



ORIGINAL ARTICLE

Awareness and Perception of Novel Omicron Variant (B. 1. 1.529) Among Radiographers in Northern Nigeria

Auwal Abubakar^{1,2*}, Muhammad Kabir Abdulkadir³, Alhaji Modu Ali^{1,4}, Ivor Chogozie Nwobi¹, Mohammed Sani Umar⁵, Prince Ameh Ogenyi⁶, Halima Konto Abba-Sulum¹, Dlama Zira Joseph⁷, Abba Ali Tijjani², Mohammed Abba⁸ and Flavious Nkubli Bobuin¹

¹Department of Radiography, College of Health Sciences, University of Maiduguri, Maiduguri, Nigeria

²Clinical Oncology department, University of Maiduguri Teaching Hospital, Nigeria

³Department of Medical Radiography, Faculty of Basic Clinical Sciences, University of Ilorin, Ilorin, Nigeria

⁴Department of Radiology, Federal Neuro Psychiatric Hospital, Maiduguri, Nigeria

⁵Department of Radiography and Radiation Science, Baze University Abuja, Nigeria

⁶Radiology, University Hospitals Birmingham NHS Foundation Trust, Birmingham, United Kingdom

⁷Radiography Department, Federal University of Lafia, Nigeria

⁸Department of Radiography, College of Health Sciences, Bayero University Kano, Nigeria

***Correspondence to:** Auwal Abubakar, Department of Radiography, College of Health Sciences, University of Maiduguri, Maiduguri, Nigeria. Email: a.abubakar@unimaid.edu.ng,
Phone: +2347063898690/+6012339284

Abstract

Background: The advent of the novel Omicron COVID-19 variant is expected to alter radiographers' standard of practice due to its rapid transmission capability. This study aimed to assess the radiographers' awareness and perception of the Omicron among radiographers in Northern Nigeria.

Methods: A cross-sectional online survey was carried out among radiographers in Northern Nigeria using convenience sampling techniques. The survey tool was designed using Google consisting of questions on the demographics, general awareness, and perception about the Omicron. The questionnaire was face-validated, and the reliability was tested using Cronbach alpha. A coefficient of 0.7 was obtained which is considered adequate. Descriptive statistics and Chi-square test at 0.05 level of significance were used to analyse the data using Microsoft Excel 2016 (Microsoft Inc, Redmond, WA).

Results: A total of 186 radiographers participated in the survey. The respondents demonstrated a "Good" awareness level with an average score of 4.3/6 (70%). The perception was generally good as about half (n=91; 48.9%) of the respondents agreed with six out of eight perception-based determinants. Only a minority (n=77; 41%) of the respondents were not certain whether the Omicron spreads faster compared to other COVID-19 variants. A similar number (n=76; 40%) of the respondents were doubtful whether COVID-19 vaccine booster dose could help in curtailing the Omicron.

Conclusion: The level of awareness and perception of the Omicron among the radiographers was generally "Good". Notwithstanding, the radiographers were doubtful about the speed of the transmission of the Omicron and whether booster vaccination could help reduce the transmission.

Implication for practice: To mitigate occupational exposure to the novel Omicron COVID-19 variant amongst radiographers, urgent institutional strategies should be put in place to promote their knowledge and awareness of novel infectious diseases to keep up with the standard practice.

Keywords; Awareness, Infection control, Omicron COVID-19 variant, Perception, Radiographers

Introduction

The world has recently witnessed a sudden advent of a new Covid-19 variant known as the Omicron. The Omicron was first reported in South Africa on 24th November 2021. This was two years after the emergence of the Covid-19 virus in Wuhan China which was declared a public health emergency by the World health organisation (WHO) within a month of the first reported case ^{1,2}. The advent of the Omicron resulted in serious concern due to its rapid transmission. It supersedes the Delta variant and it is so far the most rapidly transmitted Covid-19 infection

recorded since the emergence of the virus ³. The WHO declared the Omicron as a variant of concern (VOC) within a week of its emergence due to its large number of mutations ⁴. The new variant spread to over 98 countries within the three weeks of its existence triggering a travel ban on countries with reported cases, including Nigeria. Currently, there is a dearth of literature about the Omicron.

Nigeria is the most populous African country and second to record a case of Omicron. The case was reported in Nigeria within a week of its existence.

This resulted in serious concern and panic among the public. Literature from the experience of the severe acute respiratory syndrome (SARS) epidemic revealed that the level of panic and emotions over infectious disease is associated with the public knowledge of the disease which could have an impact on the strategies to contain its transmission^{5,6}. A large number of studies have been published that evaluated the public knowledge, attitude, and perception (KAP) of Covid-19 across the globe^{7–15}. The pandemic and, subsequent control measures can inflict mental and physical health crises on the public and healthcare providers^{16,17}.

Healthcare providers such as radiographers could be at high risk of contracting the virus as the infected individuals are being referred to the imaging department as several imaging modalities have been proven to be useful in the management of patients with Covid-19 related complications^{18–20}. Thus, radiographers saw an unprecedented surge in the number of patients during the pandemic overwhelming the radiography workforce. Experiences and impact of the pandemic on clinical radiography practice were evaluated in many countries including Ghana²¹, Cyprus²², South Africa²³, Spain²⁴, UK²⁵, Ireland²⁶, Australia²⁷, India²⁸ as well as in a systematic review study²⁹. Covid-19 vaccine hesitancy concerns was also evaluated among radiographers in Ghana³⁰. The studies in Nigeria mainly focused on the impact of the Covid-19 on radiography academic and professional programs^{31,32} as well as preparedness³³. Nevertheless, to the best of our knowledge, no study focused specifically on the Omicron involving radiographers or radiography practice in any country, including Nigeria, so far.

In view of these, and the unprecedented nature of the new variant, it is critical to develop some strategies to halt or minimise its spread among radiographers. To develop some measures to curtail and contain the rapid spread of the new variant among radiographers, it is imperative to understand the level of their awareness and perception of the Omicron. Therefore, this study aimed to evaluate the knowledge and perception of the Omicron among radiographers in Northern Nigeria.

Materials and Methods

Study design and sampling technique

The study was a prospective cross-sectional survey involving professional radiographers residing/practicing in Northern Nigeria. The study used a quantitative approach to evaluate the awareness and perception of Omicron among radiographers. Based on the estimated population of 1100 radiographers in Northern Nigeria at a chosen confidence interval of 7% at 95% Confidence level, a sample of 166 is required (<https://www.macorr.com/sample-size-calculator.htm>;

accessed December 3, 2021). Non-probability convenience sampling method was adopted to assess the target study population via social media (Whatsapp). A link to fill out the online questionnaire was created and sent to the radiographers on the “Northern radiographers” Whatsapp group. This was followed up by a private message to all the group members. The group consists of only radiographers residing/practicing in the Northern states of Nigeria. In addition, at least one radiographer from each of the states in the region was identified and contacted to encourage colleagues to fill out the questionnaire. Two separate reminders were sent to the participants at interval and the collection of responses was closed three days after the last reminder.

Ethics and informed consent

This research is considered low risk as it does not carry potential risk to the respondents. However, the research proposal was reviewed and approved by the Education Committee (EDUCOM) of the Association of Radiographers of Nigeria (ARN) and radiography department ethics committee of the university of Maiduguri. The study adhered to the human research ethics principle as each participant granted consent before participation. An informed consent note was included at the beginning of the questionnaire. All respondents were informed that the responses would be strictly used for this research and would be treated with the utmost confidentiality. The study participants’ identity was anonymous, and participation was voluntary. The participants have the right to decline, discontinue or withdraw their response before the publication. The respondents were asked to click the “next” button to access the questionnaire only when they consented to participate in the study.

The data collection tool

An online questionnaire was designed using Google (Google, Mountain View, CA) and the potential participants were allowed to submit responses between 19th to 31st of December 2021. The questionnaire consists of 24 questions that seek participants’ demographic information (Section A), questions related to awareness (Section B), and perception (Section C) of the Omicron. The demographics include gender, age, marital status, employment status and sector, state/province of residence, highest academic qualification, and years of working experience. Section B was based on questions about the awareness of Omicron. The answer to section B is either “Yes” or “No”. Section C was a 5-item Likert scale, from strongly agree, agree, neutral, disagree, and strongly disagree. The questions in the questionnaire were piloted on five experienced radiographers and then the analysis was face-validated. The result shows good agreement and the analysis average score was 4 based on a 5-item Likert scale of 1 indicating strongly disagree to 5 indicating

strongly agree³⁴. The authors made the final adjustments based on the recommendations. The reliability of the “awareness” questions was tested using Cronbach alpha. A coefficient of 0.7 was obtained which is considered adequate³⁵.

Data Analysis

Data generated from responses were exported to and analysed using Microsoft Excel 2016 (Microsoft Inc, Redmond, WA). Descriptive statistics were used to summarise the survey responses. The performance score for the “awareness” section was calculated based on the scale agreed by the authors. A score of 1 and 0 was given for “correct” and “wrong” answers, respectively. One question was excluded from the scoring as was meant to know the source of information, not awareness, and thus, is not assigned any score. Thus, the section comprised a total maximum score of 6. The awareness level was further classified as poor, average, good and excellent for scores ranging from 0-2.0, 2.1-4.0, and 4.1-4.9 and 5-6 marks, respectively. Chi-square test was used to evaluate the relationship between the demographics and “awareness” variables. The analysis was two-tailed at 0.05 level of significance.

Results

A total of 255 radiographers practicing/residing in Northern Nigeria who are registered on the “Northern radiographers” Whatapp platform were targeted for this study. Only 186 radiographers submitted their responses resulting in a response rate of 73%. The geographic distribution of the radiographers is shown in Figure 1. The respondents were mostly from Borno state, (n=69; 37.1%) while five states got the least (n=1; 0.5%) respondents. Most of the radiographers

were males, (n=138; 74.2%). About half of the respondents, (n=92; 49.5%) fall within the age group range of 21-30 years and they were mostly married, (n=101; 54.3%) with Bachelor degrees, (n=131; 70%) as the highest academic qualification. Diagnostic radiography, (n=178; 95.7) was mostly reported as a specialty with only a few indicated Radiotherapy, (n=8; 4.3%). Majority (n=85; 45.7%) had only 0-3 years of working experience. Overwhelming majority of the radiographers work in Government institutions, (n=162; 87.1%) and mostly in tertiary healthcare centers, (n=122; 70.9%). Details of the respondents’ demographics are shown in Table 1.

Awareness of Radiographers on the Omicron variant

A total of seven questions were asked but only six were included in the scoring as explained in the Method section. Thus, a total mark of six was given for all correct answers. The response of the participants to each question on “awareness” is shown in Figure 2. The average score of the entire participants was 4.3/6 corresponding to 70% ($4.3/6 \times 100$) which is “Good” based on the grading system agreed by the authors. The score ranges between 0 and 6 marks. A total of (n = 10; 5.4%) and (n = 3; 1.6%) respondents got the maximum (6 marks) and minimum mark (0), respectively. The average score for different demographic variables was either “excellent” or “good” with none getting “poor” remarks. The details of the scores including the remarks are included in Table 1. News media, (n = 81; 44.3%), and social media, (n = 74; 40.3%) were indicated as common sources of information. The distribution of the sources of information of the respondents is included in Table 2.

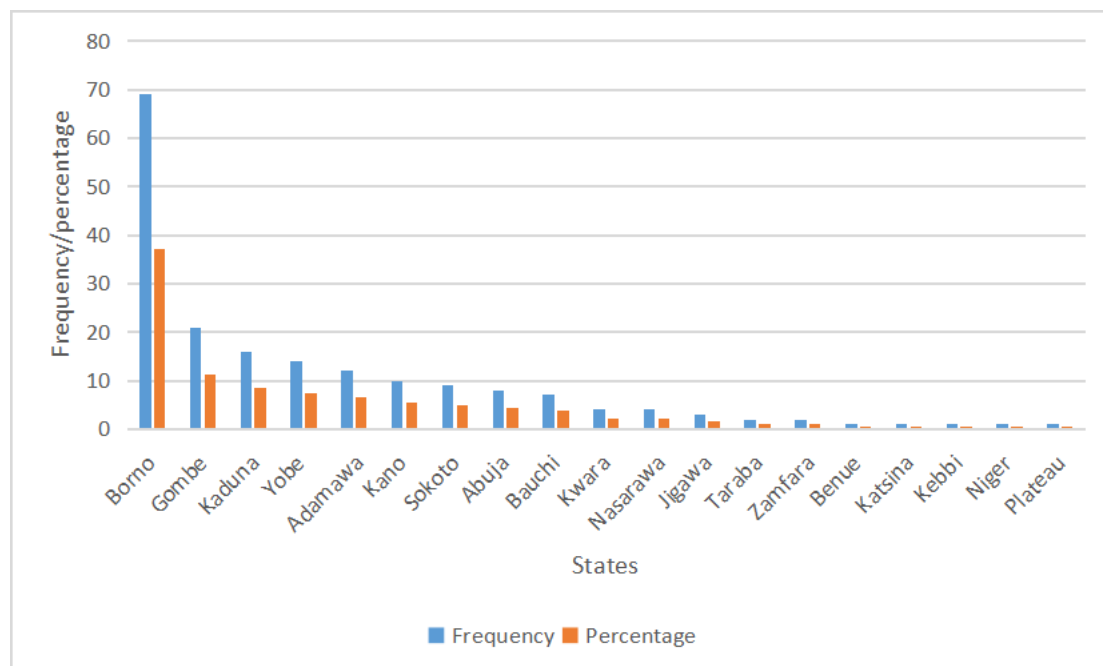


Figure 1: Geographic distribution of the respondents

Table 1: Demographics of the despondence and mean awareness score

Demographics	n (%)	Mean score	Remark
Gender			
Male	138.0 (74.2)	3.9	Average
Female	48.0 (25.8)	4.0	Average
Age (years)			
20-30	92 (49.5)		
31-40	81 (43.5)	4.5	Good
41-50	10 (5.4)	4.9	Good
51-60	3 (1.6)	4.7	Good
Marital status			
Single	84 (45.2)	4.1	Good
Married	101 (54.3)	4.3	Good
Divorced	1 (0.5)	5.0	Excellent
Highest qualification			
DCR/ND	3 (1.6)	5.0	Excellent
BSc/Bachelors	131 (70.0)	4.1	Good
MSc	44 (23.7)	4.6	Good
PhD	8 (4.3)	5.0	Excellent
Specialty			
Diagnostic	178 (95.7)	4.3	Good
Radiotherapy	8 (4.3)	4.4	Good
Duration of experience (years)			
0-3	85 (45.7)	3.8	Average
4-6	49 (26.3)	4.5	Good
7-9	26 (14.0)	4.5	Good
10 and above	26 (24.0)	4.8	Good
Employment Status			
Government/public	162 (87.1)	4.4	Good
Private	9 (4.8)	4.0	Good
Nongovernmental	1 (0.5)	4.0	
Unemployed	14 (7.5)	3.2	Average
Employed sector			
Primary healthcare Centre	5 (2.9)	4.2	Good
Secondary healthcare Centre	45 (26.1)	3.6	Average
Tertiary healthcare Centre	122 (70.9)	4.0	Good

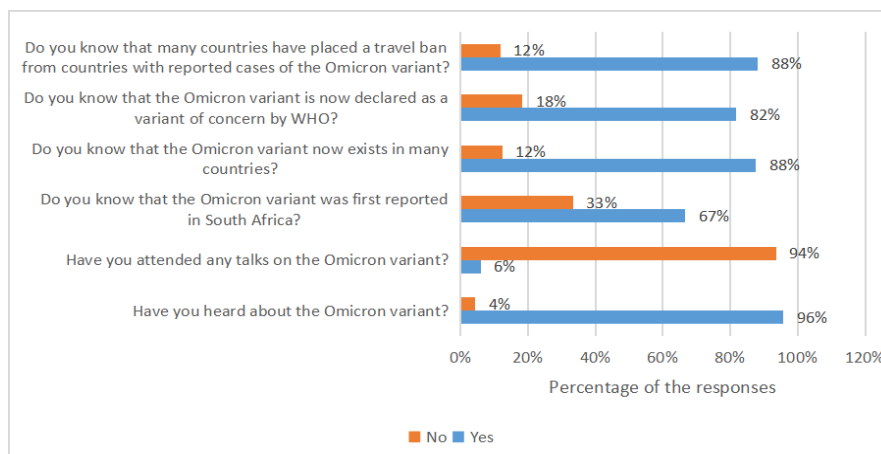


Figure 2: Awareness of Radiographers on the Omicron Covid-19 variant

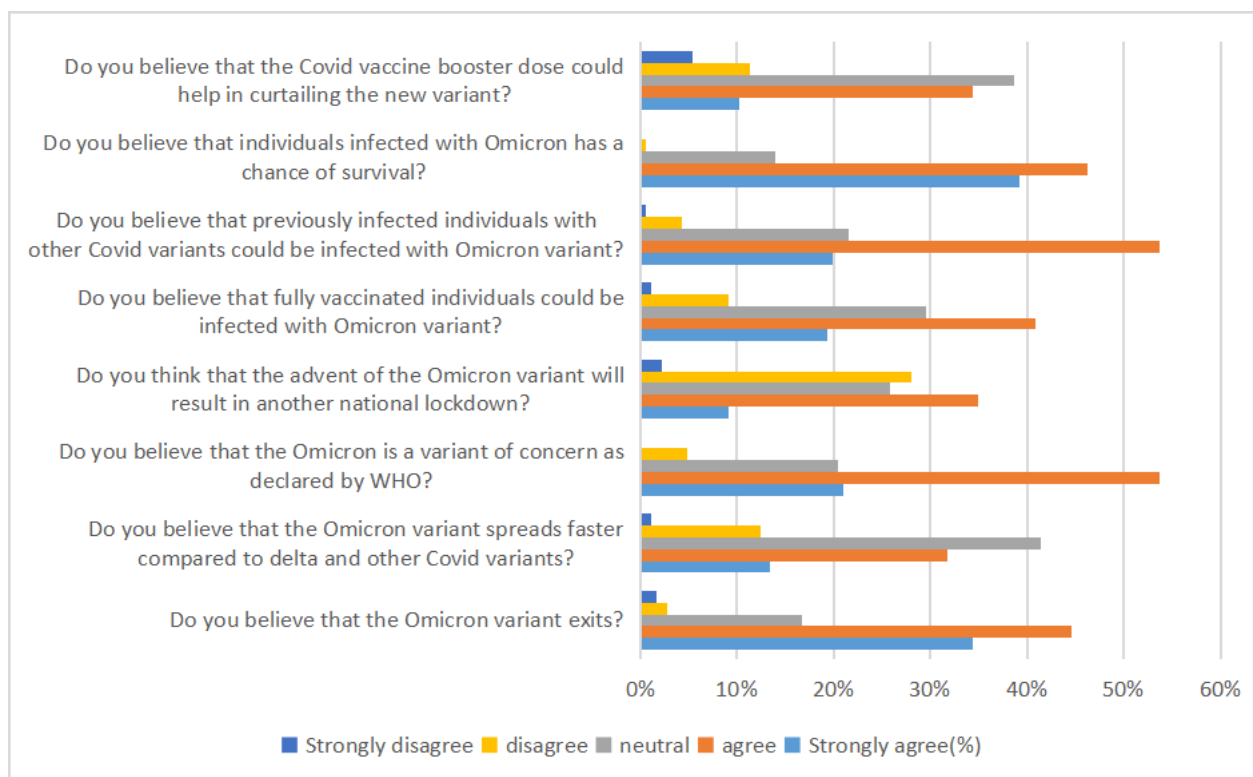
Table 2: Sources of information of the respondents based on demographic variables

Demographics	Social media	News media	Friends & associates relations	Government/non-government organisations (Ministry of health, WHO etc.)
Gender				
Females	18 (9.8%)	18 (9.8%)	11(6%)	0 (0.0%)
Males	56 (30.6%)	63 (34.4%)	9 (4.9%)	8 (4.4%)
Total	74 (40.3%)	81 (44.3%)	20 (10.9%)	8 (4.4%)
Age range (years)				
20-30	42 (23.0%)	32 (17.5%)	12 (6.6%)	3 (1.6%)
31-40	25 (13.7%)	43 (23.5%)	8 (4.4%)	5 (2.7%)
41-50	5 (2.7%)	5 (2.7%)	0 (0.0%)	0 (0.0%)
51-60	2 (1.1%)	1 (0.5%)	0 (0.0%)	0 (0.0%)
> 60	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	74 (40.3%)	81 (44.3%)	20 (10.9%)	8 (4.4%)
Marital status				
Single	37 (20.2%)	36 (19.7%)	7 (3.8%)	2 (1.1%)
Married	37 (20.2%)	44 (24.0%)	13 (7.1%)	6 (3.3%)
Divorced	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)
Widow	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	74 (40.3%)	81 (44.3%)	20 (10.9%)	8 (4.4%)
Highest qualification				
DCR/ND	1 (0.5%)	1 (0.5%)	1 (0.5%)	0 (0.0%)
BSc/Bachelors	56 (30.6%)	49 (26.8%)	18 (9.8%)	5 (2.7%)
MSc	15 (8.2%)	25 (13.7%)	1 (0.5%)	3 (1.6%)
Ph.D.	2 (1.1%)	6 (3.3%)	0 (0.0%)	0 (0.0%)
Total	74 (40.3%)	81 (44.3%)	20 (10.9%)	8 (4.3%)
Specialty				
Diagnostic	69 (37.7%)	80 (43.7%)	18 (9.8%)	8 (43.7%)
Radiotherapy	5 (2.7%)	1 (0.5%)	2 (1.1%)	0 (0.0%)
Total	74 (40.4%)	81 (44.3%)	20 (10.9%)	8 (4.3%)
Duration of experience (years)				
0-3	40 (22.0%)	24 (13.2%)	13(7.1%)	4(2.2%)
4-6	14 (7.7)	26 (14.3%)	5 (2.7%)	4(2.2%)
7-9	6 (3.3)	18 (9.9%)	2(1.1%)	-
10 and above	14 (7.7)	12 (6.6%)	-	-
Total	74 (40.7)	80 (44.0%)	20(11.0%)	8(4.4%)
Employment status				
Government/public	62 (33.9%)	74 (40.4%)	18 (9.8%)	6 (3.3%)
Private	3 (1.6%)	4 (2.2%)	0 (0.0%)	2 (1.1%)
Non-governmental organisation	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)
Unemployed	9 (4.9%)	2 (1.1%)	2 (1.1%)	0 (0.0%)
Total	74 (40.4%)	81 (44.3%)	20 (10.9%)	8 (4.3%)
Employed sector				
Primary healthcare Centre	1 (0.5%)	3 (1.8%)	0 (0.0%)	1 (0.5%)
Secondary healthcare Centre	12 (7.1%)	20 (11.8%)	6 (3.6%)	5 (3.0%)
Tertiary healthcare Centre	49 (29%)	57 (33.7%)	13 (7.7%)	2 (1.1%)
Total	62 (36.7%)	80 (47.3%)	19 (11.2%)	8 (4.7%)

3.2 Perception of Radiographers on the Omicron Covid-19 variant

A total of eight questions were asked about the perception of radiographers on the Omicron. The response “agree” was the most frequent among the six out of the total of eight questions as shown in Figure 3. The highest response was “agree” (n = 101; 54%). This was seen in two of the questions; “Do you believe that previously infected individuals with other Covid-19 variants could be infected with Omicron variant?”, (n = 101; 54%)” and “Do you believe that the Omicron is a variant of concern as declared by WHO?”, (n = 101; 54%). The response “strongly disagree” was the least frequent in all the questions. In addition, none of the respondents strongly disagreed with the following two questions, “Do you believe that individuals infected with Omicron have a chance

of survival?” and “Do you believe that the Omicron is a variant of concern as declared by WHO?” The response “neutral” was the highest in two questions; “Do you believe that the Covid-19 vaccine booster dose could help in curtailing the new variant? (n=72; 39%)” and “Do you believe that the Omicron spreads faster compared to Delta and other Covid-19 variants?”, (n = 75; 41%). Table 3 shows the demographic distribution of the responses to the two questions with “neutral” as the most common response. Table 3 shows the results of the association among the demographic variables for the two questions in which “neutral” had the highest frequency. There was no statistically significant difference among all the demographic variables ($p>0.05$).



Figures 3: Perception of Radiographers on the Omicron Covid-19 variant

Table 3: Demographics and perception question with neutral as most common response

Demographic variables	Question	“Do you believe that the Covid vaccine booster dose could help in curtailing the new variant?”					P	Do you believe that the Omicron variant spreads faster compared to delta and other Covid variants?					P
	Response	Strongly agree n (%)	Neutral n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)		Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)	
Gender	Male	22 (11.8)	57 (30.6)	44 (23.7)	13 (6.9)	2 (1.1)	0.350	21 (11.3)	43 (23.1)	58 (31.2)	15 (8.1)	1 (0.5)	0.568
	Female	14 (7.5)	19 (10.2)	11 (5.9)	4 (2.2)	-		4 (2.2)	16 (8.6)	19 (10.2)	8 (4.3)	1 (0.5)	
Age range (years)	21-30	15 (8.1)	40 (21.5)	27 (14.5)	8 (4.3)	2 (1.1)	0.634	13 (7)	27 (14.5)	37 (19.9)	14 (7.5)	1 (0.5)	0.858
	31-40	17 (9.1)	34 (17.2)	23 (12.4)	9 (4.8)	-		10 (5.4)	26 (14)	36 (19.4)	8 (4.3)	1 (0.5)	
	41-50	4 (2.2)	4 (2.2)	2 (1.0)	-	-		2 (1.1)	6 (3.2)	2 (1.1)	-	-	
	51-60	-	-	3 (1.6)	-	-		-	-	2 (1.1)	1 (0.5)	-	
	>60	-	-	-	-	-		-	-	-	-	-	
Marital status	Single	12 (8.7)	30 (18.5)	29 (13.4)	11 (4.1)	2 (0.5)	0.187	13 (7.0)	22 (11.8)	36 (19.4)	12 (6.5)	1 (0.5)	0.394
	Married	23 (12.4)	46 (24.7)	26 (14.0)	6 (3.2)	-		11 (5.9)	37 (19.9)	41 (22.0)	11 (5.9)	1 (0.5)	
	Divorced	1 (0.5)	-	-	-	-		1 (0.5)	-	-	-	-	
	Widow	-	-	-	-	-		-	-	-	-	-	
Highest academic qualification	DCR/ND	1 (0.5)	-	1 (0.5)	1 (0.5)	-	0.810	-	1 (0.5)	2 (1.1)	-	-	0.982
	BSc.	21 (11.3)	58 (31.2)	38 (20.4)	12 (6.5)	2 (1.1)		1 (0.5)	41 (22.0)	55 (29.6)	18 (9.7)	16 (8.6)	
	MSc	12 (6.5)	14 (7.5)	15 (8.1)	3 (1.61)	-		1 (0.5)	13 (6.9)	18 (9.7)	4 (2.2)	8 (4.3)	
	Ph.D.	2 (1.1)	4 (2.1)	1 (0.5)	1 (0.5)	-		-	4 (2.2)	2 (1.1)	1 (0.5)	1 (0.5)	
Specialty	Diagnostic	34 (18.3)	73 (39.2)	53 (28.5)	16 (8.6)	2 (1.1)	0.988	24 (12.9)	54 (27.3)	73 (40.3)	23 (12.4)	-	0.542
	Radiotherapy	2 (1.1)	3 (1.6)	2 (1.1)	1 (0.5)	-		1 (0.5)	5 (2.7)	2 (1.1)	-	-	
Clinical experience (years)	0-3	13 (7.0)	34 (18.3)	27 (14.5)	10 (5.3)	1 (0.5)	0.851	12 (6.5)	26 (14.1)	33 (17.8)	13 (7.0)	-	0.586
	4-6	9 (4.8)	22 (11.8)	12 (6.5)	5 (2.7)	1 (0.5)		4 (2.1)	20 (10.8)	20 (10.8)	4 (2.2)	1 (0.5)	
	7-9	7 (3.8)	13 (6.9)	6 (3.22)	-	-		6 (3.2)	5 (2.7)	10 (5.4)	4 (2.2)	1 (0.5)	
	10 and above	7 (3.8)	7 (3.8)	10 (5.3)	2 (1.1)	-		3 (1.6)	8 (4.3)	13 (7.0)	2 (1.1)	-	
Employment Status	Government	34 (18.2)	64 (34.4)	49 (26.3)	13 (6.9)	2 (1.1)	0.965	24 (12.9)	50 (26.9)	67 (36.0)	20 (10.8)	1 (0.5)	0.23
	Private	2 (1.1)	3 (1.6)	2 (1.1)	2 (1.1)	-		1 (0.5)	2 (1.1)	5 (2.7)	1 (0.5)	-	
	NGO	-	1 (0.5)	-	-	-		-	-	-	-	1 (0.5)	
	Unemployed	-	8 (4.3)	4 (2.2)	2 (1.1)	-		-	7 (3.8)	5 (2.7)	2 (1.1)	-	
Employment Healthcare sector	Primary	1 (0.6)	2 (1.2)	2 (1.2)	-	-	0.726	1 (0.5)	2 (1.1)	1 (0.6)	-	1 (0.6)	0.21
	Secondary	7 (4.1)	20 (11.6)	17 (9.9)	1 (0.6)	-		3 (1.7)	12 (7.0)	26 (15.1)	3 (1.7)	1 (0.6)	
	Tertiary	27 (15.7)	45 (26.2)	35 (20.3)	13 (7.6)	2 (1.2)		21 (12.2)	40 (23.3)	4 (2.5)	18 (10.5)	-	

Discussion

Although the Covid-19 has been around for two years the Omicron is new and different from already existing Covid-19 variants such as Delta. It is worrisome that the Omicron has largest number of mutations than other Covid-19 variants, and the world is experiencing a surge of covid-19 cases since the Omicron was reported. To date, there is limited published data about the awareness and perception of the general public and healthcare workers on the Omicron. To the best of our knowledge, no relevant work targeted specifically at radiographers was published, so far. The characteristic of the Omicron variant makes it a necessity for the concerned authority to plan suitable strategies to curtail the spread of the virus. This is most especially among healthcare providers such as radiographers who were declared as the essential frontline workforce in the management of Covid-19 patients in a multinational consensus statement³⁶. Thus, it is critical to ascertain their level of awareness and perception to guide the development of strategies to curtail the spread of the new variant.

Awareness of the Omicron variant among Radiographers

The findings of this study show that the level of awareness of the radiographers on the Omicron was generally “good” based on the authors' grading system. This shows that the radiographers are mostly aware of the Omicron a few weeks after its inception. The studies on the knowledge and awareness specific to Omicron are scarce. However, the level of awareness and knowledge on Covid-19 among the general public and healthcare workers available in the literature agrees with the current study. Although different studies used different grading systems making a direct comparison difficult, it can be concluded the results are in agreement with our study as they reported a score of 80% and above^{37–40}.

Based on the academic qualification, “Excellent” grades were scored by Ph.D. and diploma (DCR/ND) holders with each category obtained an average score of 5/6 (83.3%) marks. This could sound controversial as the two categories reflect the highest and lowest academic qualifications of radiographers in Nigeria. It is not surprising for the PhD holders to obtain the highest scores as they attained the peak in academics. On the other hand, the “Excellent” grade obtained by the DCR/ND holder may not be unconnected with their years of experience. The DCR/ND holders in Nigeria have not less than 10 years of working experience since the academic program is no longer available in the country for almost two decades⁴¹. This is supported by the data in the current study which

shows that the radiographers with 0-3 years of experience have the least score (3.8/6 marks, “average”) while those with 10 years and above have the highest (4.8, “Good”) in the category.

The current study shows that the respondent got their information mostly from traditional media (Television, radio, etc.), (n=81; 44.3%), and social media, (n = 74; 40.3%). The easy access to traditional media and social media in Nigeria could be the reason why many of the respondents obtained “good” grades. The use of social media as a common source of information was also reported in many countries including Egypt⁴² Jourdan⁴², and Pakistan⁴³. In countries like Netherlands, Italy, Australia, and Germany, the traditional media was reported as the primary source of information which agrees with the finding of this study^{44,45}. It is worrisome that most of the respondents have not attended any lecture on the Omicron. The government, non-governmental organisations, and the private sector need to provide adequate funding for research and creation of awareness among healthcare workers and the public. This could enhance the level of knowledge and minimise misconceptions among the population which could ultimately ensure success in curtailing the spread of the new variant.

Perception of Radiographers on the Omicron

The findings of radiographers' perception of the Omicron as shown in Fig. 3 revealed that except for two questions in which most of the radiographers were “neutral”, the remaining six questions were answered “agree” by majority of the respondents. The response “strongly agree” was the second most frequent response followed by “neutral”. The “strongly disagree” was the least response by the respondents for the question included in this section. None of the respondents “strongly disagree” that “individual infected with the Omicron has a chance of survival”. These findings indicate a good perception of the Omicron among the radiographers. However, the two questions, “Do you believe that the Covid-19 vaccine booster dose could help in curtailing the new variant?” and “Do you believe that the Omicron spreads faster compared to Delta and other Covid-19 variants?” which the radiographers were mostly neutral is a cause for concern. Further analysis using the Chi-square test shows that there is no significant difference between the responses to these two questions among the demographic variables ($p>0.05$). Literature revealed that the Omicron spread faster than any of the existing Covid-19 variants³. The WHO director stated that “Omicron is spreading at a rate we have not seen with any previous variant,” during the Covid-19 update in Geneva

⁴⁶. Thus, more awareness needs to be created to enlighten the radiographers about the rapid transmissibility of the Omicron. On the aspect of the Booster vaccination, our finding is contrary to the study on public perception and acceptance of the booster vaccine in China. The studies show that over 80% of the respondents have no doubt and are willing to accept the booster dose ^{47,48}. Therefore, efforts should be intensified to clarify and increase the perceived belief of the booster vaccination among radiographers.

Although the current study was conducted in Northern Nigeria, we presume that the findings and recommendations could be applied to radiographers elsewhere as the nature of the job is similar. Also, our findings could be relevant to other healthcare workers by extension due to similar settings. However, the application of these findings to radiographers outside Northern Nigeria and other healthcare workers should be treated with caution.

Conclusion

The current study provided an insight into the radiographer's level of awareness and perception of the novel Omicron in Northern Nigeria. The finding shows that the level of awareness and perception of the Omicron among radiographers were good. However, the radiographers were doubtful about the speed of its transmission and whether booster vaccination could help reduce the transmission.

Limitations

This is a survey study relying solely on self-reported data. The respondents might have given responses to the perception questions based on what they perceived to be expected of them. Secondly, potential respondents who are not active on the internet and social media, such as the elderly might have been disfranchised since the survey was online based.

Acknowledgments

The authors would like to acknowledge all the radiographers who participated in this study, especially the ones who helped in facilitating colleagues to fill out the questionnaires. We are grateful to the radiographers who assisted in reviewing the questionnaire before its distribution.

Conflict of interest

No conflict of interest.

References

1. Guo YR., Cao QD., Hong ZS., Tan YY., Chen SD., Jin HJ., et al. The origin, transmission and clinical therapies on

- coronavirus disease 2019 (COVID-19) outbreak- A n update on the status. *Mil Med Res* 2020. Doi: 10.1186/s40779-020-00240-0.
2. Lu H., Stratton CW., Tang YW. Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. *J Med Virol* 2020;401–2. Doi: 10.1002/jmv.25678.
3. Islam R., Hossain J. Detection of Omicron (B.1.1.529) variant has created panic among the people across the world: What should we do right now? *J Med Virol* 2021. Doi: 10.1002/jmv.27546.
4. WHO. Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern. WHO. Available from: [https://www.who.int/news/item/26-11-2021-classification-of-omicron-\(b.1.1.529\)-sars-cov-2-variant-of-concern](https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern) [accessed December 20, 2021].
5. Person B., Sy F., Holton K., Govert B., Liang A., Garza B., et al. Fear and Stigma: The Epidemic within the SARS Outbreak. *Emerg Infect Dis* 2004;358–63. Doi: 10.3201/eid1002.030750.
6. Wu P., Fang Y., Guan Z., Fan B., Kong J., Yao Z., et al. The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 2009;54(5):302–11. Doi: 10.1177/070674370905400504.
7. Jaber RM., Mafrachi B., Al-Ani A., Shkara M. Awareness and perception of COVID-19 among the general population: A Middle Eastern survey. *PLoS One* 2021;16(4 April):e0250461. Doi: 10.1371/journal.pone.0250461.
8. Qutob N., Awartani F. Knowledge, attitudes and practices (KAP) towards COVID-19 among Palestinians during the COVID-19 outbreak: A cross-sectional survey. *PLoS One* 2021;16(1 January).
9. Saeed BQB., Al-Shahrabi R., Bolarinwa OAO. Socio-demographic correlate of knowledge and practice toward COVID-19 among people living in Mosul-Iraq: A cross-sectional study 2021;16(3 March 2021). Doi: 10.1371/journal.pone.0249310.
10. Elayeh E., Aleidi SSM., Ya'acoub R., Haddadin RRN. Before and after case reporting: A comparison of the knowledge, attitude and practices of the Jordanian population towards COVID-19 2020;15(10 October). Doi: 10.1371/journal.pone.0240780.
11. Zhong BLB., Luo W., Li HHM., Zhang QQQ., Liu XGX., Li WWT., et al. Knowledge, attitudes, and practices towards COVID-19 among chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional

- survey. *Int J Biol Sci* 2020;**16**(10):1745–52. Doi: 10.7150/ijbs.45221.
12. Baig M., Jameel T., Alzahrani SH., Mirza AA., Gazzaz ZJ., Ahmad T., et al. Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population. *PLoS One* 2020;**15**(12 December). Doi: 10.1371/journal.pone.0243526.
13. Salameh B., Basha S., Basha W., Abdallah J. Knowledge, Perceptions, and Prevention Practices among Palestinian University Students during the COVID-19 Pandemic: A Questionnaire-Based Survey. *Inq (United States)* 2021;**58**. Doi: 10.1177/0046958021993944.
14. Hatami H., Abbasi-Kangevari M., Malekpour MR., Kolahi AA. Knowledge, Attitudes, and Safety Practices About COVID-19 Among High School Students in Iran During the First Wave of the Pandemic. *Front Public Heal* 2021;**9**. Doi: 10.3389/FPUH.2021.680514/FULL.
15. Naseef HA., Al-Shami NA., Hadba LSA., Humos LA., Shaheen RN., Mitwasi TT., et al. Knowledge, attitudes, and practices about coronavirus disease (COVID-19) among Birzeit University students: a cross-sectional study. *J Public Heal* 2021. Doi: 10.1007/S10389-021-01665-0.
16. Greenberg N., Docherty M., Gnanapragasam S., Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *BMJ* 2020. Doi: 10.1136/bmj.m1211.
17. Dong L., Bouey J., Bouey J. Public Mental Health Crisis during COVID-19 Pandemic, China. *Emerg Infect Dis* 2020;**26**(7):1616–8. Doi: 10.3201/EID2607.200407.
18. Bernheim A., Mei X., Huang M., Yang Y., Fayad ZA., Zhang N., et al. Chest CT findings in coronavirus disease 2019 (COVID-19): Relationship to duration of infection. *Radiology* 2020;685–91. Doi: 10.1148/radiol.2020200463.
19. Rubin GD., Ryerson CJ., Haramati LB., Sverzellati N., Kanne JP., Raoof S., et al. The role of chest imaging in patient management during the covid-19 pandemic: A multinational consensus statement from the fleischner society. *Radiology* 2020;**296**(1):172–80. Doi: 10.1148/radiol.2020201365.
20. Xu X., Yu C., Qu J., Zhang L., Jiang S., Huang D., et al. Imaging and clinical features of patients with 2019 novel coronavirus SARS-CoV-2. *Eur J Nucl Med Mol Imaging* 2020;**47**(5):1275–80. Doi: 10.1007/s00259-020-04735-9.
21. Akudjedu TN., Botwe BO., Wuni AR., Mishio NA. Impact of the COVID-19 pandemic on clinical radiography practice in low resource settings: The Ghanaian radiographers' perspective. *Radiography* 2021;**27**(2):443–52. Doi: 10.1016/j.radi.2020.10.013.
22. Zervides C., Sassi M., Kefala-Karli P., Sassis L. Impact of COVID-19 pandemic on radiographers in the Republic of Cyprus. A questionnaire survey. *Radiography* 2021;**27**(2):419–24. Doi: 10.1016/j.radi.2020.10.004.
23. Lewis S., Mulla F. Diagnostic radiographers' experience of COVID-19, Gauteng South Africa. *Radiography* 2021;**27**(2):346–51. Doi: 10.1016/J.RADI.2020.09.009.
24. Ruiz C., Llopis D., Roman A., Alfayate E., Herrera-Peco I. Spanish radiographers' concerns about the COVID-19 pandemic. *Radiography* 2021;**27**(2):414–8. Doi: 10.1016/j.radi.2020.10.001.
25. Akudjedu TN., Lawal O., Sharma M., Elliott J., Stewart S., Gilleece T., et al. Impact of the COVID-19 pandemic on radiography practice: findings from a UK radiography workforce survey. *BJR|Open* 2020;**2**(1):20200023. Doi: 10.1259/bjro.20200023.
26. Foley SJ., O'Loughlin A., Creedon J. Early experiences of radiographers in Ireland during the COVID-19 crisis. *Insights Imaging* 2020;**11**(1). Doi: 10.1186/s13244-020-00910-6.
27. Shanahan MC., Akudjedu TN. Australian radiographers' and radiation therapists' experiences during the COVID-19 pandemic. *J Med Radiat Sci* 2021;**68**(2):111–20. Doi: 10.1002/jmrs.462.
28. Kotian RP., Faujdar D., Kotian SP., D'souza B. Knowledge and understanding among medical imaging professionals in India during the rapid rise of the covid-19 pandemic. *Health Technol (Berl)* 2020;**10**(6):1415–20. Doi: 10.1007/s12553-020-00437-2.
29. Akudjedu TN., Mishio NA., Elshami W., Culp MP., Lawal O., Botwe BO., et al. The global impact of the COVID-19 pandemic on clinical radiography practice: A systematic literature review and recommendations for future services planning. *Radiography* 2021:1219–26. Doi: 10.1016/j.radi.2021.07.004.
30. Botwe BO., Antwi WK., Adusei JA., Mayeden RN., Akudjedu TN., Sule SD. COVID-19 vaccine hesitancy concerns: Findings from a Ghana clinical radiography workforce survey. *Radiography* 2021. Doi: 10.1016/j.radi.2021.09.015.
31. Ogolodom MP. The Impact of Covid-19 Pandemic on Academic and Professional

- Development Programmes Organized by the Radiographers Registration Board of Nigeria. *J Biomed Sci* 2021;**10**(1):1–6.
32. Michael Sunday Okpaleke., Christopher Chukwuemeka Ohagwu., Chigozie Ivor Nwobi., Michael Promise Ogolodom., Victor Kelechi Nwodo., Uche Nathaniel Eja-Egwu. Effects of the COVID-19 pandemic on radiography education in Nnamdi Azikiwe University, Nigeria. *Int J Sci Res Arch* 2021;**3**(1):082–92. Doi: 10.30574/ijrsra.2021.3.1.0104.
 33. Akpaniwo GM., Olushola DA., Okoji MC., Egbe NO. Novel Coronavirus (COVID-19) Outbreak In Nigeria: How Prepared Is The Radiography Sector? *Eur J Med Heal Sci* 2020;**2**(4). Doi: 10.24018/EJMED.2020.2.4.371.
 34. Marshall G. The purpose, design and administration of a questionnaire for data collection. *Radiography* 2005;131–6. Doi: 10.1016/j.radi.2004.09.002.
 35. van Griethuijsen RALF., van Eijck MW., Haste H., den Brok PJ., Skinner NC., Mansour N., et al. Global patterns in students' views of science and interest in science. *Res Sci Educ* 2015;**45**(4):581–603. Doi: 10.1007/s11165-014-9438-6.
 36. Rubin GD., Ryerson CJ., Haramati LB., Sverzellati N., Kanne JP., Raoof S., et al. The role of chest imaging in patient management during the covid-19 pandemic: A multinational consensus statement from the fleischner society. *Radiology* 2020;**296**(1):172–80. Doi: 10.1148/radiol.2020201365.
 37. Zhong BL., Luo W., Li HM., Zhang QQ., Liu XG., Li WT., et al. Knowledge, attitudes, and practices towards COVID-19 among chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *Int J Biol Sci* 2020;**16**(10):1745–52. Doi: 10.7150/ijbs.45221.
 38. Saqlain M., Munir MM., Rehman SU., Gulzar A., Naz S., Ahmed Z., et al. Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross-sectional survey from Pakistan. *J Hosp Infect* 2020;**105**(3):419–23. Doi: 10.1016/j.jhin.2020.05.007.
 39. Al-Hanawi MK., Angawi K., Alshareef N., Qattan AMN., Helmy HZ., Abudawood Y., et al. Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. *Front Public Heal* 2020;**8**. Doi: 10.3389/fpubh.2020.00217.
 40. Azlan AA., Hamzah MR., Sem TJ., Ayub SH., Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS One* 2020;**15**(5). Doi: 10.1371/journal.pone.0233668.
 41. Adejo T. An Inquest into the Quests and Conquests of the Radiography Profession in Nigeria. *J Radiogr Radiat Sci* 2019;**33**(1). Doi: 10.48153/jrrs/rubh5255.
 42. Abdelhafiz AS., Mohammed Z., Ibrahim ME., Ziady HH., Alorabi M., Ayyad M., et al. Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19). *J Community Health* 2020;**45**(5):881–90. Doi: 10.1007/s10900-020-00827-7.
 43. Salman M., Mustafa ZU., Asif N., Zaidi HA., Hussain K., Shehzadi N., et al. Knowledge, attitude and preventive practices related to COVID-19: a cross-sectional study in two Pakistani university populations. *Drugs Ther Perspect* 2020;**36**(7):319–25. Doi: 10.1007/s40267-020-00737-7.
 44. Meier K., Glatz T., Guijt MC., Piccininni M., Van Der Meulen M., Atmar K., et al. Public perspectives on protective measures during the COVID-19 pandemic in the Netherlands, Germany and Italy: A survey study. *PLoS One* 2020:e0236917. Doi: 10.1371/journal.pone.0236917.
 45. Seale H., Heywood AE., Leask J., Sheel M., Thomas S., Durrheim DN., et al. COVID-19 is rapidly changing: Examining public perceptions and behaviors in response to this evolving pandemic. *PLoS One* 2020;**15**(6 June):e0235112. Doi: 10.1371/journal.pone.0235112.
 46. CNCB. Omicron is spreading faster than any other Covid variant, WHO warns. Available from: <https://www.cncb.com/2021/12/14/who-says-omicron-is-spreading-at-a-rate-not-seen-with-any-other-covid-variant.html> [accessed January 15, 2022].
 47. Tung T-H., Lin X-Q., Chen Y., Zhang M-X., Zhu J-S. Willingness to receive a booster dose of inactivated coronavirus disease 2019 vaccine in Taizhou, China. *Expert Rev Vaccines* 2021;1–7. Doi: 10.1080/14760584.2022.2016401.
 48. Lai X., Zhu H., Wang J., Huang Y., Jing R., Lyu Y., et al. Public Perceptions and Acceptance of COVID-19 Booster Vaccination in China: A Cross-Sectional Study. *Vaccines* 2021;**9**(12):1461. Doi: 10.3390/vaccines9121461.