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Knowledge of practising radiographers of the supraspinatus outlet projection for shoulder impingement syndrome in the Eastern Cape, South Africa

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ABSTRACT

Background/Aim: There are many projections in plain film imaging to demonstrate the specific aspects of the anatomy of the shoulder. However, reproducing the required projections can be challenging especially if radiographers are not familiar with the projections and their evaluation criteria. The aim of the study was to explore and describe the knowledge of practising radiographers regarding the supraspinatus outlet projection for shoulder impingement syndrome.
Method: A quantitative, exploratory and descriptive design was followed. The population served as the sample and included all the practising radiographers in the public and private hospitals of a metropolitan municipality in the Eastern Cape, South Africa. A total of 84 respondents completed the structured, self-administered questionnaire.
Results: The data revealed that in many cases, the majority of radiographers in the study, due to inadequate knowledge levels would not be able to produce an optimal radiographic image of the supraspinatus outlet. The results of the chi-squares indicated statistically significant differences ($p < 0.05$) between public and private hospitals regarding certain aspects of the scapular Y projection and SOP.
Conclusion: It was found that the radiographers in the study had inadequate knowledge of scapular Y projections and SOPs in relation to SIS. Therefore, it is essential to ensure that radiographers are updated on their knowledge of radiographic practice on a continuous basis.

Introduction

Shoulder ailments are prevalent among most populations, and estimates range from 30% of the population experiencing shoulder pain at some point in their lives to 50% suffering at least one episode of shoulder pain per year.[1] Such pain is often debilitating and may be an indication of impingement syndrome. In 1972, Neer first introduced the theory of shoulder impingement syndrome (SIS).[2] The cause of most impingements is the narrowing of the supraspinatus outlet and this phenomenon can be described as outlet impingement.[3] SIS is the cause of approximately 70% of all shoulder ailments and the incidence is higher among athletes and workers who perform overhead activities.[4,5] Shoulder injuries lead to severe pain and frequently prevent movement, especially above the head.

Presently, plain film imaging remains a radiographic tool of choice for radiologists and physicians alike, and is used for all shoulder pathology.[6,7] It is often the only imaging required for an accurate diagnosis.[8] Of all the imaging modalities available, plain film imaging has the best image resolution.[7] The complex anatomical structure of the shoulder has led to the development of multiple radiographic projections and techniques within plain film imaging with each projection intended to demonstrate specific aspects of its anatomy. If a patient presents with a history of impingement syndrome the most common radiographic projection to demonstrate this would be the supraspinatus outlet projection (SOP).[9]

SOP has been described as one of the most valuable projections in demonstrating SIS and for evaluating acromial morphology and thickness.[8] SOP is also used to measure the acromial type, slope and tilt.[10] The American College of Radiology's Appropriateness Criteria

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(2010)[11] indicate that plain film imaging of the shoulder is most appropriate for shoulder pain compared with other imaging, such as Magnetic Resonance Imaging (MRI). The SOP has also been shown to be more effective at determining acromial shape than MRI.[12]

Informal interviews with orthopaedic surgeons raised a concern regarding the standard of the SOP images produced by the practising radiographers in the public and private hospitals in the Eastern Cape, South Africa. Furthermore, at the time of the study the Routine Diagnostic Radiography Protocol used in the public hospitals appeared to be lacking in the way it guided the radiographers regarding which projections should be taken for a specific history. According to the protocol, anteroposterior (AP) and lateral projections should be routinely performed for all shoulder indications. The additional projections, such as SOP, are only performed on request from the referring physician. The private hospitals have the additional projections forming part of their routine protocol.

In addition, the scapular Y projection and the SOP are similar in terms of positioning,[13,8] and may be confusing to radiographers if they do not know the difference between the two (see Figs. 1 and 2). Incorrect or diagnostically unacceptable images may possibly lead to complications during and after surgery. The aim of the study was to explore and describe the knowledge of radiographers regarding the SOP for SIS.

Method

A quantitative research approach was employed with an exploratory, descriptive research design in which respondents were asked to complete a structured questionnaire. The study was conducted at x-ray departments in private and public hospitals in a metropolitan municipality in the Eastern Cape. All respondents signed a written consent form. Group administration of the questionnaires was performed in small groups to enable the respondents to ask any questions about the questionnaire and to avoid the disruption of the work flow. Group administration also helped to prevent the respondents from seeking outside assistance and ensuring each individual completed the questionnaire independently. The completed questionnaires were placed in a sealed box.

The population included all the practising radiographers in the public and private hospitals of the Nelson Mandela Bay Municipality (NMBM) who performed plain film radiography. There were approximately 60 practising radiographers in the public hospitals and 65 in the private hospitals in the altogether. However, owing to sick leave, maternity leave, annual leave and staff on post night duty (hence six participants were unavailable to take part) the accessible population consisted of 101 radiographers. The response rate for the study was 83% (n = 84). There is a possibility for non-response bias because 32% of the private sector radiographers did not take part in the study, as opposed to just 4% from the public sector.

Figure 1. An example of a scapular Y projection (for shoulder joint).

Figure 2. An example of a supraspinatus outlet projection (SOP).

The questionnaire was developed from literature as well as from discussions with radiographic experts who were experienced in the clinical training of radiographers and on shoulder imaging. The pretest included five practising radiographers at a public hospital and four at a private practice in a different town but in the same municipality who were not part of the main study. Based on the respondents feedback, the quality of the images was improved and an extra question on work experience was introduced to Section A. The demographic section of the questionnaire included 10 items: gender; age; year of undergraduate qualification completion; institution where qualification was obtained; current employment; employment in other sectors; years of experience; postgraduate qualifications; specific postgraduate qualifications and image evaluation/critiquing as part of undergraduate training. Section B assessed the respondents' knowledge of the scapular Y projection, SOP and SIS (24 items). Section C assessed their knowledge of anatomy and image evaluation/critiquing (9 items) by using five radiographic images: one for anatomy, two for the scapular Y and two for the SOP. Closed-ended questions consisting of three-point scales (yes; not sure and no), multiple choice, and true and false items were utilised, as well as open-ended questions. Statistica Version 11 was used to analyse the data.

Ethical permission was obtained from the Nelson Mandela Metropolitan University with the reference number: H14-HEA-RAD-001. Additional ethics clearance was provided by all the ethics committees at the public and private hospitals where the study was conducted.

Results

Descriptive mean values and standard deviations were determined. The results of chi-squares indicated statistically significant differences ($p < 0.05$) between public and private hospitals regarding certain aspects of the scapular Y projection and SOP.