



Impact of COVID-19 on Radiography Practice: Radiographers' Perspective

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Abstract

This study aims to evaluate the radiographers' perceptions of the impact of COVID-19 on radiography practice. From May to June 2022, a cross-sectional online survey was conducted of radiographers working in ten hospitals. Fifty respondents are involved (female=28; male=22). 94% of radiographers reported an increasing workload, with 30% frequently stressed. 68% and 60% are confident in their knowledge of COVID-19 transmission and infection control, even though 78% had received specific training to prepare for the pandemic. The high workload and fear of infection increase the radiographers' stress during the pandemic.

Keywords: COVID-19; Infection control; Radiographer perspective; Effects of workload

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1.0 Introduction

In December 2019, in Wuhan, Hubei Province, China, a series of cases of unknown pneumonia with acute respiratory syndrome were reported (Caldaria et al., 2020). The first reported case in Malaysia in January 2020 was an imported case from China, and the rate of reported cases increased dramatically throughout 2020 and 2021 (Norhayati Mohd Zain & Nur Anis Izzati Che Mut, 2021). According to the report by Ciotti et al. (2020), an infected COVID-19 patient typically presents with respiratory symptoms that are either mild or moderate in severity and do not typically call for any specialized treatment or admission to the hospital. Despite this, even persons with just minor symptoms have a high risk of passing away from the illness, and the World Health Organization (WHO) estimates that the virus has been responsible for 6.3 million fatalities worldwide since the beginning of July 2022 (Tang, 2020).

In Malaysia, radiographers are at the forefront of radiology departments. Healthcare personnel are at a higher risk of COVID-19 exposure than the general population because of the nature of their jobs, which requires them to come into close contact with patients with the virus. According to research by Nguyen et al. (2020), healthcare professionals are at a greater risk of transmitting

COVID-19 because their jobs demand them to have close physical contact with patients who are affected. Increased COVID-19 hospitalizations are associated with an increase in the number of radiology imaging cases. Chest X-rays are typically part of the initial evaluation of patients presenting to hospitals with COVID-19 symptoms. The choice of mobile radiography in imaging the chest X-ray

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is made due to the possibility of preventing the transmission of viruses. Hence, this circumstance increased the daily imaging volume and radiographers' workload.

An Irish study discovered increased after-hours and daytime workload because of increased mobile chest x-rays and longer infection control measures (Foley et al., 2020). Radiographers interact with COVID-19 patients during CT chest procedures and mobile radiography as part of the disease's diagnosis and progression monitoring (Tay et al., 2021). Personal protective equipment (PPE) is essential for protecting employees and patients during imaging procedures. For instance, the inadequate PPE issue faced by Indonesia's healthcare system in 2020 has contributed to healthcare worker infections and deaths (The Jakarta Post, 2020). Hence, radiographers need specific training to provide care and treat COVID-19 patients (Akudjedu et al., 2020). This is crucial because it helps frontline radiographers prepare to combat the virus and prevent hospital related transmission. It may also aid in pandemic preparedness.

Even though COVID-19 cases appear to be decreasing now, as of July 2022, there is growing concern about the next wave of this infectious disease due to the elimination of masking requirements for outdoor activities and the increase in social events involving human contact. This prolonged condition of COVID-19 cases will influence radiographers, as they are among the frontline personnel who must maintain close contact with confirmed case patients to provide the most accurate diagnosis and treatment.

The work-related stress due to the COVID-19 outbreak could affect them emotionally and physically. This ongoing responsibility may affect their ability to provide radiography services and their emotional and mental health, putting them at risk for stress at work. This study aims to assess radiographers' perceptions regarding the effects of COVID-19 on their radiography practice and well-being. It also evaluates their understanding of COVID-19 transmission, infection control, and PPE availability.

2.0 Materials and Method

2.1 Research Design

This is a cross-sectional online survey assessing the impact of COVID-19 on the radiographers' practice and well-being. This questionnaire's study period it lasted one month, from 5/01/2022 to 6/01/2022. The survey question was adapted from a study by Akudjedu et al. titled "Impact of the COVID-19 pandemic on radiography practice: findings from the UK radiography workforce survey" For the use or adaption of the questionnaire or other instruments utilized in this study, proper permission was acquired.

This survey was conducted in 10 Malaysian hospitals. The sample size was estimated using the sample size calculator from Raosoft, Inc. The sample size needed for this study is 45. This study used the snowball sampling approach of the non-probability sampling technique. The researcher recruited participants or radiographers through other study participants, who were requested to distribute the link to their hospital colleagues.

The questionnaire survey was divided into four sections. The first component contained demographic information about the participants, such as their gender, age, state, and workplace. The second section of the online survey consisted of multiple-choice questions to which respondents responded based on the impact of COVID-19 on their work practices. The final section consisted of multiple-choice questions to assess the participants' understanding of COVID-19 transmission, infection control, and PPE availability. The online survey concluded with multiple-choice questions about COVID-19-related stress, its effects, and the availability of PPE.

Ethical approval was obtained from Faculty Ethics Research Committee (FERC) from the Faculty of Health Sciences, UiTM, before the start of any study related activities.

2.1 Statistical Analysis

The collected data from the online survey will be saved within the Microsoft Excel Spreadsheet before being transferred into the Statistical Package for Social Sciences (SPSS) Version 20. This study's statistical analyses will be performed using SPSS Version 20 (IBM Corporation, Armonk, NY, USA). For the descriptive analysis, data will be generated using SPSS to provide the percentages and frequencies necessary to characterize the sample and its attributes. As for inferential statistics, the chi-square test will also be computed using SPSS to obtain the appropriate result.

3.0 Results and Discussion

3.1 Response rate and demographic

This study received 50 responses (female, n=28 and male, n=22), with a more significant number of female radiographers (56 percent) than male radiographers (44%). 66% of radiographers (33 out of 50 respondents) are younger than 29 years old. The remaining 34% of replies were obtained from radiographers aged 30 to 39. Most respondents shared the survey link with coworkers of the same age due to the study's snowball sampling technique.

The following question gathered information about the hospital where each respondent works from the list of 10 hospitals selected for this study. Hospital Tuanku Fauziah (HTF) and Hospital Sultan Abdul Halim (HSAH) provided the 1 most responses, with six responses each, accounting for 24% of the total responses. Hospital Sultanah Nora Ismail (HSNI) and Hospital Taiping (HT) gave the

fewest responses, with four responses apiece. Each of the remaining hospitals submitted five responses (10%) for ten. Table 1 summarizes the demographic data of the respondents.

Table 1. Demographic data of respondents, (n=50)

Gender	Variable	Frequency	Percent
	Male	22	44
Age range	Female	28	56
	20-29	33	66
	30-39	17	34
Hospital	Hospital Tuanku Fauziah	6	12
	Hospital Sultanah Bahiyah	5	10
	Hospital Sultan Abdul Halim	6	12
	Hospital Umum Sarawak	5	10
	Hospital Sultanah Nora Ismail	4	8
	Hospital Sultan Ismail	5	10
	Hospital Al-Sultan Abdullah	5	10
	Hospital Pulau Pinang	5	10
	Hospital Taiping	4	8
	Hospital Teluk Intan	5	10

3.2 Perspective on the impact of the COVID-19 pandemic on radiography practices

Radiographers are responsible for providing care for COVID-19 and radiography cases they previously managed. This is consistent with the findings of this study, as 94% of radiographers experienced an increase in workload due to the COVID-19 epidemic, as shown in Figure 2. Two additional responses indicated that their work schedule was irregular during the virus outbreak. However, only one of fifty responses indicated that the pandemic had not caused any apparent changes in their work patterns. A study conducted in Ireland by Foley et al. (2020) revealed an increased workload due to the strict infection control method, which increased the time required per examination. This is supported by a study by Mc Fadden et al. (2022), which determined that adjustments in radiography working hours are necessary due to the additional time required for donning personal protective equipment (PPE) and implementing strict infection control measures for each patient.

In contrast to this study's findings, Akudjedu et al. (2021) found that eliminating non-urgent imaging reduced the general radiography workload. As for this study, the increasing workload may be because all the radiographers who participated in this survey work at government hospitals responsible for daily COVID-19 cases. Due to the virus-infected coworkers who were quarantined, the remaining personnel had to cover their shifts despite a heavy workload. The Malaysian Ministry of Health acknowledged the dearth of medical personnel by appointing thousands of contract medical personnel to manage the COVID-19 outbreak. For instance, the increase in workload for radiographers during COVID-19 can be attributed to multiple factors, such as the high demand for imaging services for COVID-19 cases and the shortage of radiographers.

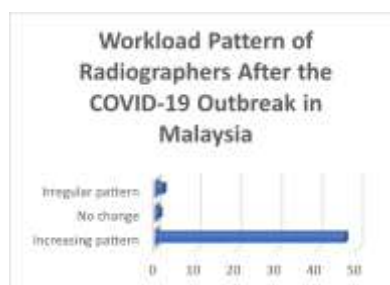


Figure 2: Workload pattern of radiographer after the virus outbreak in Malaysia

3.3 Understanding of COVID-19 transmission, infection control, and availability of PPE

68% of the radiographers strongly agreed that they comprehensively understand how the COVID-19 virus is transmitted. Another 28% of respondents agreed with the statement, and most positive responses were anticipated, given that they are on the frontlines of healthcare in the fight against the COVID-19 outbreak and must thoroughly understand the virus' transmission. In addition, most radiographers (98%), or 49 responses out of 50, strongly agreed or agreed that their knowledge of infection prevention and control as a radiographer is sufficient to deal with the COVID-19 outbreak. The Ministry of Health establish guidelines for managing COVID-19 patients in Malaysia to reduce staff and patient exposure to the virus. The guideline emphasized the importance of infection prevention and control training. Studies by Elshami et al. (2021) and Shanahan & Akudjedu (2021) found that radiographers in Australia, the Middle East, North Africa, and India have comparable knowledge of infection prevention and control. In contrast, due to a lack of knowledge regarding the proper use and selection of personal protective equipment (PPE), radiologic technologists in Palestine were

only moderately aware of the significance of preventing nosocomial infections (Firas Fohely et al., 2021). According to a study by Tay et al. (2021), strict adherence to infection prevention controls is essential for preventing nosocomial transmission of COVID-19 disease. Since this study's data were collected after the pandemic's peak, the high positive result may be impacted. This is because, as the pandemic advances, more recommendations containing the most up-to-date information about the novel coronavirus assist health professionals in adjusting infection prevention measures accordingly. In addition, the Ministry of Health's active dissemination of information via social media and other media outlets may have also contributed to the radiographers' high level of comprehension. All healthcare professionals must thoroughly understand infection control and COVID-19 transmission to provide patients with a safe environment while receiving care.

According to a study by Akudjedu et al. (2020), radiographers may feel unprepared and fearful during an outbreak due to a lack of knowledge about the proper infection control measures. As the official health agencies recommended, the radiology department should provide radiographers with specialized training in preparation for the current COVID-19 outbreak. 78% of respondents in this study reported receiving specific training and direction on how to treat COVID-19 patients during the outbreak. 22% of respondents indicated that they have inadequate training for this situation. In contrast, a study conducted in Ghana showed that less than 30% of respondents had prior training to manage COVID-19 cases during the pandemic (Akudjedu et al., 2021). Khan et al. (2020) of Pakistan also discovered that frontline professionals needed to prepare for the threat of COVID-19.

As the Malaysian Ministry of Health's official guideline mentioned, personal protective equipment should be used based on the setting, the risk of exposure, and how the pathogen is spread. The guideline also stated the accurate guidelines on donning PPE like gowns, medical gloves, face masks, and face shields. Based on this study, 92% (46/50) of radiographers agreed or strongly agreed that their workplace had enough PPE during the virus outbreak. However, in the early stages of the pandemic, there was a global shortage of PPE because they were in such high demand everywhere. A report from Kanyakumari (2020) in April 2020 says that hospitals in Malaysia only have enough PPE supplies for two weeks. Other surveys done at the start of the pandemic by Akudjedu et al. (2020) and Akudjedu et al. (2021) found that nearly half of healthcare workers need more access to PPE while on the job. Due to a lack of personal protective equipment (PPE), local health workers in Malaysia had to get creative to protect themselves during their work. Having enough PPE for healthcare services is essential because it gives healthcare workers confidence in handling COVID-19 patients.

3.4 Profile of COVID-19 related stress, impact, and available support systems

The burden on the radiographer to offer high-quality service without jeopardizing the safety of coworkers and patients can be demanding (Akudjedu et al., 2021). Thus, continuous exposure to such impediments would have psychological consequences. Epidemics like this COVID-19 outbreak might increase mental disorders such as sadness, anxiety, dread, and panic. 30% of respondents reported experiencing constant stress owing to COVID-19. In response to the COVID-19 epidemic, another 70% of respondents said that radiographers occasionally felt stress. Following the epidemic, 75.4% of radiographers were reported to be facing workplace-related stress (Akudjedu et al., 2021). Saleh et al. (2016) observed that work-related stress might lead to headaches, abdomen, and chest pain, eating disorders, and sleep issues among radiographers. Despite this, it remains concerning that radiographers may have unfavorable health impacts because of their occupation. In addition, Elshami et al. (2021) discovered that when the outbreak began, many of their respondents who worked in the healthcare business had nausea, stomach problems, and sleeping difficulties.

The stress they endured may have also jeopardized their job performance, which may have harmed the imaging services provided by the healthcare system. A study conducted in Ireland by Foley et al. (2020) revealed that radiographers are contemplating retirement or a career change due to the high stress levels they experienced during the initial phase of the pandemic. Pereira et al. (2021) discovered that burnout issues caused by high work-related stress led to low productivity, increased absenteeism, a decline in the quality of care, and professional conflicts. This condition will have a long-term impact on the organization of the radiology department. Therefore, adequate social and psychological support in the workplace is required to reduce the respondents' stress.

This is evidenced by 64 percent of respondents agreeing or strongly agreeing that their workplace provided adequate support during a disease outbreak. Another 30% still determine whether their workplace provides adequate social and psychological support. Three responses indicate that there needs to be more support for them to deal with workplace stress. This surpasses comparable surveys conducted in Australia and the United Kingdom (Akudjedu et al., 2020; Shanahan & Akudjedu, 2021). A sufficient level of workplace support would be beneficial, as it is believed that positive workplace relationships among employees can improve the mental health burden of employees (Mackenzie et al., 2013).

In addition to influencing the radiographers' work practices, work-related stress may also significantly affect their private and social relationships. More than half of the respondents to this study reported that their partners, family, and friends are negatively affected by their recent stress due to the virus outbreak. In addition, three respondents strongly agreed with this statement. However, 10% of respondents strongly disagreed and rejected the notion that their significant others are affected by their recent work stress. The remaining 17 responses, or 34% of respondents, lean toward neutrality regarding the statement. More than half of the respondents to a similar study by Akudjedu et al. (2021) reported that their pandemic-related work stress affected their family and friends. This result is consistent with other research indicating that the COVID-19 pandemic has negatively impacted respondents' family and social life (Pereira et al., 2021).

According to a survey conducted in South Africa, this pandemic has harmed the relationship between radiographers and their families (Lewis & Mulla, 2021). In addition to being on the front lines during this challenging time, the radiographers require family support. Due to their continuous exposure to the virus and its effects on their mental health, it is difficult for them to communicate normally and receive the necessary support.

Even though there is sufficient evidence regarding the mental impact of the COVID-19 outbreak on radiographers, more than half of them are on the fence regarding their need for professional assistance to manage work-related stress. 12% of the responses strongly disagreed and disagreed with the 3 statements. However, the remaining 30% of respondents admitted they require psychological assistance to manage their recent stress. In addition, they can learn effective coping strategies and receive professional support to ensure their mental health at work. This is consistent with a study by Roslan et al. (2021), which identified support-seeking, positive thinking, and problem focused coping strategies for healthcare workers who have experienced burnout due to the pandemic. Radiographers must develop effective coping strategies to continue providing medical imaging services of the highest quality within the healthcare system.

As the primary stressor causing work-related stress, 48% of respondents (34/50) cited an excessive workload as the cause. This is consistent with the findings of an Australian study that reported a general increase in work-related stress because of changes in their work environment that required them to work longer hours during the pandemic (Shanahan & Akudjedu, 2021). Other research by Foley et al. (2020) indicates that the high-stress level detected among its radiographers is increasing because of the constantly changing work environment required to manage the global pandemic's high volume of cases. High work intensity and extended contact with infectious patients have also been linked to infection. Consequently, fear of contracting COVID-19 became a significant source of work-related stress during the virus outbreak, resulting in a substantial number of responses to this survey (22%). Local mixed-methods research on the prevalence of burnout among Malaysian workers identified workload, fear of infection, and difficulties in balancing work and family as their primary sources of stress. This fear of infection may develop due to their employment-related exposure to social stigma after contracting the virus. In Ireland, for example, radiographers had difficulty obtaining childcare because childcare providers feared contracting diseases from healthcare personnel (Foley et al., 2020). In addition, there is a correlation between the presence of children among healthcare workers and a greater fear of COVID-19 infection (Ruiz et al., 2021). This is also consistent with a study by Ruiz et al. (2021), who discovered that radiographers fear infecting their family members, coworkers, and patients after the outbreak began.

3.5 Limitations of the study

This study has a couple of limitations. First, only 50 responses were obtained as the sample size for this investigation. It does not represent the entire community of radiographers in Malaysia. In addition, the time of this study could have been more suitable because it was conducted after the COVID-19 pandemic's apex, when the number of cases was on the rise, as was the case with comparable survey studies. This will significantly affect the answers of the radiographers. Next, the data gathering method was undertaken via WhatsApp, resulting in only younger radiographers responding. Lastly, no standard scale was utilized to assess the level of stress and the actual imaging volume changes resulting from the virus outbreak.

4.0 Conclusion

The study finds out that the COVID-19 virus pandemic has had an impact on radiographers on radiography practices. Due to the application of strict infection control methods, the increasing workload increases the time taken to complete an examination. Besides that, radiographers have been elevated to a prominent position among healthcare professions. As a result of the global circumstances, radiographers' former job pattern was altered, and they were assigned more responsibilities. The radiographer is also aware of the importance of strict infection control methods to prevent nosocomial transmission of COVID-19 disease. The introduction of guidelines for the management of COVID-19 patients in Malaysia by the Ministry of Health assists radiographers in applying the correct technique in handling COVID-19 patients. The radiographer acknowledges the importance of PPE usage during handling the COVID-19 patient. Most hospitals are equipped with sufficient PPE. Even though some hospitals did not have enough PPE due to the higher number of COVID-19 patients, the radiographer will use their creativity to create their PPE that can protect themselves from being exposed to COVID-19 transmission. This paper will provide information to the hospital regarding the effect of current radiography practice on radiographers' mental status. The hospital can monitor the radiographer's status and take appropriate action to ensure the radiographer can work well, especially when handling COVID-19 cases.

Paper Contribution to Related Field of Study

This paper will provide information to the hospital regarding the effect of current radiography practice on radiographers' mental status. The hospital can monitor the radiographer's status and take appropriate action to make sure the radiographer can work well, especially during handling COVID-19 cases.

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