

# ADEQUATE COMPLETION OF RADIOLOGY REQUEST FORMS: A CLINICAL AUDIT AT MANAGIL TEACHING HOSPITAL, SUDAN

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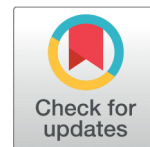
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## ABSTRACT

**Background:** Clinical auditing is one method for improving the quality of patient care, including the completion of a request form. Radiology request forms (RRFs) are critical tools for communicating between the referring clinician and the radiologist/radiographer.

**Objectives:** To evaluate the radiology request form and improve the request form content and design at Managil Teaching Hospital, Sudan.

**Methods:** A two-cycle clinical audit methodology was employed at the radiology department of Managil Teaching Hospital. A total of 200 RRFs were collected, with 100 forms acquired for each cycle. These forms were then compared to the standard structured form provided by the Royal College of Radiologists (RCR). In the second cycle, a pre-made request form was used. The data were entered into Microsoft Excel 2016 and subsequently analyzed. The obtained results were then compared to the RCR Standard.

**Results:** A notable enhancement was observed in various aspects, such as the inclusion of the patient's age in the request forms. In the first cycle, the age was recorded in only 13% of the forms, while in the second cycle, it was recorded in 92% of the forms.

**Conclusion:** A significant proportion of RRFs are incomplete. However, after the second cycle of the audit, there was a massive improvement regarding the adequate completion of the RRFs, which will aid in effectively diagnosing patients

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## المخلص

**الخلفية:** يُعد التدقيق السريري إحدى الطرق لتحسين جودة رعاية المرضى، بما في ذلك إكمال استمارة الطلب. تُعتبر استمارات طلب الأشعة أدوات حيوية للتواصل بين الطبيب المحيل وطبيب الأشعة

**الأهداف:** تقييم استمارة طلب الأشعة وتحسين محتوى وتصميم استمارة الطلب في مستشفى المناقل التعليمي، السودان

**الطرق:** استخدمت منهجية التدقيق السريري ذات الدورة الثنائية في قسم الأشعة - مستشفى المناقل التعليمي. تم جمع 200 استمارة طلب، حيث تم جمع 100 استمارة لكل دورة. تم مقارنة هذه الاستمارات بالنموذج المعياري المقدم من الكلية الملكية للأطباء (RCR) في الدورة الثانية، تم استخدام استمارة طلب مُعدة مسبقاً. تم إدخال البيانات في Excel Microsoft 2016 ومن ثم تحليلها. تم مقارنة النتائج المستخلصة بالمعيار القياسي لـ RCR

**النتائج:** تم ملاحظة تحسن ملحوظ في جوانب مختلفة، مثل تضمين عمر المريض في استمارات الطلب. في الدورة الأولى، تم تسجيل العمر في 13% فقط من الاستمارات، بينما في الدورة الثانية، تم تسجيله في 92% من الاستمارات

**الاستنتاج:** نسبة كبيرة من استمارات طلب الأشعة كانت غير مكتملة، لكن بعد الدورة الثانية من التدقيق كان هناك تحسن كبير فيما يتعلق بالتعبئة الكافية لاستمارات طلب الأشعة، مما سيساعد في تشخيص المرضى بفعالية.

**Keywords:** Managil, teaching, radiology, request, forms, audit

## 1. INTRODUCTION

According to the National Institute for Health and Clinical Excellence (NICE) (2002), clinical audit is defined as improving the quality of patient care by examining current practices and modifying them where necessary. Its growth in the United Kingdom (UK) was influenced by clinicians' desire to provide better healthcare. Clinical audit represents one of the best strategies for raising the standard of patient care across the board.

In Sudan, those responsible for filling out the request forms are primarily clinicians, followed by radiographers. In rare cases, the radiologist is responsible for interpreting the request and performing the radiological exam accordingly. Hence, the RRFs are crucial communication tools between the clinician and the radiologist/radiographers, as they are used to refer patients for radiological investigations. It was believed that by drawing attention to care deficiencies, inefficient and ineffective practices could be halted. The significance of this process shouldn't be overlooked. To prevent any misunderstandings regarding the request, the RCR expressly advises that all request forms be adequately and legibly filled out, according to the relevant sections of the European Union Nations Radiation Protection Regulations. According to the RCR, all radiology request forms should contain adequate clinical and demographic information that identifies the patient and the destination for the report.

The referring clinician is accountable for gathering all diagnostic data that supports the requested radiological examinations as well as data on prior exposures. In order for radiologists to provide the necessary information in accordance with the applicable articles of the

Radiation Protection Regulations of the European Union Nations, the clinician must provide the reason for the referral. This aids radiologists in better understanding the patient's condition. However, there isn't a standardized format for radiology request forms.

According to earlier studies, up to 20% of radiographic examinations are clinically not useful due to incorrect or inappropriate requests. It was reported that 20% of radiographic examinations within the National Health Institute (NHI) were deemed unnecessary due to inappropriate requests. The study specifically highlighted the issue of inadequate clinical information provided on request forms as a significant contributing factor. These findings underscore the need for enhanced communication between healthcare providers and stricter adherence to clinical guidelines to mitigate unnecessary radiographic examinations. Therefore, adequate and pertinent details of the radiology request are required to improve radiological support and utilization. The referring clinician or their proxy must fill out the radiology request forms, which are clinical and legal documents that explain the procedure needed and why it is needed.

A radiology request form should include the following details, according to a comparison of the American College of Radiology (ACR) and the RCR: the clinical background, the question to be answered, the patient's name, age, address, and phone number; the ward; the requesting doctor's name and signature; the name of the consultant responsible for the patient's well-being; and the date.

The practice in Sudan is lagging behind, as radiation protection is not yet included in the curriculum of referring clinicians, although the radiology request forms are mostly filled out by clinicians, not radiographers. Medical doctors, clinical officers, and physiotherapists are all allowed to refer patients for radiological examination. There aren't many radiologists in Sudan; for instance, in the whole Managil locality (the study area), there is only one radiologist. To the authors' knowledge, this is the first-ever radiology request form study conducted in Sudan, reflecting the significant gap in knowledge.

The clinical question to be answered by the radiologist is provided on the request forms. Some diseases have similar radiographic patterns, and understanding them requires detailed patient information. A partially completed form makes it difficult for the radiologist to narrow the differential diagnosis for specific imaging patterns. It may also result in unnecessary investigations, an extended hospital stay, repeated radiation exposure, and delayed patient management, all at a higher cost to the patient and the hospital. As of the time of this study, Sudanese hospitals have not yet adopted the RCR's recommendations regarding radiology request forms.

The objective of this initiative is to assess and enhance the content and design of the radiology request form at Managil Teaching Hospital. The objectives are threefold: first, to evaluate the current radiology request form's adequacy; second, to determine the extent to

which the form adheres to a structured, predesigned format; and third, to implement the necessary modifications to improve the process of completing the radiology request form.

## 2. METHODOLOGY

Ethical clearance for this study was obtained from the ethical committee at Managil Teaching Hospital (IRB 2023-00183). From May to June 2023, a total of 200 RRFs were collected during the study period, with 100 forms in the first cycle and 100 in the second cycle, which is the recommended sample size by the RCR, using a simple random sampling method. The samples were obtained from the radiology department, with the majority being chest x-rays, and the request forms were retrieved from the archives.

The study employed a clinical audit methodology comprising two cycles. In the first cycle, data were collected from the archives to study the existing request forms. After implementing adjustments, the new request forms were analyzed in the second cycle. Managil Teaching Hospital, located in Managil locality, Gezira state, Sudan, serves as the main healthcare provider in the locality, with a capacity of over 200 beds. The radiological modalities included in the study were plain film x-rays and ultrasonography only, as the area lacks other modalities such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI).

Using the RRF generated by the RCR as a standard, a new Radiology Request Form was constructed by the authors and distributed to different departments within the hospital. This new form included a detailed and structured request form consisting of all the criteria outlined in the RCR standard. The old request form was a blank piece of paper that relied on the referring clinicians to fulfill all the criteria. The researchers manually collected the data from the radiology department of Managil Teaching Hospital. The quality of the radiology request was assessed against the standard. The flow of healthcare information is paper-based. Data were analyzed using Microsoft Excel 2016. The data analysis plan included creating a master sheet, data cleaning, descriptive statistics, and summary measures, with data displayed in tables and figures.

All referrals should include the following:

- Clinical background
- Question to be answered
- Patient's name, age, address, and contact number
- Ward or location of the patient
- Name of the requesting practitioner

### 3. RESULTS

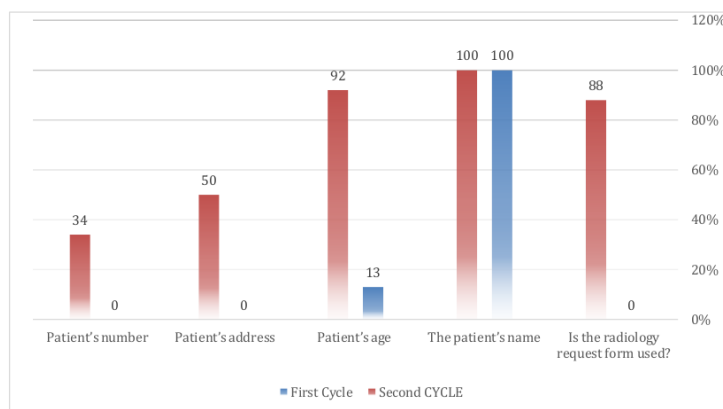
A total of 200 samples were included in the study, with 100 in the first cycle and 100 in the second cycle. In the first cycle, the samples were collected from the radiology department, and 100 request forms were compared with the standard. The second cycle included 100 samples, and the collected request forms were compared with the RCR standards. Significant improvement was observed in most areas; for instance, the patient’s age was only recorded in 13% of the request forms in the first cycle, while it was recorded in 92% in the second cycle. Additionally, the question to be answered was included in only 6% of the first cycle samples but was present in 76% of the second cycle samples. The results are demonstrated in Table 2.

**Table 1** Comparison between results of the first and second cycles of the audit.

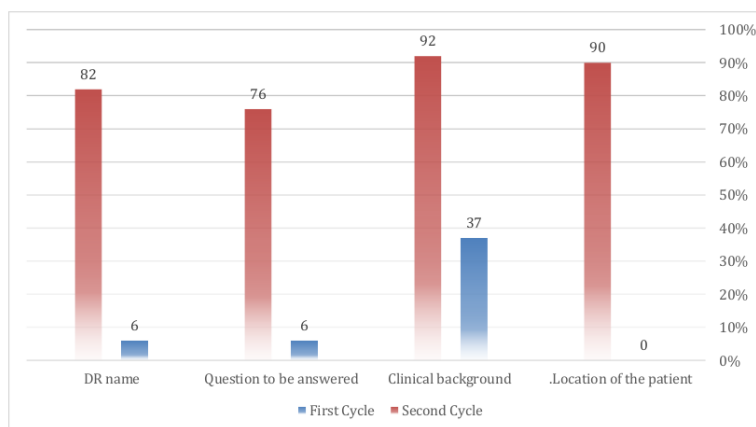
Criteria	Standard	First Cycle	Second Cycle
1. The clinical background	100%	37%	92%
2. The question to be answered	100%	6%	76%
3. The patient’s name.	100%	100%	100%
4. The patient’s age	100%	13%	92%
5. The patient’s address	100%	0%	50%
6. The patient’s number	100%	0%	34%
7 Location of the patient	100%	0%	90%
8. Name of the requesting practitioner	100%	0%	82%
9. Radiology Request form used?	100%	0%	88%
Criteria	Standard	First Cycle	Second Cycle
1. The clinical background	100%	37%	92%
2. The question to be answered	100%	6%	76%
3. The patient’s name.	100%	100%	100%
4. The patient’s age	100%	13%	92%
5. The patient’s address	100%	0%	50%
6. The patient’s number	100%	0%	34%
7 Location of the patient	100%	0%	90%
8. Name of the requesting practitioner	100%	0%	82%
9. Radiology Request form used?	100%	0%	88%

### 4. DISCUSSION

To provide the best possible service to the patient, effective management necessitates a multidisciplinary approach based on adequate communication between various team members. The radiology request form serves as an important means of communication between the managing clinician and the radiologist. The radiology requisition form has been frequently discussed to raise awareness of the significance of the information provided and to sensitize referring clinicians to adequately fill in the form to assist the radiologist in



**Figure 1** Illustrates the significant improvement observed in the second cycle (Part 1).



**Figure 2** Illustrates the significant improvement observed in the second cycle (Part 2).

narrowing the differential diagnosis for certain imaging patterns.

The majority of studies show a global deficiency in the completion of radiology requisition forms. According to the study findings, none of the request forms were adequately filled out, let alone completely filled, during the first cycle. This is consistent with the findings of Akinola et al. (Nigeria) and Depasquale and Crockford (Malta), who discovered that only 4% of request forms were fully completed. In the second cycle of the study, 50% of request forms had the patient's ward/address fully filled in, which is lower than the findings of Depasquale and Crockford, who found that 77% of request forms had addresses in their study, whereas Akinola et al. found only 2.1% of request forms with addresses. For most inpatients, the addresses help the imaging department submit the report to reduce waiting time.

The findings revealed that 100% of the forms had the patients' names correctly filled in. Agi et al. conducted a similar study in Nigeria and made a similar observation, reporting that all of the forms reviewed had the patients' names correctly filled in. Patient identifiers, such as names, are critical and must be included at all times.

Contrary to Agi et al., who had 100% of the investigated stated questions, 6% of the request forms from the first cycle did not have any stated questions to be answered. The radiologist was required to obtain a clinical history from the patient before determining the appropriate procedure. Such omissions may increase waiting time, transportation costs, and ultimately patient dissatisfaction. This was observed in the second cycle, where 76% of the forms had the question to be answered written in.

The doctor's name was found in 0% of the request forms from the first cycle, which indicates a lack of care from doctors and leaves the radiologist perplexed as to whom they should refer their findings. However, a significant improvement was observed in the second cycle, with 82% of doctors having their names written on the request forms. In the study conducted by Akintomide et al., 86% of the forms had the medical officer's name provided, whereas only 24.4% of the medical officers provided their names in the study conducted by Akinola et al. Radiologists occasionally seek clarification on the information provided. The radiologist may be unable to obtain necessary patient information if the doctor's information is missing. This may potentially lengthen reporting time or provide a wide range of differential diagnoses that may not aid in patient management. Arterial or venous disease frequently has a specific presenting complaint that must be mentioned.

The results show that only 37% of the request forms in the first cycle provided the patient's clinical background, implying that 63% of the request forms were almost not useful to the radiologist. However, 92% of the request forms in the second cycle clearly stated the patient's clinical background. Akinola et al. discovered that request forms that included an adequate clinical history resulted in radiologist reports that were more useful in patient management.

The clinical question to be answered by the radiologist is often not included on the radiology request form, so the radiologist must deduce the question from the clinical information provided by the clinician. The clinical question to be answered and the clinical information provided are critical for the radiologist to determine whether the requested investigation will answer the question, avoid exposing the patient to unnecessary radiation, decide on the protocol for the study, and aid in the final diagnosis or differential diagnoses. Referring clinicians must be educated regularly to reinforce this message.

According to our review, all of the referring doctors failed to include their contact information so that the radiologist could inquire further. This observation contradicts the Royal College of Radiologists' guidelines, which require referring clinicians to pro-

vide contact information. Regardless of the perceived difficulties, effective communication between radiologists and referring clinicians is required and must be a priority for a multidisciplinary management team. This study, therefore, recommends holding meetings with individual clinical firms to discuss the findings of this audit and the requirements of the Department of Clinical Radiology. Additionally, include the basic principles at the induction of new staff. In specific cases, send back individual referrals that are incomplete.

## **5. LIMITATIONS**

A limitation of this study is the relatively small sample size used for evaluation. The audit may have been based on a limited number of radiology request forms, which could potentially restrict the broader applicability of the findings. A larger sample size would enhance the statistical power of the audit, providing a more comprehensive understanding of the issues surrounding the current form and its improvement.

## **6. CONCLUSION**

A significant proportion of radiology request forms are incomplete, denying the radiologist critical information required to make a diagnosis or narrow the differential diagnosis. From this quality improvement process, we can conclude that there was significant improvement in the adequate filling of the radiology request forms, which will aid in effectively diagnosing patients and providing the optimal management plan.

## **7. ACKNOWLEDGEMENT:**

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