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Assessment of Radiographers' Knowledge, Attitudes, and Adherence to Standard COVID-19 Precautions: Implications for Policy: A Cross-Sectional Study

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Abstract

Background: This study examines radiographers' knowledge of COVID-19 pathogenesis and prevention, their attitudes, and adherence to safe clinical practices during the pandemic. The research aims to provide insights for informed policy recommendations.

Materials and Methods: Conducted as a national cross-sectional survey, this study utilized an online questionnaire to collect data on respondents' demographics, COVID-19 knowledge, attitudes, practices, and adherence to standard precautions. Data analysis included descriptive statistics, Pearson's correlation, and one-way ANOVA tests.

Results: Out of 255 respondents, 17.3% were actively involved in managing COVID-19 cases. Participants demonstrated high knowledge scores in COVID-19 pathology (82.46 ± 8.67%) and prevention (93.43 ± 7.11%), along with positive attitudes (74.11 ± 11.61%). However, adherence to safety precautions was low (56.08 ± 18.56%). Significant differences were observed in knowledge about COVID-19 prevention strategies across educational qualifications ($F[3, 251] = 4.62$, $p = .004$). Compliance with safety precautions also varied based on educational qualification ($F[3, 251] = 4.53$, $p = .004$) and years-in-practice ($F[4, 250] = 4.17$, $p = .003$).

Conclusion: The study highlights low adherence to standard COVID-19 precautions among radiographers. Professional qualification significantly influenced knowledge and safe practices during the pandemic. Recommendations include enhancing aseptic techniques, upgrading practice amenities, and expanding infectious diseases modules in education programs to improve radiographers' response to COVID-19 and future pandemics.

Key Messages: Radiographers with qualifications below a bachelor's degree showed lower knowledge of COVID-19 prevention. While radiographers generally held positive attitudes towards safe practices, inadequate education and resources impacted adherence levels. Challenges like insufficient personal protective equipment, poor infrastructure, and inadequate hygiene facilities hindered adherence to COVID-19 precautions in low-resource settings.

Keywords: Coronavirus, personal protective equipment, radiographer, standard precautions

Introduction

The outbreak of coronavirus disease (COVID-19) was first reported in Wuhan, China on 8 December 2019 (Li et al., 2020). The disease rapidly spread globally, leading to its declaration as a pandemic by the World Health Organization (WHO) on 11 March 2020 (Cucinotta & Vanelli, 2020). the index case of COVID-19 was reported on 27 February 2020.As of 27 January 2023, , including healthcare workers (HCWs), with 3155 reported deaths across 36 states and the federal capital territory (World Health Organization , 2023).

The rapid global spread of COVID-19, coupled with the emergence of highly mutated variants such as delta and omicron, poses risks to healthcare workers (Hewins et al., 2022). COVID-19 patients often present with respiratory disorders, necessitating radiological investigations for diagnosis (Adhikari et al., 2020). Radiographers, who conduct these investigations, are at risk due to close contact with patients and exposure to the highly contagious virus (Okeji et al., 2014). Additionally, vaccine hesitancy among healthcare workers, including radiographers, poses challenges (Botwe et al., 2022).

To mitigate the spread of COVID-19, the WHO and NCDC have recommended various safety practices for healthcare workers, including radiographers (NCDC, 2020; WHO, 2020). However, challenges such as PPE shortages have been reported globally, particularly in low-resource settings (WHO, 2020; Ogolodom et al., 2021). Understanding radiographers' knowledge, attitudes, and adherence to safety precautions is crucial in addressing these challenges.

This study is grounded in the health belief model, which posits that increased COVID-19 knowledge among healthcare workers can lead to better perceptions of risk, positive attitudes, improved adherence to safety measures, and reduced transmission (Hayden, 2022). However, it remains uncertain whether radiographers are adhering to safety recommendations, given reported PPE shortages (Ogolodom et al., 2021). Therefore, this study aims to assess radiographers' knowledge, attitudes, and adherence to standard precautions during the COVID-19 pandemic. The main hypothesis is that there will be no significant differences in these factors across educational levels, years-in-practice, practice settings, and regions among radiographers.

Materials and Methods

Study Design:

A web-based, cross-sectional exploratory study was conducted to investigate radiographers' knowledge, attitudes, and adherence to standard COVID-19 precautions during the pandemic. This approach allowed for the recruitment of a nationally representative sample during the second wave of the pandemic, given the infeasibility of face-to-face administration of questionnaires and access to remote areas. Ethical approval was obtained from the Human Research Ethics Committee

Instrument:

The survey instrument comprised closed-ended questions divided into seven sections:

- Section A: Symptoms, transmission, and diagnosis of COVID-19 (9 items)
- Section B: Prevention and treatment of COVID-19 (5 items)
- Section C: Attitudes towards clinical practice during the pandemic (7 items)
- Section D: PPE and sanitation measures in workplaces (3 items)
- Section E: Adherence to standard safe practice measures (6 items)
- Section F: Radiography practices during COVID-19 (8 items)
- Section G: Demographic information (13 items)

The instrument development involved a literature review, focus group discussions, Delphi sessions, and online piloting for validation and refinement.

Scoring of the Instrument:

Correct multiple-choice options in sections A, B, and E were scored one point each, with total scores converted to percentages. Section C used a five-point Likert scale, with scores converted to percentages. Nominal variables in sections D, F, and G were not scored.

Procedures for Data Collection:

An online questionnaire was prepared using Google Forms and distributed through radiographers' associations, social media platforms, email, clinics, and diagnostic centers. Informed consent was obtained from participants, and data were collected securely using cloud storage.

Data Analysis:

Descriptive statistics, Pearson's correlation, and one-way analysis of variance (ANOVA) were used for data analysis in IBM SPSS Version 26. Parametric inferential tests were applied with significance set at $p \leq .05$.

Results

Demographics: A total of 265 responses were received, with 255 deemed complete and included in the analysis. The participants were distributed across six geopolitical zones, predominantly male (76.9%), aged

30-39 years (43.1%), with a Bachelor of Radiography degree (62.7%), and within one decade of practice (67.1%).

Knowledge of Diagnosis, Symptoms, and Transmission: Participants were aware of COVID-19 and its pathogenic organism, with most knowing the accurate incubation period and the potential infectiousness of asymptomatic carriers. However, there were varied responses regarding the confirmatory tests for COVID-19, with a notable proportion reporting rapid test kits, sputum culture microscopy, or temperature checks as confirmatory.

Knowledge of Prevention and Treatment: Participants supported various public health interventions for COVID-19, including laboratory screening, quarantine, isolation, city lockdown, physical distancing, contact tracing, and health education. While many were aware of the public health agency in charge of COVID-19 responses, fewer had the agency's emergency response contact.

Adherence to Standard Precautions: There was a reported paucity of PPE in workplaces, with insufficient supplies of items like shoe covers, goggles or face shields, masks, gloves, and infectious disease gowns. However, materials for hand hygiene were generally provided, although not all participants complied fully with recommended practices.

Radiography Practice during COVID-19: A portion of participants worked in facilities attending to COVID-19 patients, with some imaging confirmed cases. Imaging modalities utilized included conventional X-ray, CT, ultrasound, MRI, fluoroscopy, and ECG.

Inferential Statistics: One-way ANOVA results indicated no significant difference in participants' knowledge of COVID-19 and attitude towards safe clinical practice across various factors. However, there were significant differences in knowledge of preventive measures and adherence to standard precautions based on educational qualifications and years-in-practice.

Overall, correlations among participants' knowledge of COVID-19, attitudes, and adherence to safe practices were not significant.

Discussion

The COVID-19 pandemic has significantly impacted healthcare systems worldwide since its emergence in late 2019 (Li et al., 2020). This study aimed to assess the knowledge and preparedness of radiographers during the peak of COVID-19 community transmission. Radiographers, like other frontline healthcare workers, face increased risks of contracting the disease (Ogolodom et al., 2020). Efforts by policymakers and government agencies to protect healthcare workers from the virus were noted, as an infected healthcare worker can propagate infections within healthcare settings and the community (Cucinotta & Vanelli, 2020).

The majority of radiographers demonstrated adequate knowledge about COVID-19, including its cause, mode of transmission, and testing methods such as the polymerase chain reaction (PCR) test (Adhikari et al., 2020). However, some participants lacked knowledge regarding the confirmatory test for COVID-19, highlighting the ongoing need for education and training programs for healthcare workers (Centre for Disease Control, 2020).

Participants with higher educational qualifications showed better knowledge of COVID-19 prevention strategies, emphasizing the importance of professional literacy and competence in managing infectious diseases (Hewins et al., 2022; Ogolodom et al., 2020). This finding supports the argument for enhancing radiography education and training programs to improve the understanding and implementation of preventive measures (Adejoh, 2019).

Despite the positive attitudes of radiographers toward their practice during the pandemic, challenges such as inadequate supply of personal protective equipment (PPE) and basic aseptic amenities were prevalent (Barratt et al., 2020). The shortage of PPE globally has been a significant concern, impacting healthcare workers' safety (World Health Organization, 2020). Prioritizing the distribution of PPE and improving infrastructure in healthcare settings are crucial steps in ensuring the safety of healthcare workers (Centre for Disease Control, 2020).

Radiographers played a vital role in managing COVID-19 patients, primarily through imaging modalities such as chest radiography and CT scans (Mongodi et al., 2020). However, adherence to standard COVID-19 precautions among radiographers was suboptimal, with higher adherence observed among those with advanced qualifications and more years of practice (Batterton & Hale, 2017; Sullivan & Artino, 2013). This

highlights the need for ongoing training and reinforcement of safety protocols within the radiography profession (Onyeso et al., 2022).

In conclusion, enhancing education, training, and access to adequate PPE are essential strategies in improving the preparedness and safety of radiographers during public health crises like the COVID-19 pandemic (Ogolodom et al., 2021). Public health campaigns and continuous professional development programs should be implemented to sustain knowledge and adherence to safety protocols among healthcare workers (Ezema et al., 2023).

References

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