research questions. The information collected via the checklist was demographic information, medical and medication history, laboratory tests at admission, History of comorbidities (Hypertension, diabetes, obesity, and asthma), State of discharge/recovery, prognoses, inpatient treatment plan (including maximal supportive oxygen therapy), and clinical outcomes (discharged alive or deceased during the hospital stay.

The research instrument was subjected to face and content validity to ascertain its validity. The face and content validity of the instrument was ascertained by the approval of the researcher's supervisor. All views were evaluated and incorporated to enhance the content validity of the checklist.

Inter-rater reliability was employed to ascertain the degree of agreement among the raters and determine the reliability of the checklist. For the intra-rater reliability assessment, 85 records were given to the raters (45 for rater 1, 40 for rater 2). The intra-rater reliability was substantially excellent (Cohen's kappa 0-6-0.8) with an observed percentage agreement of 75%-95%.

Method of Data Collection

The data collection process covered six weeks; each of the selected isolation centers in Abuja was visited for permission to access the records of the COVID-19 patients admitted to their centers. The data was accessible through the hospital's electronic record system. A random sampling technique was used to select 80% of the patients in the record for inclusion in this study. The identified patients were selected from the study sample, and information from the patients' records was extracted using a developed checklist. The checklist has a section for the sociodemographic characteristics of the respondents, presence and types of chronic disease, and the presenting symptoms of the patients. The number of samples from each isolation center was calculated based on their total patient records as of January 31, 2021

Methods of Data Analysis

The data was analyzed using SPSS version 27. The data collected was categorized into continuous and categorical data. Descriptive data were presented using frequency tables and charts, while inferential statistics were analyzed using a One-Way ANOVA test and a Chi-square test. The

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relationship between comorbidities and overall survival of COVID-19 was estimated, and a p-value of less than 0.05 was considered statistically significant.

Ethical approval

Ethical clearance was obtained from the National Hospital, Abuja, Nigeria, research and ethics committee, with ethical approval number NHA/EC/012/2021. Additionally, the researchers adhered to all research ethical principles in the conduct of the study.

RESULT

Table 1 shows the sociodemographic characteristics of the respondents. A total of 1056 respondents from across three isolation centers participated in the study. Results show that 619 (58.6%) of the respondents were from the This Day Dom isolation center, while the DSS clinic had the least, 209 (19.8%) of the respondents. The mean age of the respondent was 42±8. There were more males, 717 (67.9%), compared to females, and more non-smokers, 697 (66%), than active smokers. Regarding alcohol consumption, data reveal more social consumers, 898 (85%), compared to active consumers, 135 (12%). Lastly, most of the respondents, 579 (54.8%), were on admission for 11-20 days, 450 (42.6%) for 1-10 days, and 21 or more days was the least, 27 (2.6%).

Table 1. Sociodemographic Variables (n=1,056)

Variable	Frequency	Percentage
Isolation Center		
National Hospital	228	21.6
DSS Clinic Abuja	209	19.8
This day Dome	619	58.6
Age (42±8)		
Below 18	8	0.8
18-30	129	12.1
31-40	163	15.4
41-50	267	25.3
51-60	291	27.6
Above 60	198	18.8
Sex		
Male	717	67.9
Female	339	32.1
Smoking		
Never/unknown	697	66.0
Former/current	359	34.0
Alcohol Intakes		
Never	23	2.2
Occasionally	898	85.0
Always	135	12.8
Number of Days in Hospital		
1-10	450	42.6
11-20	579	54.8
21-30	27	2.6

Figure 1 shows the signs and symptoms of COVID-19 patients admitted across the isolation center in Abuja. The most prevalent symptom was a dry cough, as presented by 960 (91.2%) patients. This is followed by shortness of breath 677 (64.3%) and fever 615 (58.2%). The least symptoms presented by patients were fatigue, productive cough, and pharyngotympanic, representing 0.9, 6.1, and 8.5 percent, respectively.

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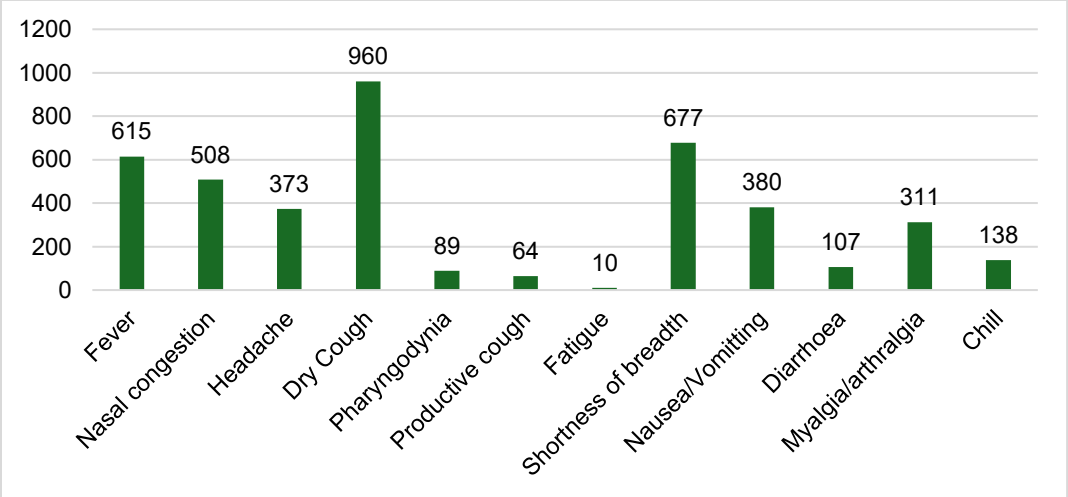

Figure 1. Symptoms Presented by COVID-19 Patients (n=1,056)

Table 2 shows the treatment outcome for patients admitted to isolation centers in Abuja. Of the 1056 patients participating in this study, 123 (11.6%) mortality was recorded, while the cumulative survival rate was 933 (88.4%). Results as presented on the table indicate that mortality among patients with diabetes and hypertension was 45 (4.3%), diabetes alone 25 (2.4%), diabetes, hypertension and obesity 15 (1.4%), hypertension alone 14 (1.3%), others were 10 (0.9%), hypertension, diabetes and asthma 8 (0.8%) and those with no comorbidity were 6 (0.6%), asthma alone and obesity alone recorded no mortality. With regards to the outcomes for survival, those with no comorbidity had 503 (53.9%), diabetes with hypertension 120 (11.4%), and hypertension alone 109 (10.3%). Concerning the association between comorbidities and treatment outcome, a significant relation exists between the variables with a p-value of 0.001.

Table 2. Treatment Outcomes for Patients with Comorbidity (n=1,056)

Underlying disease	Survived (%)	Dead (%)	Total (%)
Hypertension	109 (10.3)	14 (1.3)	123 (11.6)
Diabetes	71 (6.7)	25 (2.4)	96 (9.1)
Asthma	50 (4.7)	0 (0.0	50 (4.7)
Obesity	5 (0.5)	0 (0.0)	5 (0.5)
Diabetes with Hypertension	120 (11.4)	45 (4.3)	165 (15.6)
diabetes, hypertension, and obesity	8 (0.8)	15 (1.4)	23 (2.2)
hypertension, diabetes, and asthma	13 (1.2)	8 (0.8)	21 (2.0)
Others	54 (5.1)	10 (0.9)	64 (6.1)
Nil	503 (47.6)	6 (0.6)	509 (48.2)
Total	933 (88.4)	123 (11.6)	1056 (100.0)
$X^2 = 199.33$, df = 8, and p-value = 0.000			

Table 3 shows the association between age, alcohol consumption, and smoking with the outcome of treatment. A significant association (p-value= 0.001) was observed between alcohol consumption and treatment outcome, while an insignificant association (p-value= 0.29) was observed between the outcome of treatment and smoking.

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Table 3. Sociodemographic Predictors of Patients' Outcome (n=1,056)

Parameter	Recovery Rate	Death Rate	X^2	p-value
Age				
Age below 18 years	100	0		
18-30	96.9	3.1		
31-40	89	11		
41-50	91.4	8.6		
51-60	87.3	12.7		
Above 60	79.3	30.7		
Alcohol intakes				
Non-Alcohol consumers	100	0	16.93	0.001
Occasional consumers	89.5	10.5		
Heavy consumers	78.5	21.5		
Smoking			1.10	0.29
Non-smokers	89.1	9.9		
Current or former smokers	86.9	13.1		

DISCUSSION

Findings from the study indicate that the mean age of the respondents was 42±8. There appears to be a corresponding finding in the age distribution of patients with COVID-19, somewhat similar to the study of Osibogun et al. (2021), which reveals that the mean age distribution of respondents in their study was 43 and 49.80 (± 16.68) years, as in the study of Akinbolagbe et al. (2021). This is a pointer to the fact that most patients within the age of 40 are the ones who contract COVID-19 the most compared to other age categories. With regards to the gender that mainly contracts the disease in Abuja, the findings of this study reveal that there were more males compared to females. This could be related to the fact that men are more adventurous and, as such, do not comply with movement restrictions compared to their female counterparts (Owusu et al., 2023). In addition to the sociodemographic variables, lifestyle also appears to play a role in the epidemiology of COVID-19, as findings reveal that there were more smokers and alcohol consumers compared to non-users.

Regarding the most prevalent signs and symptoms that COVID-19 patients in Abuja present with, findings show that dry cough, shortness of breath, and fever were the three most prevalent clinical manifestations among patients. These findings correspond to the study of Esakandari et al. (2020), who found that dry cough, shortness of breath, and fever were the three most prevalent symptoms in their patients. On the contrary, the finding slightly differs from the study of Alimohamadi et al. (2020). Although fever and cough were found to be common, Alimohamadi et al. (2020) reported fatigue to be among the most prevalent presentations of patients, contrary to the shortness of breath that patients in this study presented with. Although this study's findings show fever as the most common clinical manifestation, it is important to note that not all patients present with fever as a symptom. As such, the current use of fever as a screening parameter should be cautiously implemented.

On the most common comorbidity in patients with COVID-19, findings from this study reveal that diabetes in combination with hypertension was the most common comorbidity, followed by those with hypertension alone. The findings of the combination of diabetes and hypertension as the most common comorbidity found in this study are contrary to the findings of isolated comorbidity found in various studies (Osibogun et al., 2021; Akinbolagbe et al., 2021; Singh et al., 2023). It is important to note that both the studies of Osibogun et al. (2021), Akinbolagbe et al. (2021), and Singh et al. (2023) reported diabetes and hypertension as the most common comorbidities of COVID-19; however, this study now shows that a combination of these comorbidities possesses more risk to patients than any one of them does individually. This, then, therefore, means that patients with diabetes and hypertension have an increased risk of suffering from a severe form of COVID-19 compared to patients with any of the comorbidities existing in isolation.

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Regarding the care outcome to patients with COVID-19 in isolation centres in Abuja, the study's results indicate that patients with comorbidities had higher mortality rates than patients with no underlying comorbidity. This finding corresponds to the study of Osibogun et al. (2021), who conducted their study in Lagos, Nigeria, among 2184 participants. Additionally, mortalities are seen more among patients with dual comorbidities (diabetes with hypertension) compared to any standalone comorbidity. This contradicts the findings of Akinbolagbe et al. (2021), who revealed that hypertension was associated with more mortality, closely followed by diabetes.

A similar finding was reported by Elezkurtaj et al. (2021), who conducted their study in Germany and found that more mortality was recorded among hypertensive patients compared to those with any underlying condition. Furthermore, findings reveal a significant association between comorbidity and smoking with survival. This corresponds to the findings in the study of Petrilli et al. (2019) that reveal lifestyle factors such as smoking and alcohol consumption as predictors of the risk of severe forms of COVID-19 disease. These findings, therefore, point to the need for public enlightenment for persons with underlying conditions, the aged, and cigarette smokers to be proactive in adhering to preventive measures such as hand hygiene (Akhiat et al., 2024).

CONCLUSION

The study concludes that dry cough, shortness of breath, and fever are the most common symptoms among COVID-19 patients, and existing medical conditions such as diabetes and hypertension are linked to COVID-19 prognosis. Survival rate for the patients was high, but more mortality was observed among patients with diabetes and hypertension compared to other comorbidities and those with no comorbidities. Therefore, the study recommends adequately monitoring and supporting this category of persons.

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REFERENCES

Adedoyin, R. A., Mohammed, J., Ojukwu, C. P., Okafor, U. a. C., Oti, I. K., Onuchukwu, C. L., . . . Gbiri, C. a. O. (2020). Management of Patients with COVID-19 Infection in Acute Settings: A Position Paper for Cardiopulmonary Physiotherapists by the Association of Clinical and Academic Physiotherapists of Nigeria. *Open Journal of Therapy and Rehabilitation*, *08*(03), 72–82. https://doi.org/10.4236/ojtr.2020.83007

Adegboye, O. A., Adekunle, A. I., & Gayawan, E. (2020). Early transmission dynamics of novel coronavirus (COVID-19) in Nigeria. *International Journal of Environmental Research and Public Health*, *17*(9), 3054. https://doi.org/10.3390/ijerph17093054

Adhikari, S. P., Meng, S., Wu, Y., Mao, Y., Ye, R., Wang, Q., . . . Zhou, H. (2020). Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infectious Diseases of Poverty*, *9*(1). https://doi.org/10.1186/s40249-020-00646-x

Aiyegbusi, O. L., Hughes, S. E., Turner, G., Rivera, S. C., McMullan, C., Chandan, J. S., . . . Calvert, M. J. (2021). Symptoms, complications, and management of long COVID: a review. *Journal of the Royal Society of Medicine*, *114*(9), 428–442. https://doi.org/10.1177/01410768211032850

Akinbolagbe, Y. O., Otrofanowei, E., Akase, I. E., Akintan, P. E., Ima-Edomwonyi, U. E., Olopade, B. O., . . . Esezobor, C. (2021). Predictors and outcomes of COVID-19 patients with hypoxemia in Lagos, Nigeria. *Journal of the Pan African Thoracic Society*, *3*, 42–50. https://doi.org/10.25259/jpats_25_2021

Alimohamadi, Y., Holakouie-Naieni, K., Sepandi, M., & Taghdir, M. (2020). Effect of Social Distancing on COVID-19 Incidence and Mortality in Iran Since February 20 to May 13, 2020: An Interrupted Time Series Analysis. *Risk Management and Healthcare Policy*, *13*, 1695–1700. https://doi.org/10.2147/rmhp.s265079

Amzat, J., Aminu, K., Kolo, V. I., Akinyele, A. A., Ogundairo, J. A., & Danjibo, M. C. (2020). Coronavirus outbreak in Nigeria: Burden and socio-medical response during the first 100 days. *International Journal of Infectious Diseases*, *98*, 218–224. https://doi.org/10.1016/j.ijid.2020.06.067

Anjorin, A., Abioye, A., Asowata, O., Soipe, A., Kazeem, M., Adesanya, I., . . . Omotayo, M. (2020). Comorbidities and the COVID-19 pandemic dynamics in Africa. *Tropical Medicine & International Health*, *26*(1), 2–13. https://doi.org/10.1111/tmi.13504

Balogun, J. A. (2022). The vulnerabilities of the Nigerian healthcare system. In *The Nigerian healthcare system: pathway to universal and high-quality health care* (pp. 117-152). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-88863-3_5

Baradaran, A., Ebrahimzadeh, M. H., Baradaran, A., & Kachooei, A. R. (2020). Prevalence of Comorbidities in COVID-19 Patients: A Systematic Review and Meta-Analysis. *PubMed*, *8*(Suppl 1), 247–255. https://doi.org/10.22038/abjs.2020.47754.2346

Elezkurtaj, S., Greuel, S., Ihlow, J., Michaelis, E. G., Bischoff, P., Kunze, C. A., . . . Horst, D. (2021). Causes of death and comorbidities in hospitalized patients with COVID-19. *Scientific Reports*, *11*(1). https://doi.org/10.1038/s41598-021-82862-5

Esakandari, H., Nabi-Afjadi, M., Fakkari-Afjadi, J., Farahmandian, N., Miresmaeili, S., & Bahreini, E. (2020). A comprehensive review of COVID-19 characteristics. *Biological Procedures Online*, *22*(1). https://doi.org/10.1186/s12575-020-00128-2

Khedr, E. M., Daef, E., Mohamed-Hussein, A., Mostafa, E. F., Zein, M., Hassany, S. M., . . . Hashem, M. K. (2020). Impact of comorbidities on COVID-19 outcome. *medRxiv (Cold Spring Harbor Laboratory)*. https://doi.org/10.1101/2020.11.28.20240267

Nishiura, H., Oshitani, H., Kobayashi, T., Saito, T., Sunagawa, T., Matsui, T., . . . Suzuki, M. (2020). Closed environments facilitate secondary transmission of coronavirus disease 2019 (COVID-19). *medRxiv (Cold Spring Harbor Laboratory)*. https://doi.org/10.1101/2020.02.28.20029272

Osibogun, A., Balogun, M., Abayomi, A., Idris, J., Kuyinu, Y., Odukoya, O., . . . Akinroye, K. (2021). Outcomes of COVID-19 patients with comorbidities in southwest Nigeria. *PLoS ONE*, *16*(3), e0248281. https://doi.org/10.1371/journal.pone.0248281

Otuonye, N. M., Olumade, T. J., Ojetunde, M. M., Holdbrooke, S. A., Ayoola, J. B., Nyam, I. Y., . . . Odunukwe, N. N. (2020). Clinical and Demographic Characteristics of COVID-19 patients in Lagos, Nigeria: A Descriptive Study. *Journal of the National Medical Association*, *113*(3), 301–306. https://doi.org/10.1016/j.jnma.2020.11.011

Owusu, A. B., Yiran, G. a. B., Afagbedzi, S. K., & Takyi, E. (2023). District-level analysis of sociodemographic factors and COVID-19 infections in Greater Accra and Ashanti regions, Ghana. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1140108

Patrascu, I., Lehene, M., & Bercea, I. (2023). Comorbidities of COVID-19 Patients. *Medicina*, *59*(8), 1393. https://doi.org/10.3390/medicina59081393

Petrilli, C. M., Jones, S. A., Yang, J., Rajagopalan, H., O'Donnell, L., Chernyak, Y., . . . Horwitz, L. I. (2020). Factors associated with hospital admission and critical illness among 5279 people with coronavirus disease 2019 in New York City: prospective cohort study. *BMJ*, m1966. https://doi.org/10.1136/bmj.m1966

Putri, P. (2024). The Relationship between Family Support and Patient Anxiety when Undergoing Rapid Screening Tests COVID-19 in Hospitals. *Nursing and Health Sciences Journal (NHSJ)*, *4*(3), 300–305. https://doi.org/10.53713/nhsj.v4i3.383

Reuben, R. C., Danladi, M. M. A., Saleh, D. A., & Ejembi, P. E. (2020). Knowledge, Attitudes and Practices towards COVID-19: An epidemiological survey in North-Central Nigeria. *Journal of Community Health*, *46*(3), 457–470. https://doi.org/10.1007/s10900-020-00881-1

Sanyaolu, A., Okorie, C., Marinkovic, A., Patidar, R., Younis, K., Desai, P., . . . Altaf, M. (2020). Comorbidity and its Impact on Patients with COVID-19. *SN Comprehensive Clinical Medicine*, *2*(8), 1069–1076. https://doi.org/10.1007/s42399-020-00363-4

Volume 05, Number 03 (September 2025)
e-ISSN: 2798-5067
p-ISSN: 2798-5059

Singh, A. K., Gupta, R., Ghosh, A., & Misra, A. (2020). Diabetes in COVID-19: Prevalence, pathophysiology, prognosis and practical considerations. *Diabetes & Metabolic Syndrome Clinical Research & Reviews*, *14*(4), 303–310. https://doi.org/10.1016/j.dsx.2020.04.004

Singh, P., Bhaskar, Y., Verma, P., Rana, S., Goel, P., Kumar, S., . . . Singh, H. (2023). Impact of comorbidity on patients with COVID-19 in India: A nationwide analysis. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.1027312

Yasin, D. D. F., Akhiat, N., Lazuardi, S., Fraghini, C., & Wildan, M. (2024). The impact of Parenting styles based on the Health Belief Model on School-Age Children's Personal Hygiene in the Bangka region. *Nursing and Health Sciences Journal (NHSJ)*, *4*(4), 408–414. https://doi.org/10.53713/nhsj.v4i4.422

Zhao, Q., Meng, M., Kumar, R., Wu, Y., Huang, J., Lian, N., . . . Lin, S. (2020). The impact of COPD and smoking history on the severity of COVID-19: A systematic review and meta-analysis. *Journal of Medical Virology*, *92*(10), 1915–1921. https://doi.org/10.1002/jmv.25889