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ORIGINAL ARTICLE

Self-reported Impact of COVID-19 Pandemic on Radiography Practice and Work-Life of Radiographers in Nigeria

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ABSTRACT

Background: Radiographers in Nigeria have been at the forefront of the fight against the COVID-19 pandemic, facing the challenge of contentious patient management during the pandemic with limited resources. This study assessed the reported impact of the COVID-19 pandemic on the work-life of radiographers in Nigeria.

Methods: A cross-sectional online survey was conducted among Nigerian radiographers from March to May 2021. A convenience sampling technique was used, and a structured questionnaire designed using Google forms consisting of 23 items divided into three sections: demographics, knowledge of infection control and the impact of the COVID-19 pandemic on radiography practice and radiographers' work-life was used. Data collected was analyzed using SPSS version 23.0.

Results: A total of 117 radiographers participated in the study, with a majority being male 82 (70.1%). Diagnostic radiographers made up the majority, 101 (86.3%) of participants. The pandemic negatively impacted radiographers' work-life, with 43 (9.3%) reporting a decrease in their work pattern, and 58 (49.7%) agreeing to experiencing stress during the pandemic. The major stressors reported were long duration of wearing kits and disinfecting accessories and equipment 9 (14.4%) inadequate provision of personal protective equipment (PPE) and inadequate staffing with 6 (9.6%) each, among others.

Conclusion: The study revealed the impact of Covid-19 pandemic on the work life of Nigerian radiographers. The pandemic negatively impacted their work-life, with many reporting high levels of stress. Hospital management should improve on provision of PPE, and remuneration for radiographers to encourage retention and reduce work-related stress during future pandemics.

Keywords: COVID-19; Stress; Radiographers; Radiography practice; Pandemic; Nigeria.

INTRODUCTION

In December 2019, a cluster of pneumonia cases with an unknown cause was identified in Wuhan City, China. On 7 January 2020, a novel type of Coronavirus was identified as the cause of the disease. On 30 January 2020, the World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern and later named the virus Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and the disease Coronavirus Disease 2019 (COVID-19).[1] On 11 March 2020, COVID-19 was declared a pandemic by the WHO. The first case of COVID-19 in Nigeria was confirmed on 27 February 2020, which led to the activation of COVID-19 Public Health Emergency Operation Centers (PHEOC) at national and sub-national levels.[2,3] The Nigeria Centre for Disease Control (NCDC) coordinates the activities of the public health emergency operations centres (PHEOCs) and uses the Surveillance Outbreak Response Management and Analysis System (SORMAS) to give real-time epidemiological information across the country. Since the confirmation of the first case, cases and death tolls have risen steadily in Nigeria. To mitigate the spread, the government implemented public health interventions such as physical

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distancing, complete and partial lockdown, and a ban on large public gatherings.[3]

However, in Nigeria, a developing country in West Africa with limited medical health care resources, the health care system is less than adequate and heavily centred in major cities like Abuja and Lagos, which were the epicentres of the pandemic. Despite limited medical resources, all routine clinical imaging work, including non-urgent care such as elective screening, continued during the pandemic in Nigeria. Radiographers have been regularly involved in the acquisition of chest x-ray (CXR) or computed tomography (CT) scans as part of the care of patients with known or suspected COVID-19. They have also been involved in other diagnostic and radio-therapeutic work, including imaging patients with emergency conditions such as trauma or daily radiotherapy treatment delivery.[2-4]

With growing global concerns about the pandemic and the possibility of additional waves of infection, radiology departments have adopted several streamlined approaches towards practice to limit infection risk while optimizing workflows, volumes, and access. Current recommendations emphasize the importance of the appropriate use of personal protective equipment (PPE) and the implementation of strict infection prevention and control (IPC) protocols for the management of the pandemic. However, despite these recommendations, there have been challenges like inadequate funds and where the funds are available, they are sometimes misappropriated, resulting in the insufficient availability and implementation of PPE and IPC protocols in low-resource settings like Nigeria.[3,4]

The changes to clinical practice during the pandemic have been shown to contribute to work-related stress, as reported in a radiography workforce survey in 2020 in Ghana.[5] Therefore, it is important to understand whether the impact of the COVID-19 pandemic on radiography practice (including imaging services and radiographers' well-being) in low-resource settings is important to guide the development of education and training resources for radiographers in preparation for similar future pandemics or next pandemic preparedness.[3-5]

METHODOLOGY

A cross-sectional online survey was conducted among radiographers practising in Nigeria from March 2021 to May 2021. A convenience sampling technique was employed using a structured questionnaire using Google forms. The questionnaire was adapted from literature [5-9] reviewed in line with the research objectives and adapted to our local needs. The questionnaire was pre-tested among radiographers in Maiduguri (test re-test). The face and content validity of the questionnaire was carried out by three expert radiographers with vast experience and knowledge in public health for accuracy and consistency. The questionnaire consisted of 23 items divided into three sections; demographic characteristics, knowledge of infection control and the reported impact of the COVID-19 pandemic on radiography practice, and on radiographer's work life. Participants included all radiographers practising in Nigeria who agreed and consented to fill out the questionnaire and participation was voluntary. There were approximately 1,318 radiographers registered with the regulatory board,[10] as of 2020. The questionnaire link was shared conveniently through the email of respondents and other online social media platforms like the national WhatsApp platforms were most registered radiographers (600) are on. Data analysis was done using the statistical package for social sciences (SPSS) software version 23.0. Descriptive statistics were used for the analysis. The ethical approval (RAD/09/2021 /UNIMAID/008) was obtained from the Department of Medical Radiography Ethics Committee, University of Maiduguri, Borno State, informed consent was obtained from the participants.

RESULTS

A total of 117 radiographers in Nigeria participated in the study, with 82 (70.1%) males and 35 (29.9%) females. A total of 62 (53.0%) participants practiced in tertiary healthcare centres and 18 (15.5%) in secondary healthcare centres. The majority of the respondents were registered with the regulatory body, with 101 (86.3%) registered as diagnostic radiographers and only 4 (3.4%) registered as therapeutic radiographers. The majority of the respondents were from North-eastern Nigeria 46 (39.3%), and the least were from South-South Nigeria with only 5 (4.5%) participants, as shown in Table 1.

Conventional x-ray equipment 78 (66.7%) was the most commonly used imaging equipment during the COVID-19 pandemic, followed by computed tomography (CT) with 21 (18%) and ultrasound 16 (13.6%). A high proportion of participants 93 (79.5%) and 22 (18.8%) agreed that radiographers were among the front-line health care team responding to the pandemic. Thirty-six (30.8%) of the participants agreed that their radiation doses had increased during the pandemic.

A total of 23 (19.7%) participants also agreed that their work had increased during the pandemic, while 46 (39.3%) said their work was decreasing and 23 (19.7%) during the pandemic.

Table1: Sociodemographic characteristics of respondents

Variable	Frequency (n=117)	Percent
Sex		
Male	82	70.1
Female	35	29.9
Types of Health Facility		
Primary	37	31.5
Secondary	18	15.5
Tertiary	62	53.0
Registration status with the regulatory body		
Currently not Registered	9	7.7
Registered Diagnostic Radiographer	101	86.3
Registered Sonographer	3	2.6
Registered Therapeutic Radiographer	4	3.4
Geopolitical region		
North-Central Nigeria	25	21.4
North-East Nigeria	46	39.3
North-West Nigeria	17	14.5
South-East Nigeria	11	9.4
South-South Nigeria	5	4.3
South-West Nigeria	13	11.1

Table 2: Respondents' radiography practices during COVID-19 pandemic

Variables	Frequency (n=117)	Percent
What specific COVID-19 training did you receive to prepare you for handling patients during the course of the pandemic challenge?		
E-Learning	45	38.5
Hands-on Practical Training	23	19.6
Lectures	34	29.0
Simulation training	5	4.3
No training	10	8.6
Which imaging modality was mostly used during the COVID-19 pandemic?		
Conventional X-rays	78	66.7
Computed Tomography	21	18
Ultrasound	16	13.6
Others	2	1.7
Based on your local protocol, which imaging modality do you use as your initial imaging modality and follow-up modality during the pandemic?		
Conventional X-ray	87	74.4
Computed Tomography	19	16.2
Ultrasound	11	9.4
Radiographers are a part of the major front-line healthcare management team in response to the COVID-19 pandemic.		
Strongly Agree	93	79.5
Agree	22	18.8
Neutral	2	1.7
My personal radiation exposure has changed as imaging protocols were changed after the COVID-19 outbreak		
Strongly Agree	4	3.4
Agree	36	30.8
Neutral	24	20.5
Disagree	31	26.5
Strongly Disagree	22	18.8
My workload pattern during the pandemic can best be described as		
Increasing	23	19.7
Decreasing	46	39.3
Irregular	23	19.7
Not Changed	25	21.3
The hospital management has made available adequate personal protective equipment (PPE) for work during the COVID-19 outbreak.		
Strongly Agree	20	17.1
Agree	41	35.0
Neutral	12	10.3
Disagree	32	27.4
Strongly Disagree	12	10.3
COVID-19 is a…?		
Bacterial Infection	4	3.4
Viral infection	110	94
Fungal infection	2	1.7
No idea	1	0.9

Table 3: Reported impact of COVID-19 Pandemic on respondents' work

Variables	Frequency (117)	Percent
I felt stressed about work lately due to the COVID-19 outbreak.		
Strongly Agree	19	16.2
Agree	39	33.5
Neutral	34	29.0
Disagree	19	16.2
Strongly Disagree	6	5.1
My family/partner/friends are being significantly affected by this recent work-related stress.		
Strongly Agree	11	9.4
Agree	44	37.6
Neutral	29	24.8
Disagree	23	19.7
Strongly Disagree	10	8.5
Are there adequate social and psychological support structures put in place at your place for dealing with stress?		
Strongly Agree	6	5.1
Agree	38	32.5
Neutral	17	14.5
Disagree	38	32.5
Strongly Disagree	18	15.4
I enjoy my work and have no symptoms of stress/burnout		
Strongly Agree	6	5.2
Agree	36	30.8
Neutral	28	23.8
Disagree	33	28.2
Strongly Disagree	14	12.0
I have physical and emotional exhaustion, which could probably be a result of stress.		
Strongly Agree	10	8.5
Agree	47	40.2
Neutral	29	24.8
Disagree	25	21.4
Strongly Disagree	6	5.1
The lack of adequate provision of PPE to radiographers in my department leaves me frustrated		
Strongly Agree	25	21.4
Agree	44	37.6
Neutral	18	15.4
Disagree	15	12.8
Strongly Disagree	15	12.8
I feel completely burned out and often wonder if I can keep going on. I think I need some help, or I may consider quitting my job		
Strongly Agree	3	2.6
Agree	16	13.7
Neutral	20	17.1
Disagree	54	46.1
Strongly Disagree	24	20.5
My readiness and willingness to work now are not different from what it was before the COVID-19 pandemic.		
Strongly Agree	22	18.7
Agree	45	38.5
Neutral	13	11.1
Disagree	23	19.7
Strongly Disagree	14	12.0

During the COVID-19 pandemic, 61 (52.1%) participants agreed that the hospital management made provision of necessary personnel protective equipment, while 44 (37.7%) said their hospital management did not, as shown in Table 2.

A total of 58 (49.7%) participants were stressed during the COVID-19 pandemic and 55 (47.0%) said their partners and friends were affected by the work stress during the pandemic. Also, a total of 44 (37.6%) of the participants agreed that there was social and psychological support available at their work place. However, 42 (36.0%) claimed they enjoyed their work without any symptoms of stress, 69 (59.0%) of the participants claimed that the lack of adequate provision of PPE to radiographers in their department left them frustrated and 19 (16.3%) felt like quitting their job, as shown in Table 3.

The participants stated the lack of personal protective equipment (PPE) 6 (9.6%), long stay

Table 4: Reported work place stressors by respondents

Stressors	Frequency (n=117)	Percent
Long duration of wearing kits and disinfecting accessories and equipment	9	14.4
Fear of getting infected and Hysteria on social media	8	12.8
Increased patient volume	8	12.8
Longer stay at work/ late shift duties	7	11.2
Lack of PPE	6	9.6
Inadequate staffing	6	9.6
Poor remuneration and Lack of motivation	6	9.6
Equipment breakdown and Archaic equipment	4	6.4
Technical modifications	3	4.8
Isolation impact on mental health in lockdown and Emotional stress	3	4.8
Poor management practices	2	3.2

and late shift duties at work, 7 (11.2%) fear of getting infected 8 (12.8%), Long-wearing of kits and disinfecting accessories and equipment 9 (14.4%) among others were the common reasons for their stress, as shown in Table 4.

DISCUSSION

The majority of the respondents had received some form of training in preparedness for the COVID-19 pandemic. Most of the participants indicated online learning as their source of education, others were lectures (in-house training), hands-on practical training sessions, and simulations training. Similar findings were reported by previous studies.[11-13] Continues educational training and retraining is necessary to keep the healthcare workers abreast with current and best practices in infection prevention and control. Previous studies have revealed a high rate of infection among healthcare workers in the radiology department.[14-17] This perhaps could be because the radiology staff is among the front-line staff who are in close contact with patients, especially during the pandemic.[18]

It is no doubt that the healthcare system and its personnel were stretched beyond their capacity during and after the COVID-19 pandemic. This study found some radiographers who reported being stressed about work due to the COVID-19 pandemic. The stringent rules imposed during the pandemic, like the compulsory social distancing, prolonged wearing of personnel protective equipment, use of face, and nose masks, and increased working duration, among others, could have possibly contributed to stress among radiographers. A study by Coppola, [19] reported anxiety and fear of getting infected as the reason for stress among radiologists in Italy. Prolonged time at work increased the feeling of exhaustion leading to stress which inadvertently impacted the families of the radiographers, partners, and even friends due to limited times of interactions and engagements due to social distancing among others. Our interaction with family and friends has been documented to help reduce stress.[20]

Some of the radiographers in this study reported that their relationships with their family, friends, and relations were affected due to the emotional stress they faced during the period of the pandemic. This experience was somewhat new among the radiographers in Nigeria as it affected their socialization. Tekin et al,[21] in their study found that some family members of front-line healthcare workers were negatively affected by the devastating impact of the COVID-19 pandemic, and some of them found it difficult to access childcare due to the fear of exposing their children to the COVID-19 infection. Interactions even among professional colleagues were also affected. This could be because the COVID-19 pandemic is a recent happening and radiographers have not yet been able to differentiate the causes of increased stress experienced whether it is due to the pandemic solely or other extraneous factors associated with it like inflation, the hike in commodity prices, compulsory incarceration (lockdown) which decreased socialization and mingling with family and friends. A similar study by Foley et al,[22] reported that their partners, family, and friends were negatively impacted by their work as front-line healthcare workers. Others also reported difficulty in accessing childcare services during the pandemic for fear that their children might contact it and infect others.[22]

The majority of participants in this study reported a lack of psychosocial support services in their workplaces. In other studies, despite the presence of psychosocial support services, only a very few radiographers utilized such services.[22,23] This perhaps could be because the emphasis at the beginning of the pandemic was more on the adequate provisions of personnel protective equipment (PPE) among other things than their emotional well-being. However, as the pandemic lingered on, the obvious need for psychosocial support was fully appreciated.

Some of the respondents in this study reported they enjoyed their work during the pandemic without any symptoms of stress and burnout, others reported having enough energy just like before the pandemic and were still optimistic about their life and their careers generally. Similar findings were observed among healthcare workers in Lagos, southwest Nigeria, who showed a sense of responsibility and commitment to duty and despite the fear of being infected, they remained persistent in serving humanity and had a sense of fulfilment when they saw their patients fully recover and discharged from the hospital.[24] However, a good number of radiographers were burnt out and felt like quitting their jobs. With less than 5000 registered and licensed radiographers in Nigeria serving over 200,000,000 people, if a handful is considering quitting their jobs, this will further put more pressure on the lean radiography workforce in Nigeria.[25] A similar study reported that over 30% of radiographers were considering quitting their jobs during the pandemic.[22] The majority of the radiographers in this study reported that if all the necessary facilities were put in place, they were still willing and ready to work just like before the pandemic. This goes to show their resilience and ability to adapt to tough situations.

The majority of the radiographers reported being frustrated by the lack of adequate personnel protective equipment (PPE) provision which constituted a major source of stress. This finding is in tandem with the findings from the previous studies by,[26-28] who reported similar issues with inadequate provision of PPE like the N95 masks, face shields, fluid-resistant surgical masks/caps, disposable isolation gowns, and shoe covers among others. Most of the hospital consumables like the PPEs among others used in our hospitals at the beginning of the COVID-19 pandemic were either obtained from the World Health Organization (WHO) or China and with the surge in COVID-19 cases and as the pandemic lingered on in Nigeria, the increased demand of PPE and other healthcare consumables led to panic buying and hoarding, this inevitably led to delays in the supply and deployment to hospitals and areas of need.[28]

Extended hours of work and prolonged stay in the hospitals as a result of increased patient volume, and call/shift duties for most healthcare providers including radiographers attending to emergency cases resulted in increased stress (emotional and psychological) for the participants in this study. Previous studies,[22,29,30] also reported increased levels of health workers to stress among radiographers and other healthcare workers due to increased hospital stays, Long-wearing of PPE, keeping their distance (social), and disinfecting accessories and equipment. These all resulted in decreased mental health status of some radiographers. Anxiety, depression, and stress have been reported as the major cause of mental health challenges among healthcare professionals.[22,23,31,32] Thus, the need for adequate psychosocial support for healthcare workers, communication among colleagues, reduced workplace demands, and reduced hospital stays for healthcare workers, especially during the pandemic can significantly reduce the stress level and improve their mental health status.

Inadequate staffing, equipment breakdown, and some technical modifications among others were some of the major sources of fatigue for most radiographers in our study. Several health institutions had to reorganize their manpower to areas of increased workload, others had to suspend non-emergency services like screening services to attend to more life-threatening health needs.[5,11,33-35] These were all desperate actions that were necessary in desperate moments. Several studies[5,36] have also reported seemingly poor management support for staff during the pandemic. Psycho-social support from co-workers (multidisciplinary team) and the supervising head/ managers have been strongly recommended as a way of helping healthcare workers cope with occupational stress and improve their mental health status.[23,37]

This study gives us an insight into the work-life of radiographers' job pre- and post-pandemic, whether they are stressed more than before, and the impact of the pandemic on their work-life balance. This study was however, limited in its small sample size, and the use of convenience sampling to recruit the respondents.

Conclusion: This study presents findings from a survey among radiographers in Nigeria during the COVID-19 pandemic. Most of the radiographers had experienced stress during the COVID-19 pandemic which was mainly due to inadequate provision of personal protective equipment, inadequate staffing, long-wearing of kits, and poor remuneration, among others. Despite the negative impact of the COVID-19 pandemic on the healthcare workforce globally, several radiographers in Nigeria still had a positive attitude to their work. As key players in the front-line healthcare workforce, the hospital management/radiology managers should try to make adequate provisions for PPE, improve remuneration and seek to motivate radiographers to improve retention and reduce work-related stress in preparedness for future pandemics.

Availability of data and materials: The data set used in this study can be obtained on request from the corresponding author

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Authors' Contributions:

LG: Conceptualization, literature review, research design, data collection and analysis, manuscript drafting, revision and submission of the final draft.
NBF: Conceptualization, literature review, data collection, manuscript drafting, revision and submission of the final draft.
FAM; AA: Conceptualization, literature review, research design, manuscript drafting, revision and submission of the final draft.
EPM: Conceptualization, literature review, research design, data collection and analysis and submission of the final draft.
VKN; JH; UA; MN; KO; CIN: Conceptualization, literature review, manuscript drafting, revision and submission of the final draft.
MZ, EEUN: Literature review, manuscript drafting, revision and submission of the final draft.

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GMM: Conceptualization, literature review, revision and submission of the final draft.

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