Brief Report

Data quality of request forms for lumbar spine X-rays: A clinical audit form a tertiary care hospital in Sri Lanka

Wettasinghe MC¹, Rosairo S¹, Wickramasinghe ND²

¹Department of Radiology, Faculty of Medicine, University of Peradeniya, Peradeniya (20400), Sri Lanka
²Department of Community Medicine, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka, Saliyapura (50008), Sri Lanka

Abstract

This study aimed to assess the data quality of request forms for lumbar spine X-rays. Data quality was assessed on the aspects of completeness, accuracy, and legibility of the request forms. Out of 185 lumbar spine X-ray request forms that were analysed, 13 (7.0%) requests failed to provide the clinical history. Thirty-two (17.3%) did not provide details on the region of examination. In the 172 requests, which included a clinical history, 167 (97.1%) provided relevant clinical histories for requesting lumbar spine X-rays and five (2.9%) requests contained non-standard abbreviations. We concluded that the data quality of lumbar spine X-ray request forms needs further improvement.

Keywords: Lumbar spine, Request form, Radiographs, Clinical Audit,

Correspondence: Wettasinghe MC, Teaching Hospital Peradeniya, Peradeniya, Sri Lanka
E-mail address: chamimw003@yahoo.com
ID https://orcid.org/0000-0001-9183-2395

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Background and Objective

Lumbar spine X-ray requests contribute to a major proportion of X-ray requests received by a radiology department, given that lower back pain has become an important problem worldwide with increasing disease burden.\textsuperscript{1,2} Even though being a simple investigation, the lumbar spine X-ray delivers a significant amount of radiation.\textsuperscript{3-5} During an Anteroposterior (AP) and lateral lumbar spine X-ray, approximately, 2.20 mSv and 1.50 mSv radiation doses are delivered respectively.\textsuperscript{3} Evidence from different clinical settings suggests that the data quality of X-ray request forms is suboptimal leading to reduced effectiveness of the provision of radiological evidence.\textsuperscript{6-9}

Although there is no universally accepted uniform referral form, all the forms used worldwide have generally accepted components.\textsuperscript{6} The Ministry of Health, Nutrition and Indigenous Medicine in Sri Lanka has issued X-ray request forms to all the government hospitals in the country, where the referrals should be filled by the referring medical officer. This form is the ‘Requisition for X-ray Diagnostic Examination’ (Health: 318).

Assessing the data quality of request forms received by radiology units is an essential aspect in the central quality management process with the purpose of reducing the unnecessary radiation dose to patients and staff and to implement evidence-based best practices in radiology organizations.\textsuperscript{10} Thus, the present study aimed at assessing the data quality of request forms for lumbar spine X-ray received by a tertiary care hospital in Sri Lanka.

Methods

This cross-sectional study was conducted at the Department of Radiology in a tertiary care hospital in the Central Province, Sri Lanka for a period of two months starting from February to April 2016. All the lumbar spine X-ray request forms received by the Department of Radiology during routine work hours from all the units (including emergency treatment units, in-ward and outpatient departments) were considered for analysis.

Data collection was carried out by the investigators using a data extraction sheet which included information related to all details in the request form; date, patient name and address, age of the patient, sex of the patient, ward number, Bed Head Ticket (BHT) number, clinical history, region and nature of the examination, and the signature of the requesting medical officer.

Data quality was assessed on the aspects of completeness, accuracy, and legibility:

1. Completeness
   All the components of the lumbar spine X-ray request form should be filled; hence, completeness of each component was assessed separately. When considering the region of examination, requesting the necessary X-ray views was considered.

2. Accuracy
   The accuracy was evaluated with regard to the clinical history and region of examination. Providing relevant clinical history along with the indication was evaluated. When considering a request for backache, providing the duration of symptoms and presence of red flag symptoms were considered. These red flag
symptoms included history of malignancy, unexplained weight loss, immunosuppression, urinary infection, intravenous drug use, pain not improved with conservative care, prolonged use of steroids, history of significant trauma, minor fall or heavy lift in osteoporotic or elderly individual, acute onset urinary retention or overflow incontinence, loss of anal sphincter tone or fecal incontinence, saddle anesthesia and global or progressive motor weakness in lower limbs.

When multiple regions were given, providing relevant indication and history for each region of interest was considered. Usage of abbreviations was also noted. Relevant clinical history for lower back pain was considered according The ACR appropriateness criteria, published by American College of Radiologists in 1999, which was reviewed in 2015.  

3. Legibility
Overall legibility of the referral form to the reporting radiologist was also considered. The frequencies for each aspect of data quality were calculated with the percentages.

Standard descriptive statistics were used for data analysis on the aspects of completeness, accuracy, and legibility.

Results
A total of 185 lumbar spine X-ray request forms were analysed. Details of the analysis on completeness are summarized in Table 1. Out of the 185 request forms, 138 (74.5%) had complete entries for all the nine sections. Table 2 provides analysis of accuracy of details in relation to clinical history and region of examination.

### Table 1: Completeness of each section in lumbar spine X-ray request forms (n=185)

<table>
<thead>
<tr>
<th>Number of request forms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>185</td>
</tr>
<tr>
<td>Patient name and address</td>
<td>185</td>
</tr>
<tr>
<td>Age of the patient</td>
<td>180</td>
</tr>
<tr>
<td>Sex of the patient</td>
<td>180</td>
</tr>
<tr>
<td>Ward number</td>
<td>185</td>
</tr>
<tr>
<td>Bed Head Ticket (BHT) number</td>
<td>185</td>
</tr>
<tr>
<td>Clinical history</td>
<td>172</td>
</tr>
<tr>
<td>Region and nature of examination</td>
<td>153</td>
</tr>
<tr>
<td>Medical officers’ signature</td>
<td>182</td>
</tr>
</tbody>
</table>

### Table 2: Accuracy of details in sections: Clinical history and region of examination

<table>
<thead>
<tr>
<th>No. of referrals with accurate entries</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical history (n=172)</td>
<td></td>
</tr>
<tr>
<td>Correct indication for lumbar spine X-rays</td>
<td>167</td>
</tr>
<tr>
<td>Adequate Clinical details</td>
<td>64</td>
</tr>
<tr>
<td>Use of non-standard abbreviations</td>
<td>5</td>
</tr>
<tr>
<td>Region of examination</td>
<td></td>
</tr>
<tr>
<td>Inclusion of more than one region of examination in the same referral (n=153)</td>
<td>34</td>
</tr>
<tr>
<td>Providing the relevant clinical details for each examination (n=34)</td>
<td>13</td>
</tr>
</tbody>
</table>

Five out of the 172 requests (2.9%) analysed for accuracy of clinical details provided irrelevant history, which included cough (n=3) and hip joint pain (n=2). Five (5/172;2.9%) contained non-standard abbreviations such as LBP, AS and OA.
Five out of the 185 (2.7%) referrals were illegible to the investigating radiologists.

**Discussion**

According to our study findings, all the request forms contained the referral date, the name of the patient and the BHT number. Similar results were obtained for biodata information in an audit conducted in Nigeria. In our study, the major deficiency in relation to the completeness was observed in providing clinical data. A study conducted in Nigeria showed a similar trend with only 34.4% providing adequate clinical history. On the contrary, a study conducted in a separate state in Nigeria and Malta with regard to X-ray referrals, revealed 86.9% and 93.0% forms providing clinical details respectively.

There were indications that were not related to the lumbar spine. While using standard abbreviations are justifiable, as these can be read and understood by the medical professionals, the use of non-standard abbreviations always leaves the reporting radiologist in dilemma in understanding the clinical scenario.

Although there are no standard guidelines recommending not to request for more than one region of examination in one request form, when requesting multiple regions of examination, it is important to provide necessary details for each region separately. It is important to note that illegible request forms lead to unnecessary time wastage and misleading information, both of which will negatively affect the quality of radiological reporting. Furthermore, illegible request forms may lead to obtaining inappropriate radiographs exposing the patients to unnecessary radiation.

**Conclusions**

The data quality of lumbar spine X-ray request forms needs to be improved and should be done in accordance with the available guidelines. ACR appropriateness criteria, which is widely used can be utilised in this regard, since no local guidelines are available. Since the availability of advanced imaging modalities is limited in low-resource settings, providing relevant details in the X-ray request forms would enable the radiology units to streamline investigations in providing best possible imaging modality within the available resources.

**References**


