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Research Article

Perceptions Of Radiographers On Reporting Chest Images At Public Hospitals In Malawi.

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Abstract

Introduction: Malawi health facilities' major challenge is inequalities in access to reporting services due to a shortage of radiologists to report on radiographic images. Radiographers in the developed world acquire formal training in image reporting, however, there is no postgraduate training programme in Malawi. Thus, there is a need to explore radiographers' perceptions of reporting chest images in Malawi's hospitals. The study aims to explore radiographers' perceptions of being tasked with the responsibility of reporting on chest images at public hospitals in Malawi.
Method: The study was conducted through a quantitative cross-sectional design. Data was collected using a self-developed questionnaire. Data collected was analyzed with the assistance of a statistician using the Statistical Package for Social Scientists (SPSS) version 29. The measurement scales and questions included quantitative 10-point Likert. Statistical analysis used the Mann -Whitney U test.
Results: Eighty (71) radiographers representing 81% of the total population from five public hospitals participated in the study. The results from this study found that most radiographers (97.2%) agreed that radiographers needed to report on chest images in the department. Findings demonstrated that the majority of radiographers (80.3%) supported ongoing professional development, and of the radiographers (78.9%) also agreed that reporting on chest images required post-graduate training. Overall confidence in reporting chest images was 81.6% with no difference by years worked as a qualified radiographer (p=0.196) with the less than 10 years were as confident to report chest images as 10 years or more . Confidence in detecting abnormality on chest images (78.8%) demonstrated no variation by years worked as qualified radiographer (p=0. 196) or level in department (junior of senior radiographer (p =0.323). Perceived impact of radiographer's involvement in chest image reporting to improved cost effective service delivery, work efficiently, and potential impact on patient care and safety.
Conclusion: Based on the findings of this study, there were positive perceptions among the majority of radiographers about the reporting of chest images in Malawi. It was recommended that policymakers change Malawi's health care policy, especially the radiological sector to allow radiographers to report on chest images.

Keywords : *Perceptions, Image reporting Radiographers, Radiologists Role extension Radiographer reporting.*

INTRODUCTION

A chest image is the most common investigation in many Malawian hospitals [1]. This could be attributed to the many tropical infections, high prevalence of HIV infection and HIV/AIDS, COVID -19 as well as associated comorbidities such as tuberculosis (TB), malignancy, and pneumonia [2]. However, most public hospitals in Malawi have no radiologist in the medical imaging department to report on radiographic images. Very few radiographic images are sent to referral hospitals where there are radiologists available to report and interpret. This takes a long time for a report to be given. This leads to a delay in diagnosis, compromising the overall quality of healthcare service to patients [3] Furthermore, poor radiological services subject patients to inappropriate treatments, chronic ill-health, loss of economic productivity of the population due to chronic illness, and loss of life[4].
The need to provide radiographers the opportunity to take more responsibility in interpreting and reporting on chest radiographs is urgent given the shortage of radiologists and the rise in illnesses linked to chest pathology [5].

Underreporting of the results obtained for chest imaging is directly associated with missing the diagnosis of cancer and other serious illnesses [6]. Countries with economic challenges and a shortage of radiologists could benefit from

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approving radiographers reporting on X-ray chest images for the detection of tuberculosis [7].

The number of radiologists per capita is low in developing countries [5]. The shortage of radiologists impacts the radiology service delivery. Malawi currently has a shortage of radiologists, there are only three radiologists in public hospitals and one in the private sector. Resulting in an acute shortage in the public sector, serving an estimated population of 17 million people [8]. For this reason, most hospitals, especially in rural areas have no radiologist services. This leaves most diagnostic imaging examinations including chest images unreported [9]. The situation has remained unchanged despite the increasing Malawian population.

Very few radiographic images are sent to referral hospitals where there are radiologists available to report and interpret images. Even if sent to referral hospitals it takes a long time for a report to be given. This leads to a delay in diagnosis and treatment, compromising the overall quality of healthcare service to patients [3].

Furthermore, poor radiological services subject patients to inappropriate treatments, chronic ill-health, loss of economic productivity of the population due to chronic illness, and loss of life [4]. Radiographers' ability to interpret images might greatly increase the efficacy and efficiency of the provision of radiology services. Most contemporary radiographers reporting in the UK receive their education through formal postgraduate programmes offered by Higher Education Institutions [10].

Radiographer's confidence and accuracy in reporting on images have improved after completing specialized training in image reporting [11]. A study conducted in South Africa indicated that radiographers' accuracy in muscular skeletal image interpretation had improved from 71.04% to 78%, sensitivity from 83.73% to 87.28%, and specificity from 59.62% to 70.34% after the training [12]. Further research indicated that the introduction of reporting radiographers enhances clinical decision-making and enhances service delivery in general when there is no radiologist report available [13].

METHODS

This study employed a cross-sectional survey design utilizing an online questionnaire. Ethical clearance for the study was provided by the University of Johannesburg (UJ) Faculty of Health Sciences, Research Ethics Committee (No. REC-1533-2022), and the National Health Sciences Research Committee Ministry of Health, Malawi approval (No. 22/103053).

The questionnaire included five demographic questions, and six radiographers' perceptions questions exploring perceptions regarding chest image reporting, the format included quantitative 10-point Likert ordinal measurement scales to allow responses to be compared across and within the demographic variables for patterns and relationships within the participant's experience data. Along with the questionnaire, participants were provided with an information sheet explaining the consent, how to withdraw, what anonymized data would be collected, and the participant's rights The survey was set not to allow participants to complete the survey without first completing the consent form.

Online questionnaires as data collection too are more convenient and better responses and maintain respondent anonymity, however, an issue that can arise is incompetence to reach people residing in far-off, remote locations with no access to the internet and can lead to misleading information response bias in online surveys [14].

A pilot of the survey was emailed to n=5 volunteers who checked the content validity, terminology, balance, order, and grouping of questions, The modified questionnaire only included the following little adjustments; there were no major changes. 1. Question 17, an additional column was included and titled 'I was informed about chest reporting on images during my course of study in radiography' as the participants argued that they needed to know the level of knowledge among participants with different education background.

The recruitment was conducted between October and December 2023 email. Participants were given an explanation of the research project by the department head, and those who satisfied the inclusion requirements and consented to take part in the study received an email with a letter outlining the study and a consent form that they needed to sign before answering the questionnaire.

Further to this, the researcher requested permission from the five public hospitals to distribute the online survey to their database. The researcher sent the online survey using Survey Monkey

The quantitative data used inferential statistical non-parametric analysis of the Manne-Whitney U test (Wilcoxon) to assess for statistically significant ($P \leq 0.05$) differences between three or more independent groups (level in the department and years worked as radiographer) with different distributions, using SPSS statistics (V29.0.1; IBM, UK, 2022).

RESULTS

A total of 71 radiographers completed the online survey (response rate = 81%), comprising of 52 males (73.2%) and 19 females (26.8%) radiographers. The largest responses came from the age of the 31-40 category (39.6%) and holders of Diploma in Radiography (74.6%) ,a full breakdown of participants is provided in **Table 1**.

Table 1. Demographics

Variable	Levels	n = 71	%
Gender	Male	n=52	73.2%
	Female	n=19	28.6%
Age	20-30	n=26	39.6%
	31-40	n=38	54%
	41-50	n=5	4.2%
	51-60	n=2	2.8%
Category	Junior radiographer	n=34	47.9%
	Senior radiographer	n=24	33.8%
	Chief radiographer	n=12	16.9%
	Others	n=1	1.4%
Experience	0-4	n=23	32.4%
	5-9	n=22	31.0 %
	10-14	n=19	26.8 %
	> 20 years	n=2	2.8%
Qualification	Certificate in Radiography	n=3	4.2%
	Diploma in Radiography	n=53	74.6%
	Degree in Radiography	n=14	19.7%
	Master in Radiograph	n=1	1.4%

Likert scale responses to the survey questions are displayed in Table 2. Most respondents (97.2% agreed or strongly agreed) expressed that radiographers needed to report chest images. This was frequently connected with perceptions of the radiographer's reporting, indicated by the participant's reference to the use radiographer's abnormality detection system (97.2%). Radiographers reporting on chest images were perceived to have a positive impact on patient diagnosis by 69 (97.2%) who agreed or strongly agreed with this statement.

Most participants were not interested in providing chest image reporting after hours at their hospitals. This is indicated by 85.9% of participants who disagreed with the statement 'Could radiographers provide chest image reporting after hours at your hospital'. Most participants recognized that ethical consideration was needed when reporting chest images as it may have some complications. This is indicated by 80.3% of students who agreed with the statement 'Are you aware of ethical responsibilities when reporting on chest images'.

Many participants believed chest reporting would improve teamwork in the radiology department (78.9% agreed). In terms of the cost of service delivery, participants were convinced that chest reporting would improve the cost of service delivery. 9.5% of participants agreed that the cost of service delivery would be improved. Nevertheless, most participants view that they do not have sufficient knowledge of reporting chest images and they do not receive support from other radiology staff as barriers to reporting on chest images. 23.9% and 24.9% of participants perceived participants did not have sufficient knowledge and lack of support from other radiology staff as barriers to radiographers from reporting chest images, respectively.

The participant's ability to detect an abnormality on a chest image was positive (78.9%: **Fig 1**) of participants could detect abnormalities on chest images. Statistical analysis of years of work using the Manne-Whitney U test (Wilcoxon) demonstrated no significant difference in responses of radiographers who worked less than 10 years and worked 10 years or more ($p = -1.293$.).

Figure 1. Test Statistics

Test Statistics				
	Mann-Whitney U	**Wilcoxon W**	**Z**	**Asymp. Sig. (2-tailed)**
B7.2 I can detect an abnormality on the chest image	484.500	1519.500	-1.293	0.196
B7.3 I can describe pathology on chest images	562.500	913.500	-0.288	0.773
a. Grouping Variable: Years qualified as a radiographer				

There was no statistically significant difference in junior radiographers and senior\chief radiographers across all survey questions, except for the question about desirable training needs on 90-minute tutorials over 6 months on chest image reporting. There was a significant difference, the p-value <0.001. Participants who have worked less than 10 years were less likely to support this statement when compared to participants who worked more than 10 years or more.

Likert scale responses to the survey questions are displayed in **Table 2**. Most respondents (97.2% agreed or strongly agreed) expressed that radiographers needed to report on chest images

Table 2. Perceptions of radiographers towards chest images

	Strongly disagree (%)	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly agree (%)**
It is necessary for radiographers to report on chest images in your department	0 (0)	2 (2.8)	0 (0)	4 (33.8)	45 (63.4)
Do radiographers need additional training on reporting chest images?	0 (0)	2 (2.8)	0 (0)	20 (28.2)	49 (69.0)
Radiographers reporting on chest images would have a positive impact on patient diagnosis	0 (0)	0 (0)	2 (2.8)	34 (48)	35 (49,2)
I would prefer to make a verbal report	0 (0)	0 (0)	0 (0)	39 (54.9)	32 (45.1)
I would prefer to use a Radiographer Abnormality Detection System	0 (0)	0 (0)	0 (0)	26 (36.6)	43 (60.6)
Radiographers reporting on images would improve workflow	0 (0)	0 (0)	0 (0)	31 (43.7)	40 (56.3)

The desirability for training needs was recorded using a Likert score (0-10) where 0= Not at all desirable and 10 was desirable. Fifty-five radiographers indicated a desirable level of 7 or above for sixteen 90-minute tutorials and forty-eight radiographers for an Intensive 2-week course **Table 3.**

Table 3. Desirability of training needs.

The desirability of training needs	**Mean score desirability (Likert scale 0-10)**
Sixteen 90-minute tutorials over 6 months on chest image reporting	7.80
Intensive 2-week course in chest Image reporting.	7.66

Majority of the respondents 57 (80.30%) agreed that continuous professional development course and 38% of the respondents 44 (62%) had no radiologist mentorship **Table 4**.

Table 4. Kind of training needs.

Kind of training	Yes	No	total
Postgraduate education	56 (78.9%)	15 (21.1%)	71(100%)
Continuous professional Development courses	57 (80.30%)	14 (19.7%)	71(100%)
In-house training	33 (46.5%)	38 (53.5%)	71(100%)
Radiologist mentorship	27 (38%)	44 (62%)	71(100%)

DISCUSSION

Based on the findings of this study the majority of radiographers in Malawi have a positive perception of reporting chest images. The majority of participants feel confident in their chest image reporting abilities, which supports the arguments of [15] , who found that radiographers achieved notably greater reporting accuracy and sensitivity percentages—81.5% and 67.8%, respectively—than physicians. The study suggests that additional support to build the confidence of those individuals who may not have the concept of describing abnormality must be considered. This is in line with the work of [9] that additional training is required if radiographers are expected to produce accurate reports on chest images. The findings demonstrated that 97.2% of respondents agreed on additional training for radiographers. Similar to the research by According to a study conducted in South Africa in 2023, radiographers should have further training in radiographic image interpretation to report images [16]. However, radiographers who choose to work in image interpretation should complete rigorous and structured training programmes [17]. Thus, radiographers found in this study it is imperative that post-basic qualification training in image reporting be introduced in Malawi. The necessity for a curriculum about chest interpretation and reporting at universities and training opportunities for practicing radiographers has been confirmed and advocated in previous surveys. Therefore, a training programme should be implemented for all Malawians to have access to radiological services, especially in rural hospitals. The Radiographers Association of Malawi should work in collaboration with the University that offers a Bachelor's degree in radiography, to establish a postgraduate programme, to incorporate image interpretation of chest images for radiographers

The study findings demonstrated that radiographers have a duty to report chest imaging ethically. The study's conclusions demonstrated that radiographers have a duty of care to report chest imaging ethically, radiographers are expected to maintain the trust placed in them during their employment as radiographers. This includes safeguarding patients' privacy, maintaining the confidentiality of information unless mandated by law, and ensuring the general health and safety of the community or individuals. This result is consistent with [18]. which found that radiologists uphold patient privacy rights, honor confidences given in the course of their work, and only divulge private information when necessary to comply with legal requirements or safeguard the public's health.

The study found an overwhelming number of participants reported that chest reporting images would enhance professional development by creating new roles and job descriptions resulting from the introduction of reporting chest images into clinical practice. This is particularly important for student radiographers and newly qualified professionals. Furthermore, many radiographers feel reporting chest images impacts their profession more than those practiced by their peers in fellow allied health disciplines. This is concordant with a study done in Uganda by, [5]. which showed that radiographers can offer an expert judgment on certain chest radiographs, which can help with timely patient care.

The results of this study identified that all radiographers agreed would prefer to make a verbal report on chest images. This is in line with, current regulations state that radiographers are permitted to provide a verbal and voluntary opinion on performed examinations [18]. However, reliance on verbal communication only is time-limited, open to misinterpretation, and lacks transparency [19]. This is in line with the conclusions of [20] who found that due to the radiographers' limited area of practice. The necessity for policy change in Malawi is to allow radiographers to provide radiological reports. The policy would cover fundamental components like educational requirements, the scope of practice, reporting procedures, reporting structures, and requirements for ongoing professional development.

As highlighted in the results, not all participants had the support of other radiology staff in reporting chest images, which can lead to a loss of confidence and ability to report on chest images.

The findings are limited by the small sample size used in the study. This small sample limits its generalization. Due to time, budget, and study scope limitations, performing this research at all Malawian hospitals that provide radiology services was impossible. As a result, only five hospitals participated in the study. The anonymous nature of the study permitted any radiographer to potentially respond to the survey and give false information that could inaccurately skew the findings.

CONCLUSION

The data gathered from the study suggest that participants generally feel confident with detecting abnormalities on chest images. It also transpired that chest reporting image training for radiographers at the postgraduate level was considered suitable. The necessity of chest image reporting education in the undergraduate setting is central to transforming future clinical practice, and it is encouraging that radiographers largely meet this with intrigue and willingness to learn about chest image reporting. The finding has demonstrated the importance of chest image reporting and its impact on patient management and healthcare services.

The study's findings can help inform further larger-scale research on the role of radiographers in chest image reporting and inform policy, practice, and education on the subject.

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