Peer Reviewed **Original Article**

AN AUDIT OF X-RAY REQUEST FORM COMPLETION AT TWO NAMIBIAN STATE HOSPITALS: HOW COMPLIANT ARE THE DOCTORS?

Mbangoje Kuvare[1] *BRad Radiography* | **Mondjila Amkongo**[1] *M Public Health* | **Abel Karera**[1] *MSc Radiography* | **Edwin R Daniels**[1] *MSc Radiography*

[1]University of Namibia, Faculty of Health Sciences and Veterinary Medicine, School of Allied Health Sciences, Department of Radiography, Windhoek, Namibia.

https://doi.org/10.54450/saradio.2022.60.2.721

ABSTRACT

Background. An x-ray request form (XRF) is a legal document that aims to communicate a physician's (medical practitioner's) request for radiological procedures to radiographers. Due to the need to conform to radiation protection regulations, the requestor has a responsibility to justify their requests and comply with the legal framework. This study aimed to assess the completeness of cervical spine and pelvis x-ray request forms (XRFs).

Materials and method. A review of all plain film x-ray request forms for pelvis and cervical spine during the calendar month of September 2021 was performed to assess for completeness (adequacy) at two radiology departments in Windhoek by means of a retrospective cross-sectional design. A 15-item checklist was used to collect data, employing purposive sampling. The Statistical Software Package for Social Sciences (SPSS) version 27 was used to analyse and present data using descriptive statistics.

Results. A total of 172 (110 pelvis and 62 cervical spines) XRFs were assessed. The majority were not adequately completed. Only 4.8% of C-spine and 1.8% of pelvis XRFs were adequately completed.

Conclusion. The omissions of certain components on the XRFs are suggestive of ineffective communication between referring medical practitioners, radiologists, and radiographers, affecting the justification of procedures warranting a need for improvement in current referral practices. We recommend in-service training to sensitise medical practitioners and radiographers on the need for adequate completion of XRFs.

Keywords: accurate, clinical audit, complete, justified, X-ray request forms

INTRODUCTION

A clinical audit refers to a formalised quality assurance process aimed to improve the quality of service delivered. The objective of clinical audits is therefore to evaluate specific aspects and audit them against best practice standards to determine compliance with standards, as well as ensuring that standards of practice are optimal in order to improve patient outcomes and experience.[1]

Technological advances over the past decades have resulted in advanced modalities such as computed tomography (CT) and magnetic resonance imaging (MRI). Plain film radiography however is the first line of imaging in many Sub-Saharan countries,[2] including Namibia, due to its low cost and availability. The practice of radiography involves the production of radiographic images that enables medical practitioners to visualise a patient's internal anatomy as well as physiological function. Although beneficial, exposure to ionising radiation may result in detrimental health effects and thus needs to be justified.[3]

In radiography, XRFs are used as a means of communication between referrers, radiographers and radiologists.[4] Guidelines by the Society of Radiographers in the United Kingdom (UK) require health professionals that refer patients for radiographic imaging to adequately, completely and legibly state a patient's clinical history.[5] Furthermore, the Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) of 2017 requires health professionals who refer patients for radiographic examinations to provide radiographers and radiologists with adequate information that is relevant to the x-ray procedure requested.[5] A referring health professional (e.g., medical practitioner) is responsible for collecting all diagnostic information that justifies the radiographic procedure requested as well as any previous exposure to ionising radiation. A referring clinician (medical practitioner) must then provide the correct biographic and clinical information (indication) on a patient's XRF. Accurate and complete patient information helps a radiologist to better understand the patient's disease and also guides radiographers on the correct radiographic technique and imaging protocol: some

techniques need modification based on the clinical history provided. Optimised radiographic images correlated with complete and adequate patient history, therefore, enable radiologists to accurately diagnose and report abnormalities. Additionally, adequate clinical history improves diagnostic outcomes and reduces the number of unjustified x-ray examinations. Literature reports that 20% to 77% of radiographic examinations may be unjustified and clinically inappropriate.[6] Inadequate completion of XRFs has been reported as a global problem.[7-9] Additionally, there is a lack of literature within the Namibian context with respect to adequate completion of XRFs. In view of this it was deemed important to assess XRFs for completeness in this country.

The scope of practice in Namibia requires radiographers to analyse x-ray request forms and corroborate a patient's clinical information provided by a medical practitioner or patient with the procedure requested.[10] The scope, therefore, mandates the responsibility of the radiographers to ascertain whether x-ray request forms are clinically justified. Anecdotal evidence indicates that some XRFs are not adequately completed in these state hospitals. Incomplete XRFs creates a barrier to the clinical justification of radiographic procedures and may lead to unjustified radiation exposure, poor patient management, and improper patient diagnosis due to incorrect positioning technique, projection or exposure.[11] Of note, the pelvis and cervical regions contain two of the highly radiosensitive anatomical organs (thyroid and gonads) in the human body.[12,13] In radiography, these anatomical regions are challenging to image, and prone to high repeat rates[14,15] hence must be properly justified before imaging. It is against this background that the study aimed to evaluate the adequacy of the completion of pelvis and cervical XRFs received from medical practitioners at two state hospitals in Windhoek, to determine possible areas of improvement.

METHODOLOGY

The respective radiology departments in two referral state hospitals in Windhoek were purposively selected. The rationale for their selection is that they are the hospitals were the majority of pelvic and cervical spine x-ray procedures in the country are performed. A quantitative retrospective design was used. A total of 172 XRFs (cervical spine: n=62; pelvis: n=110) were purposively selected, to determine the degree of completeness of the XRFs. A retrospective study was deemed appropriate as it did not compromise the work-flow and scheduling of patients at the study sites. A checklist was used for data collection to ascertain the level of completeness of each selected XRF. This tool was developed by the researchers as a direct reflection of the state hospitals' request forms components. It comprised 15 components: name, age, sex, mode of travel to the department, patient registration number, ward of origin, referring doctors name, referring doctor signature, clinical history, examination requested, x-ray number, radiographer signature, date of examination, legibility of doctor's handwriting, and standard abbreviations used. A dichotomous scale (yes or no) was used to rate each component for completeness. An XRF is a legal document, therefore, the completion of all its components is mandatory for it to serve its intended purpose.[5]

The data were collected at both study sites (Hospitals A and B) during the calendar month of September 2021. A week before the data collection commenced, the head of the two respective radiology departments at the selected hospitals (A and B) was individually contacted and informed about the audit protocol. The principal researcher explained the context and purpose of the audit and sought access permission to both radiology patient records rooms. Once permission was granted, all XRFs of the pelvis and cervical spine plain film examinations performed in the study sites were retrieved from the patient records rooms. One of the researchers retrieved the request forms, one at a time, for cervical spine (n=62) and pelvis procedures (n=110) performed in September 2021, allocated codes and masked all institutional identifiers. Each request form was then evaluated for completeness and immediately returned to the respective patients' records and accordingly refiled.

Ethics approval for this study was sought and obtained from the Ministry (REC NO: MK 2021), and additional approval for site access was granted by the chief medical officers and heads of departments at the two hospitals. Bioethical principles of respect, confidentiality, beneficence, non-maleficence and justice were upheld in this study.[16] Confidentiality of research data was attained by storing research data in the main researcher's office with restricted access to the researchers only. All data were reported without any modifications or alterations.

Data were entered into the Statistical Software Package for Social Sciences (SPSS) version 27. Descriptive statistics were used to analyse and display data. The researchers assessed the extent of each XRF completion using the 15 components and classified them as adequate and inadequate. For each of the components completed a score of 1 was allocated; a score of zero was allocated for each omitted component. Individual checklist total scores were then calculated and all XRFs with a total score of 15 were classified as adequately completed, whereas a score between 0-14 indicated inadequately completed request forms.

RESULTS

A total of 172 conventional/plain film XRFs were retrieved and analysed over one month and stratified according to the examination requested and the hospital of origin (Table 1). Table 2 compares the components of the XRFs completed for cervical spine examinations at Hospital A and B respectively. The combined results for both study sites indicate that the most common components omitted were: age (24.2%), mode of travel (53.2%), and radiographers' signature (83.9%). As shown in Table 2 a considerable proportion of the XRFs was unclear and illegible (27.4%). Table 3 displays the components of the XRFs completed for pelvis examinations at each site. The combined results for both study sites indicate that the most common components omitted were: age (7.3%), mode of travel (37.3%), radiogra-

Table 1. Total request forms analysed

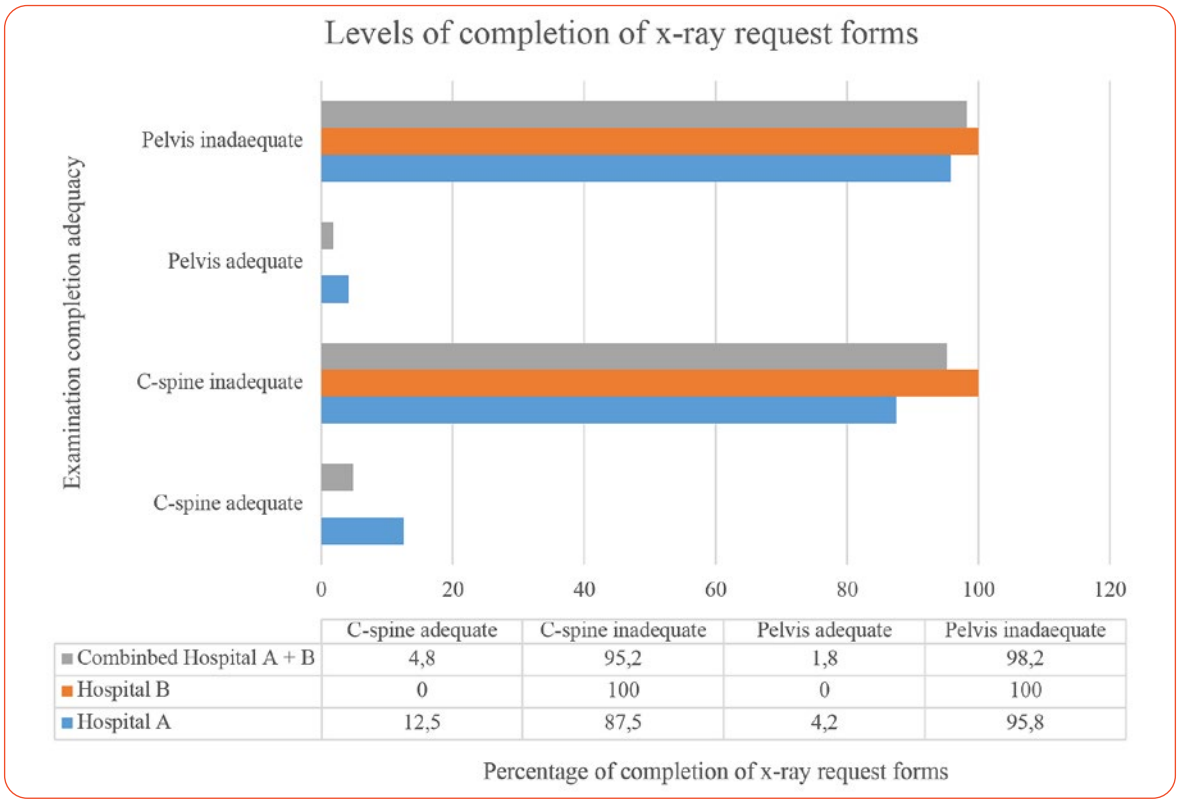
RESEARCH SITE	CERVICAL SPINE N (%)	PELVIS N (%)	TOTAL N (%)
Hospital A	24 (33.3%)	48 (66.7%)	72 (100%)
Hospital B	38 (38%)	62 (62%)	100 (100%)
Combined Hospital A + B	62 (36%)	110 (64%)	172 (100%)

Table 2. Completed components for C-spine requests

COMPONENTS COMPLETED	HOSPITAL A		HOSPITAL B		COMBINED HOSPITAL A+B	
	N (%) YES	N (%) NO	N (%) YES	N (%) NO	N (%) YES	N (%) NO
Name	23 (95.8)	1 (4.2)	38 (100)	-	61 (98.4)	1 (1.6)
Age	16 (66.7)	8 (33.3)	31 (81.6)	7 (18.4)	47 (75.8)	15 (24.2)
Sex	23 (95.8)	1 (4.2)	38 (100)	-	61 (98.4)	1 (1.6)
Mode of travel (e.g. ambulatory)	13 (54.2)	11 (45.8)	16 (42.1)	22 (57.9)	29 (46.8)	33 (53.2)
Registration number	12 (50)	12 (50)	7 (18.4)	31 (81.6)	19 (30.6)	43 (69.4)
Ward	22 (91.7)	2 (8.3)	28 (73.7)	10 (26.3)	50 (80.6)	12 (19.4)
Doctor's name	23 (95.8)	1 (4.2)	27 (71.1)	11 (28.9)	50 (80.6)	12 (19.4)
Doctor's signature	22 (91.7)	2 (8.3)	38 (100)	-	60 (96.8)	2 (3.2)
Brief clinical history	23 (95.8)	1 (4.2)	38 (100)	-	61 (98.4)	1 (1.6)
Nature of exam	24 (100)	-	38 (100)	-	62 (100)	-
X-ray number	23 (95.8)	1 (4.2)	38 (100)	-	61 (98.4)	1 (1.6)
Radiographer signature	9 (37.5)	15 (62.5)	1 (2.6)	37 (97.4)	10 (16.1)	52 (83.9)
Date of examination	23 (95.8)	1 (4.2)	38 (100)	-	61 (98.4)	1 (1.6)
Legibility of the clinician's handwriting	18 (75.0)	6 (25.0)	27 (71.1)	11 (28.9)	45 (72.6)	17 (27.4)
Use of standard abbreviations	22 (91.7)	2 (8.3)	35 (92.1)	3 (7.9)	57 (91.9)	5 (8.1)

Table 3. Completed components for pelvis requests

COMPONENTS COMPLETED	HOSPITAL A		HOSPITAL B		COMBINED HOSPITAL A+B	
	N (%) YES	N (%) NO	N (%) YES	N (%) NO	N (%) YES	N (%) NO
Name	48 (100)	-	62 (100)	-	110 (100)	-
Age	45 (93.8)	3 (6.3)	31 (81.6)	7 (18.4)	102 (92.7)	8 (7.3)
Sex	48 (100)	-	62 (100)	-	110 (100)	-
Mode of travel (e.g. ambulatory)	31 (64.6)	17 (35.4)	38 (61.3)	24 (38.7)	69 (62.7)	41 (37.3)
Registration number	24 (50)	24 (50)	17 (27.4)	45 (27.4)	41 (37.3)	69 (62.7)
Ward	45 (93.8)	3 (6.3)	54 (87.1)	8 (12.9)	99 (90.0)	11 (10.0)
Doctor's name	48 (100)	-	45 (72.6)	17 (27.4)	93 (84.5)	17 (15.5)
Doctor's signature	48 (100)	-	61 (98.4)	1 (1.6)	109 (99.1)	1 (0.9)
Brief clinical history	48 (100)	-	62 (100)	-	110 (100)	-
Nature of exam	48 (100)	-	62 (100)	-	110 (100)	-
X-ray number	46 (95.8)	2 (4.2)	62 (100)	-	108 (98.2)	2 (1.8)
Radiographer signature	8 (16.7)	40 (83.7)	6 (9.7)	56 (90.3)	14 (12.7)	96 (87.3)
Date of examination	47 (97.9)	1 (2.1)	61 (98.4)	1 (1.6)	108 (98.2)	2 (1.8)
Legibility of the clinician's handwriting	43 (89.6)	5 (10.4)	55 (88.7)	7 (11.3)	98 (89.1)	12 (10.9)
Use of standard abbreviations	44 (91.7)	4 (8.3)	62 (100)	-	106 (96.4)	4 (3.6)



	C-spine adequate	C-spine inadequate	Pelvis adequate	Pelvis inadaequate
Combinbed Hospital A + B	4,8	95,2	1,8	98,2
Hospital B	0	100	0	100
Hospital A	12,5	87,5	4,2	95,8

Figure 1. Levels of completion of x-ray request forms.

phers' signature (87.3%). In addition a small proportion of the XRFs was unclear and illegible (10.9%). Figure 1 displays the levels of completion of XRFs for C-spine and pelvis examinations at each site. Analysis based on the radiographic examination performed at both hospital shows that XRFs for pelvic examinations were less adequately (1.8%) completed than C-spine examinations (4.8%).

DISCUSSION

The aim of the study was to determine the adequacy of completion of XRFs for two conventional radiographic procedures (C-spine and pelvis) at two state radiology departments in Windhoek, Namibia. The results show that only 1.8% of pelvis examinations and 4.8% of cervical spine XRFs were adequately completed.

It is a regulatory requirement that all XRFs should contain the biographic information of patients such as the name, age, and sex for proper patient identification and management.[17] Our results indicate that 100% of pelvic and 98.4% for C-spine examinations XRFs had the patients name indicated. The results of this study are in keeping with the findings by Asare,[18] who reported 99% of patient names were indicated on XRFs. It is essential for medical professionals who refer patients for x-rays to provide radiographers with a patient's correct name/identity. Incorrect patient identification by radiographers has the potential for medico-legal hazards through radiographers performing a correct procedure on the wrong patient. Medical malpractice resulting from incorrect patient identification has dire medico-legal consequences since patients may be exposed to unnecessary radiation.[19,20] In radiography just like other medical professions, negligence is not justifiable.[21] It is therefore essential for referrers to fully complete a patient's name/identity to avoid misidentification of patients by radiographers and comply with correct standards of practice. The Namibian Patient Charter imposes an ethical duty on all patients to provide their correct identity to health professionals.[22] Similarly, radiographers have an ethical duty to analyse, and correlate x-ray procedure requests and clinical information provided by a medical practitioner or patient.[10]

The component where medical practitioners are required to complete information regarding the registration number was omitted in 62.7% of XRFs for pelvis compared to 69.4% for C-spine requests. These results are not in accord with those of Asare[18] who reported a non-completion rate of 100%. It is important that all patients have a hospital registration number as it may be used for patient identification especially if a patient is comatose or cannot verbally communicate on arrival.

A total of 8.3% of the request forms for pelvis and 7.3% for cervical spine did not contain the age of a patient. Our results are slightly higher than those of Afolabi et al.;[4] they reported 5.9% of incomplete request forms due to missing patients' age. However, our results are considerably lower in terms of completion rate for age than those of Asare[18] who reported a completion rate of 31% for age. A patient's age is an important indicator in radiography; some pathology are age specific and are more prevalent in certain age

groups.[23] Additionally, the age of a patient is regarded as important as it may inform clinical diagnosis and is used as a reference to manipulate radiographic exposures as well as create demographic profiles of patients during research surveillance focussing on prevalence of disease.[23] A patient's age can also be used to differentiate between patients with similar names and avoid unnecessary delays in patient management as well as reduce patient turnaround time in a radiology department.

The gender of patients was adequately completed for all pelvis examinations (100%), and 98.4% of the cervical spine XRFs. These results approximate those by Afolabi who reported a 96% completion rate of gender in their study.[4] Knowledge of a patient's gender is important for a radiographer in preparing for the examination and weighing the need for consideration of pregnancy status. It is a statutory requirement that radiographers determine a patient's pregnancy status especially those of childbearing age.[5] Failure to ascertain pregnancy status may lead to unnecessary radiation exposure in early pregnancy risking medico-legal issues and malpractice claims. The gender of a patient is also important to establish rapport between the radiographer and the patient especially in culturally diverse societies such as in Namibia. Lack of gender identification on the XRF may also cause radiographers to incorrectly address patients, especially in cases where patients are non-binary and gender nonconforming which may often lead to patients feeling embarrassed.[24]

On the mobility status of patients to the radiology department, only 53.2% of cervical spine and 37.3% of pelvis XRFs indicted the status showing how the patients arrived at the radiology department. In addition, 10% of pelvis and 19.4 % of cervical spine XRFs lacked information of the ward of origin of patients. The results of this study are inconsistent with those of previously reported findings where information on referring wards was omitted in 39% and 11.4% of the XRFs respectively.[4,18] It is essential for radiographers to be knowledgeable of the ward of origin of the patients as this enables them to triage procedures based on the urgency. In addition, information on patients' ward of origin enables radiographers to track and recall patients when repeat or additional radiographs are needed.[4] This information also enables radiographers to contact the referring clinicians and obtain additional information regarding the x-ray request.[18] Our results are therefore suggestive that patients may experience delays in imaging and turnaround time when radiographers do not fully understand the x-ray request.

The section that requires referring physicians to complete their names was incomplete for 19.4 % of cervical spine and 10% of pelvis XRFs. Although most request forms did not contain the name of the doctor, 96.8% of cervical spine and 99.1% of pelvis XRFs contained the signature of the respective referring doctor. According to local hospital procedures, and the Royal College of Radiographers guidelines, as cited in the Society and College of Radiographers,[5] every request forms submitted to a radiology department should be adequately completed and contain the details of the referrer. Our findings therefore indicate a higher compliance to regulatory requirements when compared to a study conducted in Nigeria, where the doctor's name (83.1%) and the doctor's signature (85.6%) were completed on XRFs.[8] It is an ethical obligation for patients to know the name of the health professional who provides treatment to them.[22] The name and signature of a referring medical clinician (physician) can be used determine the authenticity of the request.[23] Additionally, this information can be used to identify and trace the referring physician, when a radiographer face challenges with the XRF and requires additional information regarding the x-ray request. Failure to locate or consult a referring physician may hamper proper patient management and result in unnecessary delays should additional projections be needed. In our study 16.1% of cervical spine and 12.7% of pelvis XRFs were signed by the respective radiographers upon completion of the examination. The reluctance of radiographers to sign the XRFs impedes quality assurance measures and is a serious breach of the patient charter as it masks accountability on their part.[22]

The researchers in this study were not able to decipher the handwriting on 27.4% of cervical spine and 10.9% of pelvis XRFs. Our results are of concern in terms of being compliant with regulations because a study in the literature[8] reports 7.37% XRFs with illegible handwriting. XRFs that contain illegible handwriting hamper an effective communication process and may result in suboptimal patient care. This may delay the time taken to complete an x-ray examination, and effect the procedure being performed negatively (wrong or incorrect projections) and increase patient waiting times and radiation dose as radiographers struggle to decipher the handwriting of referring clinicians (medical practitioners). This finding is in keeping with that of Garba et al.[23]

Justification of exposure to ionising radiation for medical purposes is one of the three pillars of radiation protection.[25] Radiographers by the nature of their duty have an ethical obligation to correlate a patient's clinical history with the examination requested.[10] In this study 98.4% and 100% of referrers provided a clear clinical history (indication) for cervical spine and pelvis procedures respectively.

The date of the x-ray examination serves as a quality indicator and may be used to assess whether the request is still valid; and also whether patients' radiographs are reported within a specified time.[23] The findings of our study were that the date of the examination was completed in 98.2% of pelvis examinations compared to 98.4% for C-spine examinations. Literature reports similar completion rates: Garba et al.[4] reported 97.5%; Afolabi et al.[23] reported 97%.

Health professionals are continuously exposed to medical terminology during clinical practice. Although universal, these terminologies are not standardised and are procedure, discipline and context specific.[26] For example, USA may be used to refer to the United States of America, whereas it may also refer to 'unstable angina' in the medical professions.[26] Abbreviations on the XRFs are normally subject to clinical history. In radiography they guide a radiographer in terms of performing a relevant radiographic projection. For example, a patient with sinusitis may require occipital

mental (OM) compared to a patient that requires occipital frontal (OF) for skull fractures. It is therefore evident from the literature that identical abbreviations can have different meanings to different health professionals working in different clinical departments. Unconventional abbreviations in radiography may hamper the quality of care provided to a patient: a radiographer may perform the incorrect projections on patients resulting in unnecessary radiation exposure.[27] Our results indicate that the majority of XRFs for cervical spine (91.9%) and pelvis (96.4%) contained standard abbreviation easily understood by radiographers. Our results therefore suggest that the correct procedures were carried out on patients.

STUDY LIMITATIONS

This retrospective study was limited by poor and incomplete filing of completed radiographs. Verification whether the radiographs retrieved from the filing room actually corresponded to the number of radiographic procedures performed during the data collection period was not provided. This also applies to whether the volume of stored x-ray requests and radiographs was representative of the typical activity of the departments. As a result, our findings must be interpreted with caution.

CONCLUSION

Accurate and complete filling in of XRFs is essential for the proper imaging and management of patients. Our results indicate that the majority of XRFs were not adequately completed: slightly more XRFs for pelvis radiography were adequately completed than C-spine. The omissions of certain components on the XRFs suggest that the communication process between a referring medical practitioner, radiologist, and radiographer may be ineffective. The results indicate that there is room for improvement in current referral practices. There is a need to sensitise referring medical practitioners and radiographers on the importance to adequately completing XRFs. There is a need for radiographers to sign XRFs when they complete a requested examination. This enhances accountability.

Our study highlights that there are no standards of best practice for compliance of completion of XRFs in Namibia. We therefore recommend that clinical audits should be routinely undertaken in all health facilities in Namibia that offer radiographic services in order to determine best practice standards for compliance with the standard, to ensure standards of practice are optimal, and to improve patient outcomes and experience. In addition further research is needed to explore the reasons for incomplete XRFs among referring physicians/doctors and radiographers.

ACKNOWLEDGEMENTS

Special thanks to the two state radiology departments for granting permission for their facilities to be accessed for completion of the study.

COMPETING INTEREST

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in conducting the study or writing this article.

AUTHORS' CONTRIBUTION

MK was the principal investigator, conceptualised the study responsible for literature review, data collection. AK and MA and ED assisted with data analysis, literature review and manuscript preparation. ED were responsible for the supervisory role and guarantees the integrity of the study.

FUNDING

No funding was received for this study.

DATA AVAILABILITY

The data that supports the findings are available from the corresponding author, E.D.

DISCLAIMER

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

REFERENCES

1. Bwanga O, Bwalya M. Clinical audit in diagnostic radiology. Br J Med & Health Sci. 2021; 3(10): 1168-72. [Cited 2022 June 10]. Available from: https://www.researchgate.net/publication/355796448_Clinical_Audit_in_Diagnostic_Radiography/link/617ef00feef53e51e110536e/download
2. Maboreke T, Banhwa J, Pitcher RD. An audit of licensed Zimbabwean radiology equipment resources as a measure of healthcare access and equity. PAMJ. 2019; 34(60). [Cited 2022 June 10]. Available from: https://www.panafrican-med-journal.com/content/article/34/60/full
3. Nakashima J, Duong H. Radiology, Image Production and Evaluation. StatPearls. 2021. [Cited 2022 June 10]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK553145/
4. Afolabi OA, Fadare JO, Essien EM. Audit of completion of radiology request form in a nigerian specialist hospital. Ann Ibadan Postgrad Med. 2012; 10(2): 48-52. [Cited 2022 June 10]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4111050/pdf/AIPM-10-48.pdf
5. The Society & College of Radiographers. The Ionising Radiation (Medical Exposure) Regulations 2017 (No. 1322). Vol. 2. 2017. [Cited 2022 Octber 25]. Available from: https://www.gov.uk/government/publications/ionising-radiation-medical-exposure-regulations-2017-guidance%0Ahttp://www.legislation.gov.uk/uksi/2017/1322/pdfs/uksi_20171322_en.pdf
6. Rawle M, Pighills A. Prevalence of unjustified emergency department x-ray examination referrals performed in a regional Queensland hospital: A pilot study. J Med Radiat Sci. 2018; 65(3): 184-91. [Cited 2022 October 25]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6119727/pdf/JMRS-65-184.pdf

7. Abubakar MG, Ivor CN, Joseph DZ, Luntsi G, Obotiba A et al. Evaluation of the adequacy of completion of radiology request forms in a tertiary hospital. Pacific J Sci Technol. 2015; 16(2): 219-224. [Cited 2022 April 2022]. Available from: https://www.researchgate.net/publication/292216462_Evaluation_of_the_Adequacy_of_Completion_of_Radiology_Request_Forms_in_a_Tertiary_Hospital_Northeast_Nigeria/link/56ac304e08ae28588c5d1901/download
8. Akintomide A, Ikpeme A, Ngaji A, Ani N, Udofia A. An audit of the completion of radiology request forms and the request practice. J Fam Med Prim Care. 2015; 4(3): 328-330. [Cited 2022 June 10] Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4535088/pdf/JFMPC-4-328.pdf
9. Barakzai MD, Sheer ZZ, Muhammad A, Alvi A, Khan N et al. Evaluation of radiology request forms in a tertiary care hospital: an audit with a focus on the impact of technological intervention. Cureus. 2021; 13(2): e13335 [Cited 2022 June 10]. Available from: https: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7962420/pdf/cureus-0013-00000013335.pdf
10. Republic of Namibia. Regulations relating to minimum requirements of study for registration as diagnostic radiographer, additional qualifications, keeping of registers, restoration of names to register and ccope of practice for diagnostic radiographer: Allied Health Professions Act (Act 7 of 2004. No. 7411:312). [Cited 2022 June 10]. Avalable from: https://www.lac.org.na/laws/2020/7411.pdf
11. Ekeme Ikubor J, Mohammad H. An assessment of the adequacy of filling of radiology request cards in a teaching hospital in Makurdi , North Central Nigeria. IOSR J Dent Med Sci. 2016; 15(6): 71-74. [Cited 2022 June 10]. Available from: https://www.researchgate.net/publication/348834218_An_Assessment_of_The_Adequacy_of_Filling_of_Radiology_Request_Cards_in_A_Teaching_Hospital_in_Makurdi_North_Central_Nigeria/link/60124fc992851c2d4dfb7956/download
12. Priyadarshini SK, Sathasivasubramanian S, Murali V. Measurement of surface dose to the thyroid gland in intraoral radiography. Int J Dent Oral Sci. 2021; 8(11): 5175-5178. [Cited 2022 October 26]. Available from: https://www.researchgate.net/publication/356724079_Measurement_Of_Surface_Dose_To_The_Thyroid_Gland_In_Intraoral_Radiography/link/61a91156ca2d401f27bbf588/download
13. Kumar T, Schernberg A, Busato F, Laurans M, Fumagalli I et al. Correlation between pelvic bone marrow radiation dose and acute hematological toxicity in cervical cancer patients treated with concurrent chemoradiation. Cancer Manag Res. 2019; 11: 6285-6297. [Cited 2022 October 25]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6636180/pdf/cmar-11-6285.pdf
14. Jabbari N, Zeinali A, Rahmatnezhad L. Patient dose from radiographic rejects/repeats in radiology centers of Urmia University of Medical Sciences, Iran. Health 4. 2012; 4(2): 94-100. [Cited 2022 October 25]. Available from: https://www.scirp.org/pdf/Health20120200007_85445714.pdf
15. Benza C, Damases-Kasi C, Daniels E, Amkongo M, Nabasenja C. The causes of reject images in a radiology department at a state hospital in Windhoek, Namibia. South African Radiogr. 2018; 56(1): 35-39. [Cited 2022 October 25]. Available from: https://sar.org.za/index.php/sar/article/view/424/315
16. Pera SA, Van Tonder S. Ethics in healthcare. 3rd ed. Africa Journal of Nursing and Midwifery. Lansdowne: Juta & Co Ltd.; 2011, pp55-56.
17. IAEA. Justification of diagnostic medical exposures, some practical issues", Report of an International Atomic Energy Agency (IAEA) Consultation. Vienna; 2008.
18. Asare H. Audit of X-Ray Requisition form at Tamale Central Hospital, Ghana. J Radiol Radiat Ther. 2018; 6(1): 1078. [Cited 2022 April 22]. https://www.academia.edu/39171760/Audit_of_X_Ray_Requisition_form_at_Tamale_Central_Hospital_Ghana
19. Woodward M, Nayak R, McCulloch P. Radiography as a sociotechnical system – Improving patient identification with a multi-level human factors approach. Saf Sci. 2022; 1; 150. [Cited 2022 October 25]. Available from: https://www.sciencedirect.com/science/article/pii/S0925753522000194?via%3Dihub
20. Alassaf O. Patient misidentification in medical organizations: A case report.Patient Saf Qual Improv. 2014; 5(3): 590-591. [Cited 2022 October 25]. Available from: https://psj.mums.ac.ir/article_9041_0fe06617181ae96e70ae20b39a8c9f7f.pdf
21. Adejoh T, Elugwu CH, Sidi M, Ezugwu EE, Asogwa CO et al. An audit of radiographers' practice of left-right image annotation in film-screen radiography and after installation of computed radiography in a tertiary hospital in Africa. Egypt J Radiol Nucl Med. 2020; 51: 1-7. [Cited 2022 June 10]. Available from: https://ejrnm.springeropen.com/articles/10.1186/s43055-020-00371-3
22. Ministry of Health and Social Services. The Patient Charter of Namibia. Windhoek, Namibia: Priamary Health Care Division; 1998. [Cited 2022 April 10] Available from: https://books.google.com.na/books?id=c5fjlwEACAAJ
23. Garba I, Bashir H, Mohammed S, Dambele M, Hikima M et al. Evaluation of inadequately filled radiology request forms with its impact on patient radiation exposure and waiting time in a tertiary care hospital: A preliminary report from northwest Nigeria. West African J Radiol. 2021; 28(2): 55-60. [Cited 2022 June 10]. Available from: https://www.researchgate.net/publication/358502463_Evaluation_of_inadequately_filled_radiology_request_forms_with_its_impact_on_patient_radiation_exposure_and_waiting_time_in_a_tertiary_care_hospital_A_preliminary_report_from_Northwest_Nigeria/link/620801afafa8884cabdd4fda/download
24. Medina-Martínez J, Saus-Ortega C, Sánchez-Lorente MM, Sosa-Palanca EM, García-Martínez P et al. Health inequities in lgbt people and nursing interventions to reduce them: A systematic review. Int J Environ Res Public Health. 2021; 18(22). [Cited 2022 October 25]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8624572/pdf/ijerph-18-11801.pdf
25. Atomic Energy and Radiation Protection Act. Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005). Windhoek; 2005. [Cited 2022 April 10] Available from: https://www.ilo.org/dyn/natlex/natlex4.detail?p_isn=85756&p_lang=en
26. Hunter TB, Taljanovic MS. Glossary of medical devices and procedures: abbreviations, acronyms, and definitions. RadioGraphics. 2003; 23(1): 195-213. [Cited 2022 June 10]. Available from: https://pubs.rsna.org/doi/10.1148/rg.231025136
27. Kuzminski SJ. Avoiding abbreviations in radiology reports. J Am Coll Radiol. 2015; 12(11): 1136. [Cited 2022 October 25]. Available from: https://www.jacr.org/article/S1546-1440(15)00726-7/pdf