ISSN: 2474-3658

Okunbor et al. J Infect Dis Epidemiol 2024, 10:318
DOI: 10.23937/2474-3658/1510318
Volume 10 | Issue 3
Open Access

Journal of
Infectious Diseases and Epidemiology

ORIGINAL ARTICLE

COVID-19 Risk Categorization of Patients Attending Private Healthcare Facilities in Southwest Nigeria

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Abstract

Background: Understanding disease risk is important for prevention. Identifying high-risk COVID-19 patients helps healthcare professionals implement precautions. This study examined factors related to COVID-19 prevention in patients at private healthcare facilities in Southwest Nigeria, during the early stages of the pandemic.

Methods: A survey was conducted in two hospitals using multi-stage sampling. 400 respondents were chosen from two out of 78 private healthcare facilities in Southwest Nigeria. Trained interviewers administered a questionnaire to collect information on risk profile, symptoms, perception of COVID-19 risk, and preventive practices. COVID-19 risk was assessed on a five-point scale. Data was analyzed using descriptive statistics, chi-square test, and binary logistic regression at a significance level of 0.05.

Results: The average age of participants was 27.83 + 10.46 years. 52.8% of respondents were female. 70.5% were single, 75.8% belonged to the Yoruba ethnic group, and 72% identified as Christians. None had a history of international travel or contact with a confirmed COVID-19 case in the past 14 days, but 12.75% had been in contact with suspected cases. 47% reported having a fever. The majority had a low risk score for COVID-19. Most did not smoke (98.5%), consume alcohol (83.75%), or visit club houses (85.75%). Only 9.5% underwent COVID-19 testing, and 16.0% of those tested were positive. The main reason for test refusal was a lack of perception of susceptibility to COVID-19. Adherence to preventive practices was poor in all investigated circumstances.

Conclusion: Patients presenting in hospitals during the early phase of the COVID-19 pandemic had a low risk of COVID-19. However, their poor compliance with preventive protocols and low testing uptake make them a potential source of transmission. Strategies to promote adoption of preventive measures are needed, especially among patients at private healthcare facilities.

Keywords

COVID-19, Risk categorization, Private healthcare facilities

Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by a new strain of coronavirus, is a highly contagious respiratory illness [1]. It spreads through respiratory droplets and can cause mild to severe symptoms such as fever, cough, and fatigue. The incubation period is around 5 to 14 days. The first case was reported in Wuhan, China on December 31, 2019, and Nigeria confirmed its first case in Lagos on February 27, 2020 [2,3].

Understanding the burden and distribution of risk factors is crucial in decision-making for implementing preventive measures [4-7]. An individual's perception of their risk to COVID-19 is influenced by personal and social factors. Having an accurate perception of one's risk is vital in motivating individuals to take necessary

Citation: Okunbor HN, Dairo MD, Oluwole TO, Okunbor LO, Akinsolu F, et al. (2024) COVID-19 Risk Categorization of Patients Attending Private Healthcare Facilities in Southwest Nigeria. J Infect Dis Epidemiol 10:318. doi.org/10.23937/2474-3658/1510318

Accepted: March 29, 2024: **Published:** March 31, 2024

protective actions. Adherence to preventive measures can effectively prevent and control the spread of the disease. Limited awareness of COVID-19 symptoms and risk factors may hinder willingness to adopt preventive measures. Identifying common risk factors can enhance preventive efforts (Otu, et al. 2018). Early identification of a patient's risk category can contribute to curtailing the spread of the disease [8]. The objective of this study was to determine the factors associated with COVID-19 risk among patients attending private healthcare facilities in Southwest Nigeria.

Methods

This is a cross-sectional study among 400 outpatients in two private healthcare facilities, with the aim of investigating the factors associated with COVID-19 risk among patients in two private healthcare facilities in Southwest, Nigeria. A was a multi-stage random sampling technique was used to select participants for this study (simple random sampling to select the Local Government Area -stage 1,simple random sampling without replacement to select two hospitals- stage 2, systematic random sampling to select participants- stage 3) [9]. Participants had to be willing, able to understand information, and adults aged 18-60 who had visited two hospitals. Exclusions included those taking antipyretics, severely ill individuals, and those who did not provide informed consent.

Data was collected through an interviewer-administered questionnaire, focusing on socio-demographic characteristics, COVID-19 risk profile scoring system adapted from WHO risk categorization tool was used (0-2: low risk, 3-4: moderate risk, 5-16: highrisk) [10], questionnaire was administered to respondents who met the inclusion criteria until the desired sample size was reached. Ethical approval was obtained from the Oyo State Ministry of Health and confidentiality was assured.

For data analysis, the questionnaires were counted, screened, coded, and entered into SPSS version 23. The respondents' occupations were categorized. The scoring guide in section C of the questionnaire had five sections, each assigned a specific point value. Risk categorization was determined based on the total points. Binary logistic regression was used to identify predictors of risk perception for having COVID-19. A p-value of less than 0.05 was considered statistically significant.

Results

The mean age was 27.83 ± 10.46 years. 57.8% of the population below below 20-years-old, while 17.0% were between 20-29 years-old. 52.8% of the population was female and 70.5% was unmarried. 303 individuals identified as Yoruba, 8.5% as Igbo, and 4.3% as Hausa. 72.0% of the population identified as Christian. 56.8% of the population consisted of students. 58.1% had completed secondary education and 42.3% had completed tertiary education. 17% of the population reported having medical conditions, with hypertension being the most prevalent at 38.8%. Other reported conditions include respiratory disease at 19%, diabetes mellitus at 3.5%, and hemoglobinopathy at 2.25%. None of the participants had contact with a confirmed case of COVID-19, while 12.75% had contact with a suspected case (Table 1 and Table 2). 47% reported experiencing combinations of symptoms such as fever, body aches, runny nose or sore throat, and cough. Other reported symptoms included abdominal symptoms (13.8%), loss of smell (6%), loss of taste (4.5%), and shortness of breath (1.8%). The most common symptoms were fever, body ache, and cough, which align with findings from studies conducted in the USA and Lagos [11-14] (Table 3). The majority of respondents had low or moderate risk scores for COVID-19 screening (Table 4).

Individuals between the ages of 36 and 43 had the highest risk of COVID-19, three times higher than individuals at the extremes of age. This finding contradicts a study conducted in the United States. Older age groups may be more susceptible to severe forms of the disease ($x^2 = 55.70$; $p < 0.05$). This finding was dissimilar to a study conducted in USA which found that people of the extremes of age had higher risk of COVID-19 [15,16]. Male respondents were twice as likely to be classified as high risk compared to females. However, this difference was not statistically significant ($x^2 = 3.84$, $p = 0.146$). These findings align with studies conducted in European Union member countries [17,18]. Individuals of Northern Nigerian descent, specifically the Hausa ethnic group, were three times more likely to be classified as high risk compared to individuals from Eastern Nigeria (Ibo). Individuals of Yoruba descent were twice as likely. These differences in risk were statistically significant ($x^2 = 15.35$, $p = 0.018$). These findings are consistent with previous research on health disparities in the Hausa community. Socio-cultural and environmental factors contribute to these disparities [19-22].

In terms of religious affiliation, Muslims were found to have a 2-fold higher likelihood (13, 11.7%) of being classified as high risk compared to Christians, but this difference was not statistically significant ($x^2 = 8.24$, $p = 0.083$). The relationship between religion and health outcomes has been studied, but the findings have been inconsistent. Some studies have found a significant link between religion and mental health, particularly in relation to depression, anxiety, substance abuse, and suicidal behavior [23]. Other studies have explored the role of religious coping in moderating psychosocial factors and its potential protective effect on mental health outcomes [24-27]. However, the influence of religious beliefs on health behaviors and outcomes is still a complex area of investigation. Tertiary education was associated with a significantly higher risk (13.0%) compared to secondary education for being classified

Table 1: Socio-demographics characteristics of the study population.

Characteristics		Frequency (n = 400)	Percentage (%)
Age	< 20 year	231	57.8
	20-29 years	68	17.0
	30-39 years	57	14.3
	40-49 years	26	6.5
	50-59 years	18	4.5
	≥ 60 years	0	0
Gender	Male	189	47.3
	Female	211	52.8
Ethnicity	Yoruba	303	75.8
	Hausa	17	4.3
	Ibo	34	8.5
	Others	46	11.5
Religion	Christianity	288	72.0
	Islam	111	27.8
	Traditional	1	0.3
Marital Status	Single	282	70.5
	Married	116	29.0
	Separated	2	0.5
	Widowed	0	0.0
Level of Education	No formal	3	0.8
	Primary	1	0.3
	Secondary	229	58.1
	Tertiary	169	42.3
Occupation	Student	227	56.8
	lecturer	19	4.8
	Civil servant	18	4.5
	Unemployed	6	1.5
	Others	130	32.5
Medical Conditions	Hypertension	35	8.75
	Heart disease	0	0
	Diabetes mellitus	14	3.5
	Kidney disease	0	0
	Respiratory disease	19	4.75
	Hemoglobinopathy	9	2.25

Table 2: Contact with suspected and confirmed cases.

	Yes	No
Contact with Confirmed Case	0(0)	400(100)
Contact with Suspected Case with	51(12.75)	349(87.25)
Fever	41(10.25)	
Cough	25(6.25)	
Runny nose	30(7.5)	
Fatigue	12(3)	

Table 3: Symptoms of respondents.

	Yes	No
Patient Symptoms		
Fever	188(47)	212(53)
Cough	110(27.5)	290(72.5)
Runny nose or sore throat	114(28.5)	286(71.5)

Body aches	158(39.5)	242(60.5)
Abdominal symptoms (diarrhea)	55(13.8)	345(86.25)
Shortness of breath	7(1.8)	393(98.25)
Loss of smell	24(6)	376(94)
Loss of taste	18(4.5)	382(95.5)
Total	400(100)	400(100)

Table 4: Factor associated with COVID-19 risk categorization of patients.

		Low risk	Moderate risk	High risk	Total	X^2	P value
Age	<= 26	168	50	13 (5.6%)	231	55.70	0.000
	27-35	39	23	6 (8.8%)	68		
	36-43	22	25	10 (17.5%)	57		
	44-52	12	13	1 (3.8%)	26		
	53+	2	15	1 (5.6%)	18		
Gender	Male	107	63	19 (10.1%)	189	3.84	0.146
	Female	136	63	12 (5.7%)	211		
Ethnic Group	Yoruba	183	95	25 (8.3%)	303	15.35	0.018
	Hausa	4	10	3 (17.6%)	17		
	Ibo	21	11	2 (5.9%)	34		
	Others	35	10	1 (2.2%)	46		
Religion	Christianity	185	85	18 (6.3%)	288	8.24	0.083
	Islam	58	40	13 (11.7%)	111		
	Traditional	0	1	0 (0.0%)	1		
Level Of Education	No Formal	1	2	0 (0.0%)	3	21.68	0.001
	Primary	0	1	0 (0.0%)	1		
	Secondary	156	62	9 (4.0%)	227		
	Tertiary	86	61	22 (13.0%)	169		
Occupation	Student	176	40	11 (4.8%)	227	75.38	0.000
	Lecturer	12	7	0 (0.0%)	19		
	Civil Servant	9	6	3 (16.7%)	18		
	Unemployed	4	2	0 (0.0%)	6		
	Others	42	71	17 (13.1%)	130		
Marital Status	Single	202	62	18 (6.4%)	282	48.81	0.000
	Married	40	63	13 (11.2%)	116		
	Separated	1	1 (50.0%)	0 (0.00%)	2		
Comorbidities	Hypertension (YES)	10	22	3 (8.6%)	365	18.54	0.000
	Hypertension (NO)	233	104	28 (7.7%)	35		
	Diabetes mellitus (YES)	6	6	2 (14.3%)	14	2.16	0.340
	Diabetes mellitus (NO)	237	120	29 (7.5%)	386		
	Respiratory disease (YES)	9	8	2 (10.5%)	19	1.50	0.473
	Respiratory disease (NO)	234	118	29 (7.6%)	381		
Total	Count	243	126	31	400		
	Total	60.8%	31.5%	7.8%	100.0%		

as high risk (x^2 = 21.68, p = 0.001). Larina, et al. [28] found a higher risk of breast cancer in medium and high education level groups compared to low education level group. Jiang, et al. [29] found that higher education was associated with more favorable cardiovascular disease risk factors.

Government workers had a higher likelihood (16.7%) of being classified as high risk compared to students (4.8%). This difference was statistically significant (x^2 = 75.38, p < 0.05). The higher risk among government workers can be attributed to stress from role overload and responsibility, as suggested by Mirmohammadi, et al. [30] and Sealey, et al. [31]. Straub, Ronald Arthur Marsh and Whalen [32] found a high prevalence of

chronic disease risk factors among government office employees. Married individuals had a higher risk of COVID-19 compared to unmarried individuals. This was also statistically significant ($x^2 = 18.54$, $p < 0.05$). Previous research also supports this connection, with married individuals having a lower risk of infection. Being single and living alone is associated with negative lifestyle changes and less psychological support [33-35]. Hypertension increased the risk of COVID-19, while diabetes mellitus ($x^2 = 48.81$, $p < 0.05$) and respiratory diseases also increased the risk, but not significantly. A study found that individuals with diabetes mellitus had a higher risk compared to those with hypertension and respiratory diseases [11].

Strengths and Limitations

This study's strength lies in its robust statistical method for generating valid and reliable perception constructs. However, it faces limitations due to potential recall bias among participants, which may not necessarily indicate intentional actions based on voluntary and correct COVID-19 outcome statements.

Conclusion

The study analyzed the risk for COVID-19 infection in Nigeria, focusing on the age, gender, ethnicity, and religious affiliation of the population. The majority of respondents were students, with a high percentage of students and a high rate of completion of secondary education. The study found that individuals aged 36-43 had the highest risk of COVID-19, while male respondents were twice as likely to be classified as high risk. The study also found that Muslims had a higher likelihood of being classified as high risk compared to Christians. Higher education is linked to a higher risk of high-risk diseases. Government workers are at a higher risk due to stress and responsibility. Married individuals have a higher risk of COVID-19. Comorbidities like hypertension and diabetes mellitus also increase the risk.

Recommendation

The study suggests several public health recommendations to reduce the risk of COVID-19 infection. These include targeted campaigns, education programs, gender-specific interventions, community engagement, stress management, health screening, and policy interventions. These measures aim to raise awareness, promote preventive measures, and improve healthcare access for vulnerable populations. Collaboration between government agencies, healthcare providers, community organizations, and other stakeholders is crucial for effective implementation and mitigation of the virus's impact.

Availability of Data and Materials

All data relevant to the study are included in the article or uploaded as supplementary information.

Author Contributions

All authors were involved during: Concept and design, acquisition, analysis or interpretation of data, drafting and critical revision of the manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. World Health Organization (2020) Coronavirus.
2. CDC (2020) First case of corona virus disease confirmed in Nigeria.
3. World Health Organization (2020) Coronavirus disease 2019 (COVID-19) Situation Report -73 highlights.
4. Ye Y, Wu R, Ge Y, Wang T, Yao X, et al. (2021) Preventive behaviours and family inequalities during the COVID-19 pandemic: A cross-sectional study in China. Infect Dis Poverty 10: 100.
5. Alkhaldi G, Aljuraiban GS, Alhurishi S, De Souza R, Lamahewa K, et al. (2021) Perceptions towards COVID-19 and adoption of preventive measures among the public in Saudi Arabia: A cross sectional study. BMC Public Health 21: 1251.
6. Sánchez-Arenas R, Doubova SV, González-Pérez MA, Pérez-Cuevas R (2021) Factors associated with COVID-19 preventive health behaviors among the general public in Mexico City and the State of Mexico. PLoS One 16: e0254435.
7. Feyisa ZT (2021) Factors limiting youths' practice of preventive measures toward the outbreak of COVID-19 in Oromia special zone surrounding Finfinnee, Ethiopia. PLoS One 16: e0248495.
8. Jin JM, Bai P, He W, Wu F, Liu XF, et al. (2020) Gender differences in patients with COVID-19: Focus on severity and mortality. Front Public Health 8: 152.
9. Federal Ministry of Health (2019) NIGERIA Health Facility Registry (HFR).
10. World Health Organisation (2020) Establishing COVID-19 triage stations at healthcare facilities: Key instructions and tips.
11. Osibogun A, Balogun M, Abayomi A, Idris J, Kuyinu Y, et al. (2021) Outcomes of COVID-19 patients with comorbidities in southwest Nigeria. PLoS One 16: e0248281.
12. Jin YH, Huang Q, Wang YY, Zeng XT, Luo LS, et al. (2020) Perceived infection transmission routes, infection control practices, psychosocial changes, and management of COVID-19 infected healthcare workers in a tertiary acute care hospital in Wuhan: A cross-sectional survey. Mil Med Res 7: 24.
13. Turcotte JJ, Meisenberg BR, MacDonald JH, Menon N, Fowler MB, et al. (2020) Risk factors for severe illness in hospitalized Covid-19 patients at a regional hospital. PLoS One 15: e0237558.
14. Dan-Nwafor C, Ochu CL, Elimian K, Oladejo J, Ilori E, et al. (2020) Nigeria's public health response to the COVID-19 pandemic: January to May 2020. J Glob Health 10: 020399.

15. Kim L, Whitaker M, O'Halloran A, Kambhampati A, Chai SJ, et al. (2020) Hospitalization Rates and characteristics of children aged < 18 years hospitalized with laboratory-confirmed COVID-19- COVID-NET, 14 States, March 1-July 25, 2020. MMWR Morb Mortal Wkly Rep 69: 1081-1088.

16. Perrotta F, Corbi G, Mazzeo G, Boccia M, Aronne L, et al. (2020) COVID-19 and the elderly: Insights into pathogenesis and clinical decision-making. Aging Clin Exp Res 32: 1599-1608.

17. Halvatsiotis P, Kotanidou A, Tzannis K, Jahaj E, Magira E, et al. (2020) Demographic and clinical features of critically ill patients with COVID-19 in Greece: The burden of diabetes and obesity. Diabetes Res Clin Pract 166: 108331.

18. Klein SL, Morgan R (2020) The impact of sex and gender on immunotherapy outcomes. Biol Sex Differ 11: 24.

19. Uzochukwu B, Okeke C, Ogwezi J, Emunemu B, Onibon F, et al. (2020) Exploring the drivers of ethnic and religious exclusion from public services in Nigeria: Implications for sustainable development goal 10. International Journal of Sociology and Social Policy 41: 561-583.

20. Hasyim H, Dale P, Groneberg DA, Kuch U, Müller R (2019) Social determinants of malaria in an endemic area of Indonesia. Malar J 18: 134.

21. Dawaki S, Al-Mekhlafi HM, Ithoi I, Ibrahim J, Atroosh WM, et al. (2016) Is Nigeria winning the battle against malaria? Prevalence, risk factors and KAP assessment among Hausa communities in Kano state. Malar J 15: 351.

22. Antai D, Wedrén S, Bellocco R, Morad T (2009) Ethnic disparities in child health in Nigeria: A multilevel analysis of individual and contextual factors. Ethnicity and Inequalities in Health and Social Care 2: 39-49.

23. AbdAleati NS, Zaharim NM, Mydin YO (2014) Religiousness and mental health: Systematic review study. J Relig Health 55: 1929-1937.

24. Pramesona BA, Taneepanichskul S (2018) The effect of religious intervention on depressive symptoms and quality of life among Indonesian elderly in nursing homes: A quasi-experimental study. Clin Interv Aging 13: 473-483.

25. Hatah E, Lim KP, Ali AM, Shah NM, Islahudin F (2015) The influence of cultural and religious orientations on social support and its potential impact on medication adherence. Patient Prefer Adherence 9: 589-596.

26. Kim PY, Kendall DL, Webb M (2015) Religious coping moderates the relation between racism and psychological well-being among christian Asian American college students. J Couns Psychol 62: 87-94.

27. Cummings JP, Pargament KI (2010) Medicine for the spirit: Religious coping in individuals with medical conditions. Religions 1: 28-53.

28. Larina VN, Oinotkinova OS, Glibko KV, Arakelov SE, Titova IY, et al. (2022) The results of the analysis of risk factors, cardiovascular risk, chronic non-communicable diseases in young and middle-aged patients, depending on the education. Probl Sotsialnoi Gig Zdravookhranenniiai Istor Med 30: 1055-1060.

29. Jiang R, Wang X, Sun Z, Wu S, Chen S, et al. (2023) Association of education level with the risk of female breast cancer: A prospective cohort study. BMC Women's Health 23: 91.

30. Mirmohammadi SJ, Taheri M, Mehrparvar AH, Heydari M, Kanafi AS, et al. (2014) Occupational stress and cardiovascular risk factors in high-ranking government officials and office workers. Iran Red Crescent Med J 16: e11747.

31. Sealey RM, Sinclair WH, Pollock P, Wright AM (2010) A case study identifying disease risk factor prevalence in government office workers in Queensland, Australia. International Journal of Workplace Health Management 3: 34-43.

32. Straub J, Marsh RA, Whalen DJ (2017) Student involvement and risk. Springer eBooks, 101-128.

33. Abe M, Arima H, Satoh A, Okuda N, Taniguchi H, et al. (2023) Marital status, household size, and lifestyle changes during the first COVID-19 pandemic: NIPPON DATA2010. PLoS One 18: e0283430.

34. Kudoh R, Komiya K, Shinohara A, Kageyama T, Hiramatsu K, et al. (2023) Marital status and post-COVID-19 conditions. Respir Investig 61: 181-185.

35. Ahmed IE, Ali A, Humayun A (2023) Association of pre-infection vitamin D status with COVID-19 severity. J Pak Med Assoc 73: 1770.