

Brief Report**Data quality of request forms for lumbar spine X-rays: A clinical audit from a tertiary care hospital in Sri Lanka****Wettasinghe MC¹, Rosairo S¹, Wickramasinghe ND²**

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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 LankaE-mail address: chamimw003@yahoo.com <https://orcid.org/0000-0001-9183-2395>**Copyright:** Wettasinghe MCDOI: <https://doi.org/10.4038/sljr.v9i1.118>

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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.^{1,2} Even though being a simple investigation, the lumbar spine X-ray delivers a significant amount of radiation.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.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.⁶⁻⁹

Although there is no universally accepted uniform referral form, all the forms used worldwide have generally accepted components.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 organizations¹⁰. 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 2015¹⁰.

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)

	Number of request forms	%
Date	185	100.0
Patient name and address	185	100.0
Age of the patient	180	97.3
Sex of the patient	180	97.3
Ward number	185	100.0
Bed Head Ticket (BHT) number	185	100.0
Clinical history	172	93.0
Region and nature of examination	153	82.7
Medical officers' signature	182	98.4

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

	No. of referrals with accurate entries	%
Clinical history (n=172)		
Correct indication for lumbar spine X-rays	167	97.1
Adequate Clinical details	64	37.2
Use of non-standard abbreviations	5	2.9
Region of examination		
Inclusion of more than one region of examination in the same referral (n=153)	34	19.8
Providing the relevant clinical details for each examination (n=34)	13	38.2

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.⁸ 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 history⁸. 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^{7,9}.

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

1. Somerville S, Hay E, Lewis M, *et al.* Content and outcome of usual primary care for back pain: a systematic review. *British Journal of General Practice*. 2008;58:790-7. PMID: 19000402 PMCID: PMC2573978 DOI: 10.3399/bjgp08X319909
2. Ehrlich GE. Low back pain. *Bulletin of the World Health Organization*. 2003;81:671-6. PMID: 14710509 PMCID: PMC2572532
3. Simpson AK, Whang PG, Jonisch A, *et al.* The radiation exposure associated with cervical and lumbar spine radiographs. *Journal of Spinal Disorders and Techniques*. 2008;21:409-12. PMID: 18679095 DOI: 10.1097/BSD.0b013e3181568656
4. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Annals of Internal Medicine*. 2002;137:586-97. PMID: 12353946 DOI: 10.7326/0003-4819-137-7-200210010-00010
5. Baker R, Lecouturier J, Bond S. Explaining variation in GP referral rates for x-rays for back pain. *Implementation Science*. 2006;1:15. PMID: 16884536 PMCID: PMC1570475 DOI: 10.1186/1748-5908-1-15
6. Abubakar MG, Ivor CN, Waziri A, Joseph DZ, Luntsi G, Obotiba A, Mathew E. Evaluation of the Adequacy of Completion of Radiology Request Forms in a Tertiary Hospital, Northeast, Nigeria. *Pacific Journal of Science and Technology*. 2015;16:219-24.

7. Depasquale R, Crockford MP. Are radiology request forms adequately filled in. *Malta Medical Journal*. 2005;17:37.
8. Afolabi OA, Fadare JO, Essien EM. Audit of completion of radiology request form in a Nigerian specialist hospital. *Annals of Ibadan Postgraduate Medicine*. 2012;10:48-52. PMID: 25161413 PMCID: PMC4111050
9. Akintomide AO, Ikpeme AA, Ngaji AI, *et al*. An audit of the completion of radiology request forms and the request practice. *Journal of Family Medicine and Primary Care*. 2015;4:328-30. PMID: 26288767 PMCID: PMC4535088 DOI: 10.4103/2249-4863.161308
10. Patel ND, Broderick DF, Burns J, Deshmukh TK, Fries IB, Harvey HB, Holly L, Hunt CH, Jagadeesan BD, Kennedy TA, O'Toole JE. ACR appropriateness criteria low back pain. *Journal of the American College of Radiology*. 2016 Sep 1;13(9):1069-78.