

# Current Status of Interpreting Routine Radiographs of Adults in the Emergency Department of University Hospital in Western Saudi Arabia

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## Abstract

**Background:** In the emergency department (ED) interpretation of radiographs is crucial for patient care. However, due to the global shortage of radiologists, most acute-trauma radiographs remain unreported. Unreported medical images affect patient management. Therefore, in this study, we aimed to explore the current status of interpretation of routine radiographs of adults in the ED of King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia.

**Materials and methods:** In this retrospective study, 3,816 conventional radiographs (routine X-ray) obtained from the ED of KAUH in 2016 were included. We determined the number of reported and unreported radiographs. If a radiograph has been reported, time taken for the radiograph to be reported was determined. In this study, the term "unreported radiographs" refers to the radiographs that were not interpreted, while "reported radiographs" refers to the radiographs interpreted by an authorized physician. Radiographs were categorized according to the anatomical regions such as the abdomen/kidney, ureter and bladder (KUB), pelvis, limbs, spine, skull, and chest.

**Results:** All the radiographs included in this study (100%; n = 3,816/3,816) remained unreported. The reason for this state remains unknown. Because there were no reported radiographs, we could not determine the time taken for radiographs to be reported.

**Conclusion:** Despite, great efforts from the administrative team of ED at KAUH, there were a huge number of unreported radiographs in ED.

## Introduction

Trauma radiographs provide important information to practitioners of emergency medicine and facilitate the decision-making process in the emergency department (ED). Therefore, it should be done accurately and immediately [1]. The proper interpretation of radiographs facilitates better management to the patient's condition in ED [2]. In the context of this study, unreported refers to the radiographs that were not interpreted, while reported refers to the radiographs interpreted by an authorized physician. However, due to the global shortage of radiologists, emergency medicine physicians (EMP) are largely responsible for the interpretation of acute - trauma plain radiographs in public- sector health-care facilities in well-resourced countries [3,4]. Due to the shortage of radiologists, most acute-trauma radiographs remain unreported [3,5]. Training, experience, and commitment are required to achieve optimum accuracy in the interpretation of ED radiographs [6,7].

Radiographic images help determines the plan and method of treatment [8]. Overwhelmingly, images are initially interpreted by EMPs and the diagnosis depends on this initial interpretation. In several institutions, radiographs are transferred to radiologists for the confirmation of diagnosis. This study has two specific objectives. The first objective was to evaluate the number of reported and unreported routine trauma radiographs of adults in ED at King Abdulaziz University Hospital (KAUH), over a period of 12 months. The second objective was to determine time required for to getting radiographs reported. To the best of our knowledge, this is the first study of its kind to be conducted in the Arab countries.

## Materials and Methods

The study was undertaken from January 2015 through December 2016 in the ED of KAUH, which has a 1002 -bed public-sector hospital in the Western Area of Saudi Arabia. Gathered data from the picture archiving and communication system (PACS) and Sectra program were transcribed into an Excel spreadsheet. The percentage and frequency of reported/unreported radiographs from each anatomical part were

**Keywords:** Trauma; Emergency; Radiology; Unreported; Radiographs

obtained by the audit of consecutive radiographs obtained over the 12-month period. Preliminary trauma radiographs (routine X-ray) of 3,816 adults were obtained during the study period. During data collection, the numbers of reported and unreported conventional trauma radiographs of adults were determined; if the radiograph has been reported, time taken for the radiograph to be reported (immediately, 1-6 hours or more) was determined. Statistical SPSS 16.0 software analyzed data and Kendall's tau-b (Correlation is significant at a p-value of  $\leq 0.01$ )

## Results

All (100%;  $n = 3,816/3,816$ ) the routine adults radiographs in the ED of KAUH remained unreported, and none (0%;  $n = 0.00 / 3,816$ ) of the radiographs were reported during the study period. In summary, the audit included 3,816 unreported radiographs corresponding to various anatomical parts: limbs (19.29%), spine (2.73%), abdomen/pelvis (11.14%), chest (66.30%) and skull (0.55%) (**Table 1**). Notably, there was significant difference between the number of unreported and reported radiographs ( $p = 0.000$ ).

**Table 1:** Reported and unreported radiographs.

Parts	Frequency and percentage				p value
	Unreported	%	Reported	%	
Limbs	736	19.29 %	0	0.00%	0
Spine	104	2.73%	0	0.00%	
Abdomen/ KUB/pelvis	425	11.14 %	0	0.00%	
Chest	2530	66.30 %	0	0.00%	
Skull	21	0.55%	0	0.00%	
Total	3,816	100%	0	0.00%	

\*Kendall's tau-b (Correlation is significant at  $p < 0.01$  level)

## Discussion

To the best of our knowledge, this is the first study conducted in the area to determine the number of reported and unreported radiographs in ED at KAUH. The results are disappointing, because the interpretation of radiographs in ER did not meet the Royal College of Emergency Medicine (RCEM), United Kingdom (UK) best practice guideline for the management of radiology results in the ED, February 2016. They recommend that all radiological imaging performed in the ED must have a formal report prepared by a radiologist [9,10]. The General - Medical - Council, UK in its guidance over roles and accountability should ensure clarity [11].

The current state of ED at KAUH is similar to that of institutions of emergency care radiographic images are interpreted by health practitioners (HP) as part of their duty

[12]. HP may include radiographers [13], physiotherapists [14], nurses [15], and medical professionals [16]. They interpret the results prior to the preparation of a report by a radiologist. However, we have no explanation on how and why none of the radiographs were interpreted by radiologists. Similar studies have reported that radiographs are usually interpreted by physicians (not radiologists). However, these physicians have enough experience in radiographic interpretation to support clinical decision making, considering that this information is not a relevant to the objective of the current study, we did not take it into consideration. A previous study on interpretation of ED radiographs reported significant differences of equal or greater magnitude associated with the training level and physician specialty [17]. Another study showed that most junior doctors in accident and emergency departments misdiagnose significant trauma abnormalities on X-ray radiographs [18].

One of the objectives of this study is to determine the time taken for radiographs to be reported. However, we were unable to achieve this objective because all the collected radiographs during this study were unreported. Regarding interpretation of radiographs, the Royal College of Radiologists (RCR), UK recommends an average time is approx. 90 sec/ examination [19].

## Conclusion

Although it does not satisfy the ambition and guidance of the administration of radiology department to improve and develop service, the current status of interpreting routine radiographs for adults in ER at KAUH have been displayed. In conclusion, we hoped this study will stimulate for crucial procedures to apply the guidance of RCEM and RCR to promote the provision of high quality service to traumatic patients.

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