

# Appraisal of Reporting of Trauma Images: Implications for Evolving Red-Dot System in Nigeria

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## ABSTRACT

An appraisal of reporting of trauma images in secondary and tertiary health care centers in Nigeria was conducted using structured questionnaires. The study sought to evaluate how timely trauma radiographs were reported by radiologists and the implication for recommendation of Red-dot system. Our study revealed that in all the hospitals surveyed only 8(22.2%) have permanent radiologists in her employment and 6(33.3%) have visiting radiologists. All the hospitals have operational emergency departments with a doctor and a nurse designated on duty. The study showed that it takes between 24 to 72 hours to report emergency radiographs in the surveyed hospitals. The absence of prompt reporting of radiographs increased the morbidity and mortality experienced in the surveyed hospitals. There is therefore need to introduce Red-dot system to assist emergency physicians to make prompt and more accurate diagnosis in the absence of a radiologist.

**Keywords:** Radiographers reporting, Red-dot, Nigeria.

## 1. INTRODUCTION

Radiographer's identification of abnormality on a radiograph also known as Red-dot system in Medical Imaging is a practice widely used in the United Kingdom. It is a system whereby there is an initial radiographer's reporting by the application of red dots on the radiographs to highlight abnormalities for the attention of the referring medical practitioners [<sup>1,2</sup>]. This method was introduced due to limited number of radiologists and the need to promptly report trauma radiographs. Different modifications of the system are being practiced in various parts of world at present but its origin has been traced to an earlier work by Swinburne [<sup>3</sup>]. Several authors have audited the system as currently being practiced. Sonex et al [<sup>4</sup>] observed that only 1% of the pathological changes were missed by the radiographers. Berman et al [<sup>5</sup>] noted that radiographers' reporting has reduced the possibility of pathologies likely to be missed by emergency doctors. They advocated a protocol of image screening by radiographers as a standard practice. Vincent et al [<sup>6</sup>] in their study noted that the casualty officers many a time are inexperienced and frequent errors are usually made by their interpretation when compared with that of a standard radiologist's report.

In Nigeria, the Red-dot system has not been officially introduced in the health care system despite the limited number of radiologists in the country.

This paper therefore was to assess the rate at which radiographs are reported in emergency department of some secondary and tertiary health care centers in Nigeria with a view to advocating alternatives to enhance better health care delivery.

## 2. MATERIAL AND METHOD

This study was designed to cover the six geo-political zones of Nigeria. Two tertiary and two secondary health care centres in each of the geo-political zones were selected for the study giving a total of twenty-four hospitals. Authorization for the study was obtained from the hospitals concerned and the aim of the study was explained to the respondents.

Two sets of structured questionnaires were designed for the study. The first set of questionnaires was for the radiographers while the second set was for the nurses working in the emergency departments of the same hospitals. The questionnaires were validated by a Chief radiographer and a Chief Nursing Officer who were asked to assess the appropriateness and relevance of the questions. The questions were reviewed after the pilot study.

A total of 96 questionnaires were sent out to the radiographers and 81 were received giving a return rate of 84.4%. For the emergency nurses, 83 questionnaires were sent out and 71 were received giving a return rate of 85.5%. The questionnaires to the radiographers sought to find out; whether emergency radiography services were provided, the knowledge of the radiographers towards identification of pathologies, whether radiographers run on-call-duty services, whether radiologists are in their employment and hours of availability. The questionnaires for the emergency nurses sought to find out; whether the emergency radiographs of patients were reported and by whom, how long it takes to be reported, whether the radiographers were always available to attend to emergency cases and the implication for morbidity and mortality. This method

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was adopted due to the inability of the researchers to obtain vital information from the records in the radiology departments.

Data analyses were carried out in line with the objectives of the study using percentages.

### 3. RESULTS

All the hospitals surveyed had three or more radiographers in their employment and they all ran emergency call duty services. Radiographers who have knowledge of reporting from the survey were 59/81 (72.8%) and were more in the southern part than in the Northern part of the Nigeria. Eight of the hospitals (33.3%) have consultant radiologists in permanent employment while 6(25%) have visiting radiologists. The rest had no radiologist in their employment. In all the hospitals studied, an emergency department was operational with at least one qualified nurse, and a doctor designated on duty roster. On whether the radiologists were available to report films in cases of emergency, 19% of the nurses responded "Yes" while 81% of the nurses responded "No". On the length of time taken to report the radiographs which range between 24 hours and 72 hours, 62% of the nurses responded that the length of time was poor, 33% of the nurses responded that it was fair and 5% of the nurses responded that it was good. On the question, whether the radiographers believed they could practice red-dot system when given extra training, 76% of them responded "yes", while 34% responded "no".

On whether it was desirable to introduce red-dot system in their departments, 85% of the radiographers responded "yes" while 15% responded "no".

### 4. DISCUSSION

In emergency radiology services, the 'gold standard' is the availability of a report at the time of patient attendance or "hot" reporting [7]. Our study revealed 'cold' or retrospective reporting in majority of the departments. Emergency radiographs were reported 24 to 72 hours after they had been taken. For most imaging diagnosis, a radiologist's report is the 'gold standard' and wherever possible, a formal report on the radiographs should be the first priority [2]. However, in many circumstances where a radiologist is not available, the next best person could be the radiographer or the referring physician. Majority of the radiographers surveyed (76%) believed that they could conduct red-dot system and 85% of them responded that red-dot system was desirable. In the UK, the introduction of the NHS and Community Care ACT in 1990[8] changed the dynamics of delivering health care services thus allowing not just red-dot system but relaxation of restrictions on radiographers reporting. It was reported

that radiographers reporting was introduced in the UK during the mid 1990s in response to the growing services demand and increasing pressures on the radiology workforce [9]. Meta-analysis showed that when compared to a 'reference standard' radiographers are capable of interpreting plain radiographs in clinical practice with a level of sensitivity of 92.6% and specificity of 97.7% [10].

Our study revealed that in all the hospitals surveyed only eight (33.3%) have permanent radiologists in her employment and six (25%) had visiting radiologists. All the hospitals had operational emergency departments with a doctor and a nurse designated on duty. The study showed that the absence of prompt reporting of radiographs by radiologists increased the morbidity and mortality experienced in the hospitals.

Based on this finding, it may be timely and necessary in Nigeria to consider formal legislation towards application of red-dot system by radiographers in emergency departments as a prelude to the current system of radiographer reporting obtainable in the UK [11]. The potential benefits of application of red-dot system in emergency services include, enhancing better opinion on trauma images and conducting further investigations when needed in order to save life. It will also promote flexible team working between different professionals in trauma units.

### 5. CONCLUSION

The result of this study provided data on the level of emergency reporting in selected emergency departments of tertiary and secondary health care centers in Nigeria and an insight into the possible advantages of application of red-dot system in emergency services. Data from our study reported 'cold' reporting in all the secondary health care centers. This is contrary to the accepted standard of 'hot' reporting of radiographs at the time of patient's presentation to the trauma department. In South Africa and across African continent, there has been interest in the development of radiographers' skill towards reporting from both within and outside the radiography profession, though there has been limited success in implementing this extended role [12].

The Radiographers Registration Board of Nigeria initiated a process of equipping radiographers with the skill of image interpretation by organizing an update course in film critique with resource persons from Nigeria and South Africa. The benefit of this role development in Nigeria is to provide the workforce needed in accident and emergency radiography services particularly in the secondary health care centres and in rural communities where there are no radiologists. It is hoped that this scheme will equip radiographers for application of red-dot system and serve as foundation for future courses in image interpretation.

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