Reporting trauma and emergency plain film radiographs: Radiologists' support for role extension of South African radiographers.

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Abstract: This study covers the opinions of South African (SA) radiologists in the Western Cape in terms of their support of radiographers undertaking interpretation and formal reporting of musculoskeletal trauma and emergency (T & E) plain film radiographs. A non-experimental quantitative research approach was adopted. A postal questionnaire, based on studies undertaken in the United Kingdom [1-12], was used for data collection. Sixty-eight percent of the radiologists indicated that they were willing to support radiographers interpreting and reporting T&E plain film examinations within the SA healthcare system. The nature of support to be provided was the assessment of clinical competence (54%), support as a clinical mentor (38%), supervisor (32%) and academic support in the form of lecturing 26%.
Keywords: Skills mixing, *Red Dot* system.

Introduction

A shortage of radiologists results in many plain film radiographs being returned unreported to the clinicians, or untimely reports that cannot influence patient management. In seeking solutions to this problem in the United Kingdom (UK), the experience of radiographers have been explored in terms of the delegation of some of the plain film reporting workload to suitably trained radiographers. Crucial to this development is the support from radiologists for this role to be extended to radiographers. These additional responsibilities of radiographers have been termed skill-mixing or role extension. Skill-mixing implies the utilization of a radiographer's skill and expertise to complement or increase the expertise available to patients in order to improve the provision of health care to patients [1]. There are many definitions of role extension but one that is most appropriate for this article is offered by Hardy and Snaith [2] namely, "post-qualification acquisition of skills, responsibilities and resultant associated additional professional accountability". This definition implies a fundamental change to the current professional practice of radiographers.

In 1971 a radiologist from the UK, Dr Swinburne challenged the traditional view held of radiographers as he was of the opinion that radiographers had the potential to comment on radiographic images [3]. However, radiologists remained skeptical of his point of view and the debate continued until another UK radiologist, Dr Saxton, suggested in 1992 that the significance of radiographers' reporting could only come about through careful design and control of education programs as well as close collaboration between radiologists and radiographers [4]. This implied that non-medical personnel could not be expected to provide a medical interpretation without appropriate training. A critical shortage of radiologists led to various initiatives to determine image interpretation skills of radiographers. The process was further driven through published evidence of the questionable abilities of trauma and emergency (T&E) clinicians in accurately interpreting plain-film trauma radiographs thereby increasing the risk of misinterpretation, incorrect treatment and the effect of medical errors [5].

The first initiative was the adoption of a radiographic abnormality flagging system, called the *Red Dot* system whereby a radiographer would physically place a red dot on a radiograph to indicate that a possible abnormality may be present [6]. This system has its limitations as it is operated on a voluntary basis thus the absence of a red dot on a radiograph does not exclude the possibility of an abnormality whereas placing a red dot on a radiograph also does not indicate the site or significance of abnormality. The system is an additional service and has no influence on the reporting workload. The development of radiographer role extension became research driven with most publications concentrating on radiographers' reporting abilities in musculoskeletal trauma [7-9]. The results of a meta-analysis study done in 2005 found that radiographers compared well with the reference standard, reporting plain films with 92.6% and 97.7% sensitivity and specificity respectively [10].

In 2002 in the United States of America a consensus paper outlined the creation of a radiologist assistant as a career pathway. This new type of radiologic assistant was introduced to extend the role of radiographers. The need to develop this role was supported by various factors which included the increased radiologist shortage, a growing demand for medical imaging procedures as well as a desire to enhance the overall quality of patient care. It was recommended that a radiologist assistant should complete a recognized radiologist assistant curriculum and a radiologist-directed clinical preceptorship. The extended roles would include patient assessment, patient management, fluoroscopy and other radiology procedures. Radiologist assistants would be competent to make initial observations on diagnostic images but the final written report would be provided by a radiologist [11].

In South Africa (SA) some health care institutions adopted the *Red Dot* system during the 1980s. Pattern recognition was introduced which resulted in the offering of various non-sustainable *ad hoc* seminars and courses to enhance pattern recognition skills of a South African radiographer. SA is also experiencing critical personnel shortages within the health care sector. In 2003 Professor Peter Corr stated, in an interview with Jerslid, that the shortage of radiologists in SA had reached critical proportions with less than 400 radiologists for a population of more than 42 million and with the majority of radiologists working in the private sector [12].

This study was undertaken to determine whether South African radiologists would support professional role extension for radiographers in order to improve health service delivery. Since radiographers highlighting abnormalities on T & E plain film radiographs is still in its infancy in SA, most of the literature review in this study include studies undertaken in the UK.

Ethics approval

Ethics approval was obtained from the Divisional Ethical Advisory Panel, (UoB) where this study was undertaken. Participation consent was assumed when the respondents returned the completed questionnaire.

Methodology

A non-experimental quantitative research approach was adopted. A descriptive survey of radiologists practicing in the diagnostic field in the Western Cape (WC) in SA was undertaken using a postal questionnaire as the primary collection tool. The WC Province was chosen as the geographical area for the research because it encompasses both rural and urban areas with varying levels of radiology services offering a range of diagnostic modalities. Urban and rural areas experience a shortage of

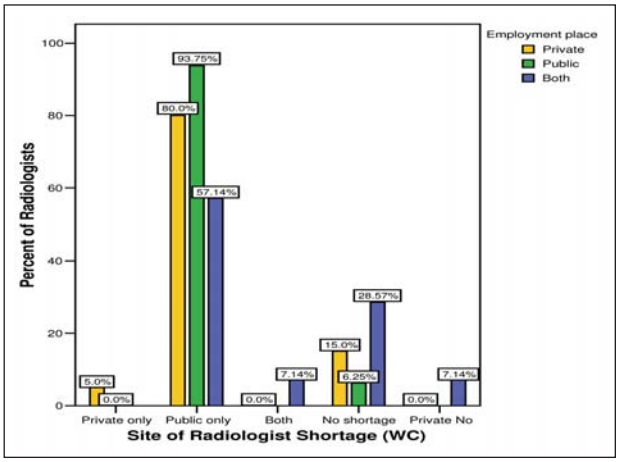

Figure 1. Shortage of radiologists (WC) defined by employment place.

radiologists in the public sector health care institutions. This results in many facilities having to cope with unreported plain film radiographs or lengthy waiting periods for a radiologist's report. According to available statutory council records one hundred and sixty-three (163) radiologists were practicing in the WC at the time of the study [13]

Results

A response rate of 44.8% (n=73/163) and completion rate of 68.5% (n=50/73) was achieved. Twenty-three questionnaires were returned incomplete thus were excluded in analysis of the data. The results from this study indicates that a shortage of radiologists was experienced particularly in the public sector of the WC (Figure.1) and 93.7% (n=15/16) of radiologists employed in the public sector indicated that shortage of radiologists was only present in the public sector. This opinion was supported by 80% (n=16/20) of private radiologists. Results from radiologists employed in both sectors varied markedly with only 57.1% (n=8/14) indicating a shortage in the public sector. Exploring the responses further indicated a consistent belief that T & E patient services were compromised by radiologist shortages with 81.3% (n=13/16) of public sector radiologists, 75% (n=15/20) of private radiologists and 64.3% (n=9/14) from both sectors in agreement.

An opinion was sought whether radiologists would be willing to support radiographers formally interpreting and reporting T & E plain film radiographs (Table 1). Results indicate that 68% (n=34/50) of radiologists were supportive of the professional role development of reporting radiographers. In response to a question on the preferred training of reporting radiographers the respondents supported a combination of training methods (Table 2) with training provided by radiologists 70% (n=35/50), accredited short courses 62% (n=31/50) and training at post graduate Magister of Technologiae (M.Tech) level or similar 50% (n=25/50) receiving the most support. Analysis of the level of support in relation to employment place (Figure 2) revealed that radiologists from all health sectors in the WC were willing to offer clinical and academic support. Radiologists were also asked to indicate their level of agreement whether reporting of T & E plain radiographs should only be undertaken by radiologists (Table 3). The majority of radiologists (56%, n=28/50) were in agreement that reporting of trauma radiographs should remain in the domain of radiologists. In contrast, the level of disagreement with the statement was poor, 12% (n=6/50). Of the remaining responses, 30% (n=15/50) had no strong feeling about the issue and a further 2% (n=1/50) did not offer a response. These results indicate inconsistencies in the support of radiologists towards the development of a plain film reporting initiative for radiographers.

Radiologists' opinions towards the capability of radiographers to accurately identify abnormalities on T & E plain film radiographs were explored (Table 4). It is evident from the results that the majority of radiologists (54%) did not believe in the ability of radiographers to identify abnormalities on trauma films accurately; only 34% (n=17/50) supported the statement and the remaining 12% (n=6/50) had no strong opinions about the issue.

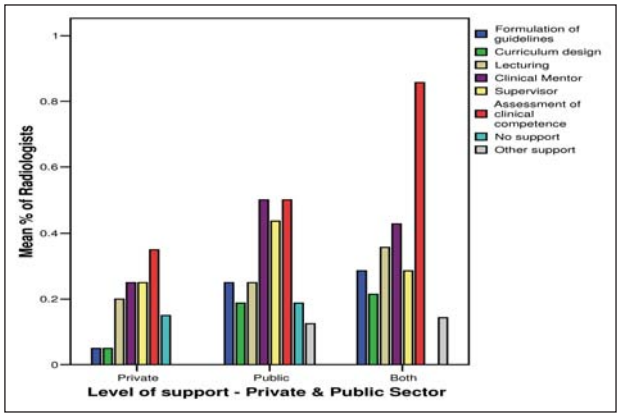

Figure 2. Radiologist level of support defined by employment place.

Radiologists' opinion regarding the medical responsibility of interpretation and reporting of radiographic images was sought. The majority of radiologists indicated that there should be no delegation of reporting (56%; n=28/50), only 26% (n=13/50) disagreed and the remaining 18% (n=9/50) indicated that they had no strong opinion about the issue. These results indicate that radiologists in the WC, where the study was undertaken, were ambivalent in their support for developing a reporting program for radiographers.

Table 1. Radiologist support for radiographers interpreting & reporting trauma radiographs.

Radiologist support defined by employment place	% Responses
Public only	32% (n=16/50)
Both sectors	22% (n=11/50)
Private only	14% (n=7/50)
Neither	32% (n=16/50)

Table 2. Preferred training for reporting radiographers.

Preferred training for reporting radiographers	% Responses
Radiologist in-house training	70% (n=35/50)
Accredited short courses	62% (n=31/50)
M,Tech or similar	50% (n=25/50)
Radiographer in-house training	24% (n=12/50)
Casualty officer in-house training	12% (n=6/50)
Other	12% (n=6/50)
None	2% (n=1/50)

Table 3. Only radiologists should report T & E plain films.

Only radiologists should report T & E plain films	% Responses
Strongly agree	26% (n=13/50)
Agree	30% (n=15/50)
No strong feeling	30% (n=15/50)
Disagree	8% (n=4/50)
Strongly disagree	4% (n=2/50)
Missing	2% (n= 1/50)

Table 4. Radiologists opinion towards radiographer's accuracy in interpreting T & E plain film radiographs.

Radiologists opinion towards radiographers film interpretation skills	% Responses
Strongly agree	0%
Agree	34% (n=17/50)
No strong feeling	12% (n=6/50)
Disagree	48% (n=24/50)
Strongly disagree	6% (n=3/50)

Discussion

The cornerstone of the South African health service is to develop a health care system that meets the needs of all South Africans. Challenges facing the health care system to deliver an effective and efficient system enforce the need to develop the skills of existing staff thereby optimising professional knowledge and experience for the benefit of patients. Analysis of results of the study undertaken in the WC confirms a severe shortage of radiologists particularly in the public health sector. This impacts on the service delivery to the underprivileged societies particularly those in rural areas. It is in these impoverished areas that health needs are the greatest. One solution is to expand the traditional roles of health professionals by delegating responsibilities undertaken by medical practitioners. This will demand changes to the existing boundaries for radiographers and a review of codes of professional practice. The ability to influence transformation of the health service is in the area of professional role development of radiographers to include plain film reporting, but the concept of radiographers reporting is not universally accepted.

From the literature reviewed it is evident that musculoskeletal reporting of T & E plain film radiographs has been an area of rapid development and intense scrutiny in the UK and that appropriately trained reporting radiographers are equal to radiologists in their ability to accurately interpret trauma radiographs. A proposed change to clinical practice to include reporting by radiographers holds obvious benefits. These benefits include improvement to the quality of clinical patient management as reported radiographs can assist the clinician in providing the appropriate treatment for the patient, reducing incidences of patients being discharged with missed fractures, urgent cases can be expedited and a reduction to unreported T & E plain film radiographs. However the implementation of such a scheme cannot be instantaneous. The potential for radiographers to formally interpret radiographs can only be realised by addressing the complex issue of relaxing the professional boundaries of reporting exclusively by medical practitioners. Essential to this proposed change is consultation between the radiography and radiology professions, and a review of legislation pertaining to health practice in SA. In addition the lack of formal training in image interpretation by SA radiographers requires a review of existing postgraduate training courses.

Increased professional responsibilities should not be undertaken at the expense of quality. To ensure quality of care, a reporting program requires an increase in film interpretation skills as well as a well-developed and expanded knowledge base. Defining the scope of the reporting service, uniformity of training courses and a measurement of competencies, are essential to any reporting training program. The success of such a program will also be determined by the competency and commitment of radiographers entered into the program. Central to its development would be close collaboration between academics and clinical providers of the service and 'buy-in' from hospital managers. Competency in interpretation skills needs to be tested at the end of the training program before reporting responsibilities can be delegated with the level of performance by reporting radiographers comparable to the performance of radiologists.

There should also be a commitment from the SA National Department of Health to invest in staff development as the training of reporting radiographers requires additional staffing to compensate for the lengthy duration of radiographer reporting courses and the necessary withdrawal from duties during training periods. Support from radiologists in the clinical departments, in the form of supervision, mentoring and assessment of clinical competence, must be assured from the outset. The radiography profession also has an obligation to utilise professional knowledge and expertise to benefit patients. Complacency within the SA radiography profession has deterred professional development resulting in the role of radiographers still primarily being viewed as technical. Therefore radiographers need to become the driving force to implement changes to expand their professional role, concentrating on development of career paths and promoting further education to extend their professional role to benefit their patients. They also need to adopt a research culture for scientific decision-making regarding their profession. It is pertinent to believe that developing radiographer reporting similar to the standards achieved in the UK will result in a long term investment which will benefit treatment and management of T & E patients particularly in rural regions.

An accepted limitation to this research study was that bias was introduced as the responses relating to radiographers reporting on T & E plain film radiographs were only from the viewpoint of radiologists in the WC excluding the opinions of radiographers, service providers and patients. However, this approach was deemed necessary as radiologists are the leaders in plain film reporting service and they need to be consulted before delegation of reporting responsibilities can take place.

Recommendations

This study highlighted the need (i) to improve radiology services particularly in the public health sector, and (ii) to extend the professional role of radiographers to include T & E plain film radiograph reporting to benefit trauma patients, particularly in public sector hospitals. It also highlighted the perseverance of traditional practices in radiography that might not be beneficial to patient treatment and management. Based on these findings several recommendations are made, namely:

- To implement further research projects to evaluate the opinions of radiographers, health service providers and patients with regard to radiographers formally undertaking plain film reporting.
- To engage in consultation with the South African health department to obtain financial support for this initiative.
- To research the feasibility of nationally agreed criteria for the development of a reporting training program for radiographers and to define the scope of the reporting service.
- To develop an accredited *Red Dot* course to increase the interpretation skills of radiographers in SA.

Conclusions

This study has revealed that radiologists in the WC are willing to support the professional development of SA radiographers to include T & E plain film radiograph reporting. The level of support offered is in line with current radiographer reporting training practices found in the UK. However, a lack of consistency found in further analysis of responses, revealed that radiologists were sceptical about the ability of SA radiographers to accurately interpret abnormalities on trauma radiographs. In light of the absence of scientific evidence supporting SA radiographers' capability to accurately interpret trauma radiographs, it is yet to be proven that their knowledge and skills are fully appreciated.

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