

Original Article**Evaluation of radiology request forms in diagnostic centers in Khartoum state**Mohamed O. Yousef¹*, Caroline .E .Ayad¹, Amin A. E. Elzaki² and Abdelmoneim Sulieman¹College of Medical Radiologic Science, Sudan University of Science and Technology. P.O.Box 1908, Khartoum, Sudan¹Faculty of Radiological Science and Medical Imaging, Alzaiem Alazhari University, Khartoum North, Sudan²E-mail: mohnajwan@yahoo.comAccepted: March 11
© National College**ABSTRACT**

The x-ray request form is an essential tool for communicating patient data and clinical indication from the referring physicians to radiologic departments and reduction of unnecessary radiation dose to the patient. This study aimed to evaluate the applied x-ray request form formula and to compare between the applied and standard request forms in different radiology departments. Numbers of elements of x-ray request form to be evaluated were assessed and questionnaire forms for technologist and physicians were distributed and data were analyzed using simple statistical method "percentage". The results of the evaluation of the applied x-ray request form filling elements including (patient full name, age, sex, history, condition, clinical indication, LMP, date of the examination previous x-ray exams, Physician name and clearness of requested exam) were found to be 80%, 60%, 60%, 30%, 30%, 100%, 100% respectively. The total results filling of evaluation of all patient information of 50 x-ray request forms were 50.67%, 26.18%, 28%, 21.09%, 18.18%, 55.9% and 60.03 respectively. This study concluded that providing patients data and clinical indication on the x-ray request form is of vital importance regarding the answers of technologists and physicians in the questionnaire. Regarding to the result it showed that the method of filling patient information in x-ray request form by the referring physicians in addition to the formula of x-ray request form that were applied in Khartoum state hospitals should be reviewed.

*SMM 2011; 6 (3): 201 - 210***Keywords:** Radiology, request forms , adequately filled**INTRODUCTION**

The X-ray request is important recorded for a patient to undergo a radiographic procedure and a form of communication between one referring doctor and radiology department. X-ray request form therefore, vital to provide sufficient and legible data on the request form so that the

procedure undertaken is most appropriate for patient management¹.

Radiologic technologists are frequently the initial point of contact in the imaging department yet their views, on the effectiveness of the information on requests they receive as a means of communication, appears not to have been investigated².

The importance of well defined clinical details is enabling justifiable examination, and reducing the radiation dose to the patient.

The physicians should write x-ray request forms clearly legibly and provide accurate, full and relevant clinical information. This will enable the radiologist to optimize the diagnostic value of the films that have been requested. Physicians should signed their names and ward number clearly, so the radiologist can contact with urgent findings³.

Request form for radiological examination should be carefully reviewed by the technologist prior to commencement of examination. Many hospitals and radiology department have specific rules about what kinds of information must appear on the X-ray request form.

The X-ray request form is usually stamped with patient's personal information (name, age, sex, address, patient hospital number and admitting physician)³

The request should also include the patient mode of travel to the radiology department (e.g. wheelchair versus stretcher).

The type of the examination performed, pertinent diagnostic information and infection control or isolation information. Many institutions now have computerized system via personal password, thus insuring confidentiality of patient information.

The radiologic technologist should carefully review the patient before introducing the patient into radiographic room. This will enable the technologist to have the x-ray room prepared, having all equipment and accessories readily available. Scope of practice to supply additional, unrequested positions, but the technologist should advice the physician of other projections or modifications that might enable him or her to better visualize the affected area, accurate terminology and appropriate request. The radiologic technologist must be certain to understand and if necessary, clarify the information provided, for example, an abbreviations, used and vague terms such "leg" or "arm" (versus femur or hummers)³. The technologist must also be alert to note and clarify conflicting information, for example left ankle examination, when the patient complains of his obvious injury to the right ankle. Computerized systems or department policy may require that there be appropriate and accurate diagnosis information accompanying every X-ray request form for diagnostic procedure.

Radiology request forms are essential communication tools used by doctors referring

patients for radiological investigations⁴. Its importance is highly underestimated. The Royal College of Radiologists clearly suggests that all forms should be adequately and legibly completed to avoid any misunderstanding that may arise⁴. The clinician is required to state the reason for referral as this helps radiologists to better understand the patient's condition; so that the required expertise may be utilized to proffer the necessary information to aid proper patient management. However, no standardized format for radiology request forms is available. Different organizations adopt personalized versions.

The standard is that all request forms received should contain the patient's name, age, address, telephone number, ward, clinical background, the specific question to be answered, the name and signature of referring clinician and the name of the consultant responsible for patient's care⁴.

Previous studies in literature have shown that up to 20% of radiographic examinations are clinically unhelpful⁽⁵⁾ because they were either not appropriate or the request was wrong ab initio. Filling of the request form adequately and in details is therefore paramount to helping the radiologist give less clinically unhelpful radiographic examinations and concise radiological diagnosis⁽⁵⁾. It also indirectly helps to shorten the investigation time and improve the quality of service offered to the patient. It aids the radiologist to determine the justification for radiation exposure and the conformity of these requests to the Royal College of radiologists (RCR) guidelines. Radiologists can only justify exposure when enough clinical history is given.

The aim of this study is to audit the adequacy of completion of radiology request forms received at different diagnostic center and to compare between the applied and the standard request form.

MATERIALS AND METHODS

The data of this research were collected by using two materials; the current x-ray request forms and distribution of questionnaire forms to radiologic technologist and physician.

Five governmental hospitals and one private center were involved in this study. The teaching hospitals were: military hospital, Khartoum hospital (Both emergency department and the internal department of the x-ray), Alban jaded hospital, Ibn sina specialized and academy hospital. The one private center is: Alzytona specialized hospital.

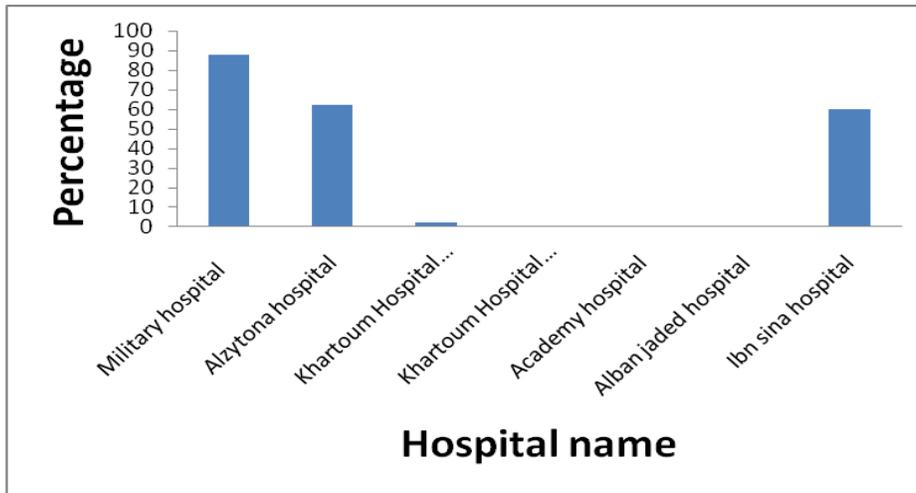
Data from request forms were obtained as following: fifty request forms were collected from each hospital and private centre. Eleven elements are evaluated from the current x-ray request forms and these elements are: patient full name, patient age, patient sex, clinical indication, patient mode, patient history, last menstrual period, clearness of the requested exam, date of examination and referring physician name.

Twenty questionnaire forms were distributed for radiologic technologist and 20 questionnaire forms were distributed for physicians and then collected from them. This research was carried out at Khartoum state from April 2010 to June 2010

RESULTS

The result of the filling of element of x-ray request form were obtained by collecting 50 request forms each hospital under study

The evaluation of filling of pt full name that obtained after collection of 50 x-ray request forms from each of the seven hospitals under study (In numbers &percentage). Military hospital 37(74%) , Alzytona hospital 27(54%), Khartoum Hospital "emergency dept." 19(38%), Khartoum Hospital "internal dept." 18(36%),Academy hospital 15(30), Alban jaded hospital 12(24) and Ibn sina hospital 47(94%)The evaluation of filling of age Military hospital40 (80%) , Alzytona hospital 33 (66%), Khartoum Hospital "emergency dept." 1(2%), Khartoum Hospital "internal dept." 0(0%),Academy hospital 0(0%), Alban jaded hospital 2(4%) and Ibn sina hospital 29(58%)



Fig(1) shows a comparison of the hospitals under study in writing sex in the X-ray request form

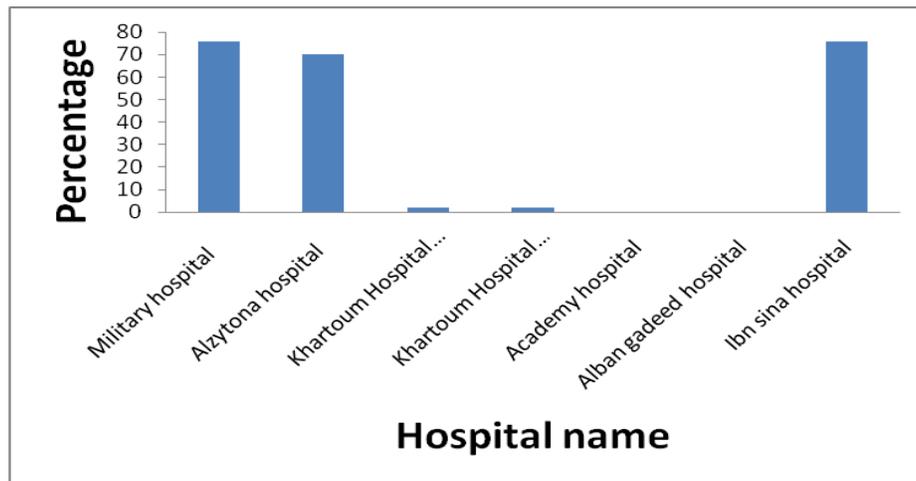


Fig (2) shows a comparison of the hospitals under study in writing clinical indication in the x-ray request form

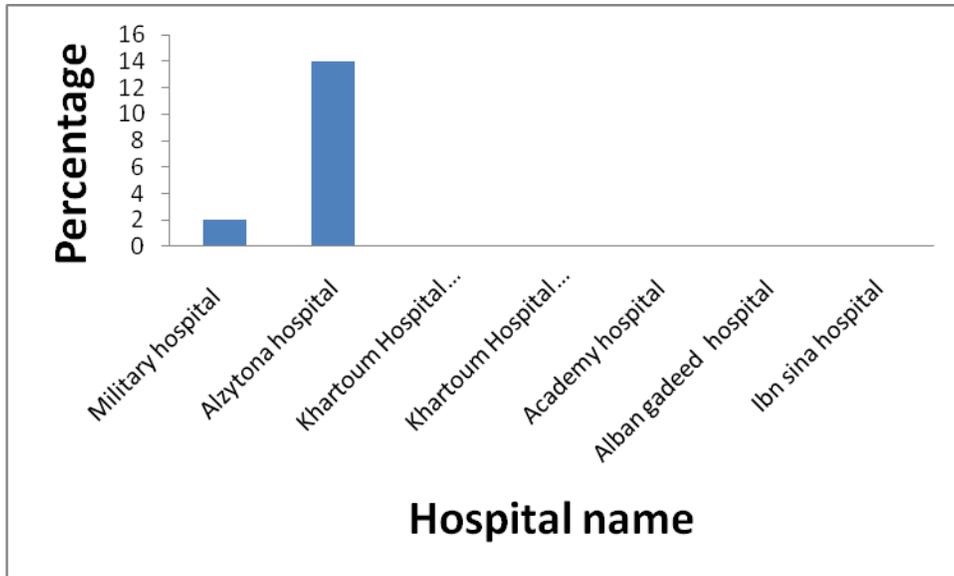


Fig (3) shows a comparison of the hospitals under study in writing patient condition in the x-ray request form

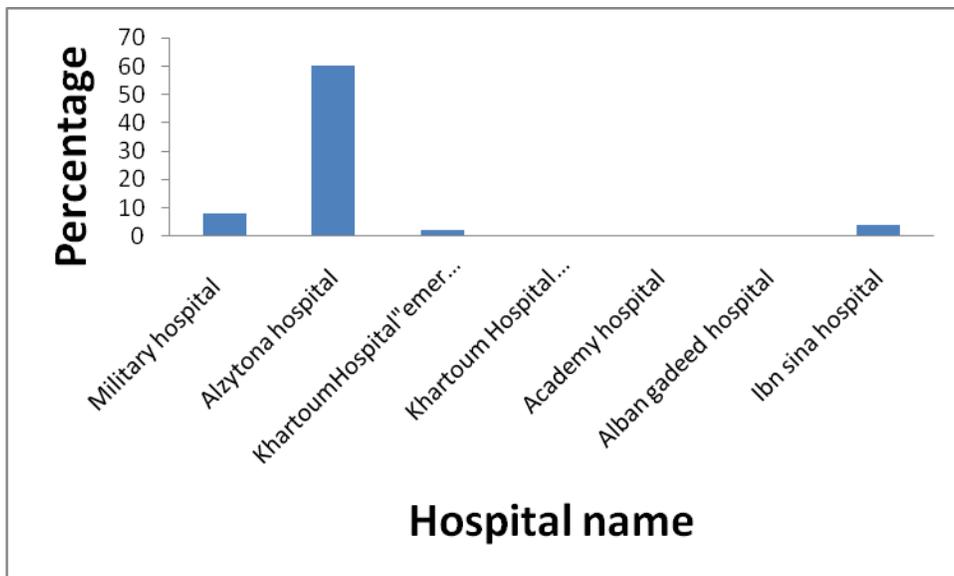


Fig (4) shows a comparison of the hospitals under study in writing patient history in the x-ray request form

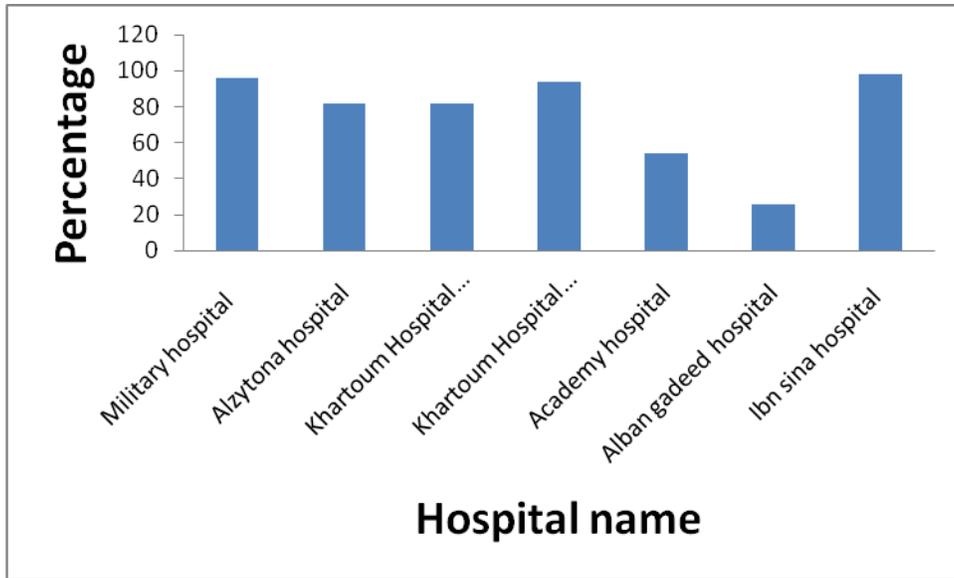


Fig (5) shows a comparison of the hospitals under study in writing date of exam in the x-ray request form

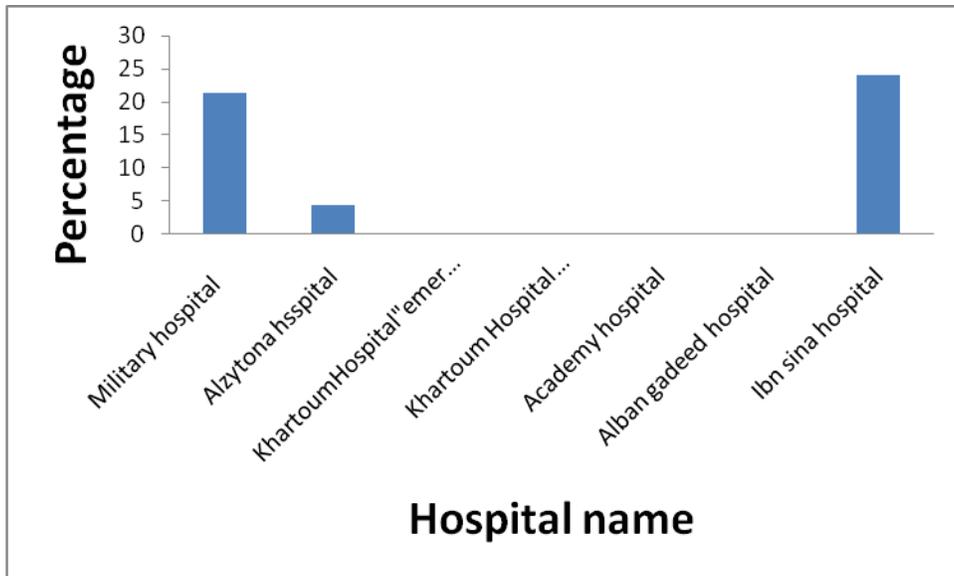


Fig (6) shows a comparison of the hospitals under study in writing LMP in the x-ray request form

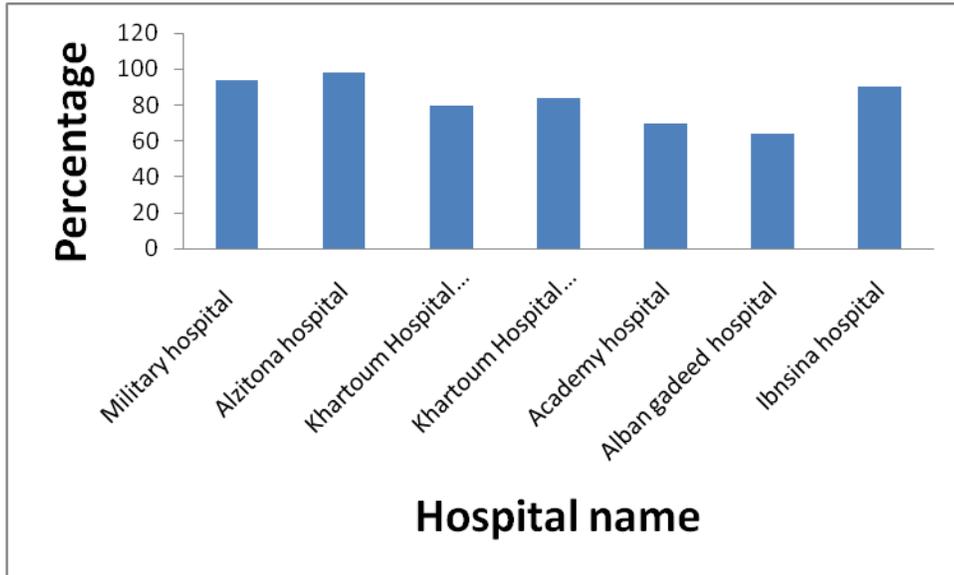


Fig (7) shows a comparison of the hospitals under study in writing clearness of the exam in the x-ray request form

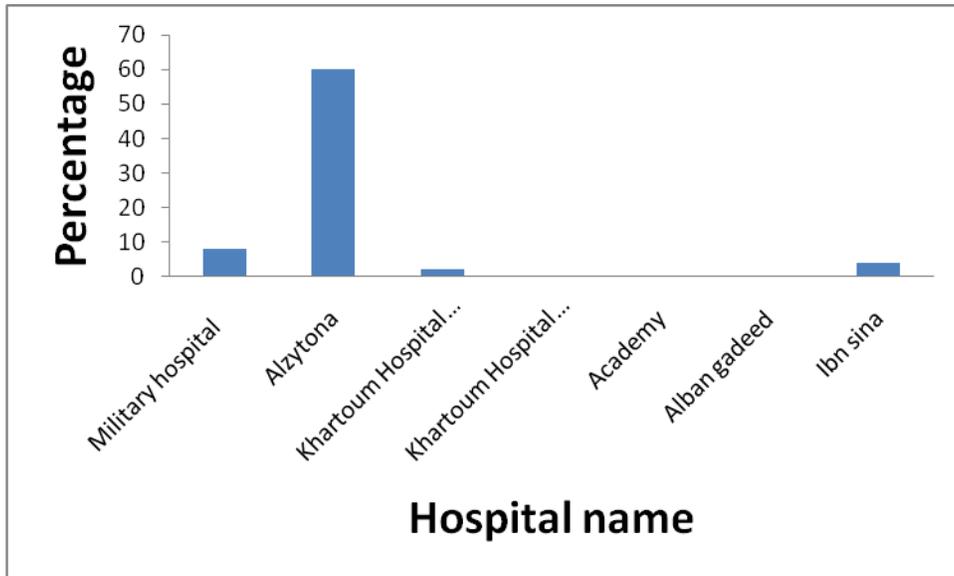


Fig (8) shows a comparison of the hospitals under study in writing previous examination in the x-ray request form

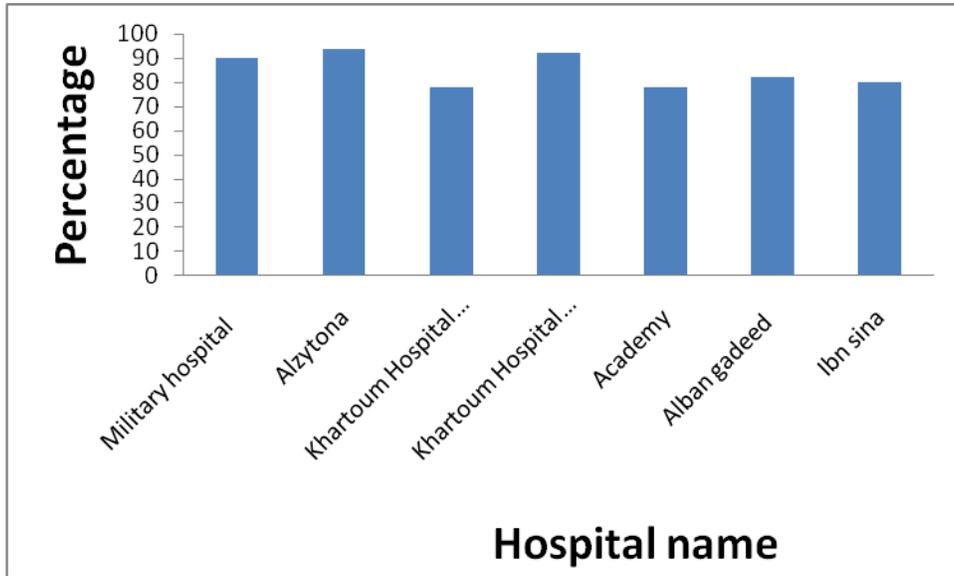


Fig (9) shows a comparison of the hospitals under study in writing physician name in the x-ray request form

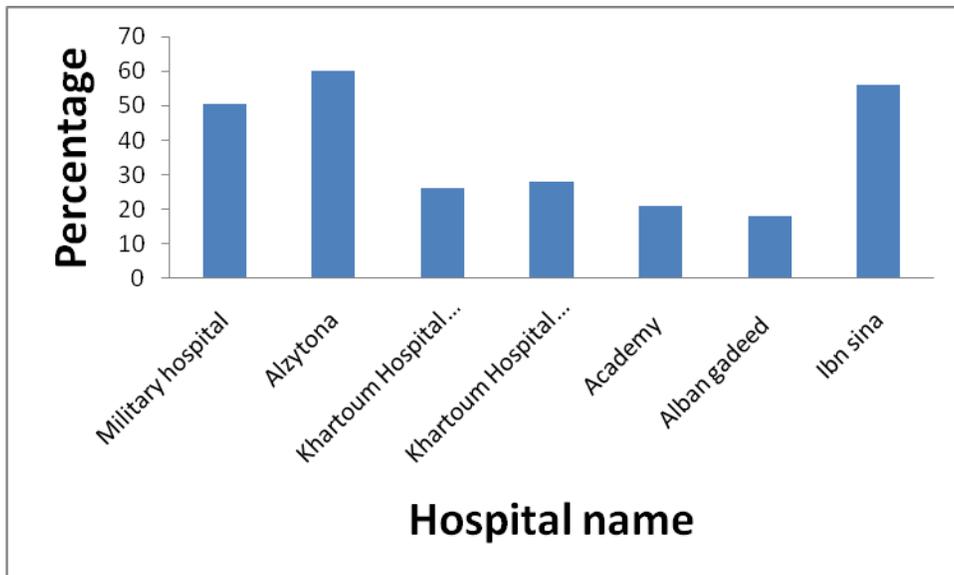


Fig (10) shows a comparison of the hospitals under study of total percentage in filling of the x-ray request form

DISCUSSION

The radiology request cards are usually the only means of communication between a clinician and the radiologist; since there is little opportunity to discuss clinical cases and their management by both parties. However, additional information can be obtained by the radiologist or radiographer directly from the patient or by contacting the clinician. The best possible service is provided to the patient only if a multidisciplinary approach is adopted by the various teams involved in the management ². It must be stated that inadequate request form filling is a worldwide problem ².

The absence of patient's demographic data, contact details and incorrect information may cause serious errors even in identifying the patient. This might sometimes warrant a recall of the patient. The same may also apply when the referring clinician cannot be contacted for further discussions about the patient. The Royal College of Radiologists suggests that all radiologists' reports should address the question posed by the referring doctors ^{2, 4} as was seen in 41% of cases in this study. This can only be achieved by increasing the awareness of referring clinicians on the need to ask specific questions and to provide full clinical details to aid radiological diagnosis. Moreover, it tends to serve as a guide for radiologists to decide the appropriate radiological investigations and to limit patient exposure to unnecessary radiation which may be harmful ⁴⁻⁶. Subsequently, the final differential diagnosis is reached by combining the radiological findings with the clinical picture. Though the individual risks are not large, the increasing exposure to radiation in the population may be a public health issue in future ⁽⁷⁾. Considering that conventional x-ray imaging procedures have high radiation dose, and thus the consequent cancer risks in adults and in children ⁽⁷⁾, therefore the radiologist is able to prevent unnecessary radiation as much as possible.

There is evidence that inadequate clinical information is associated with increased level of inaccurate report; while accurate clinical information is more likely to assist the radiologist in constructing a report which will in turn help the referring doctor with the management of the patient⁽⁸⁾. This study has shown that requests which asked specific questions through a detailed clinical history had their questions addressed and was more helpful to the clinician. However, these were much less than those which did not ask specific questions.

Similar to the findings by Depasquale and Crockford, ⁽⁴⁾ who claimed that only 4% of forms were fully filled, none of the forms in this study was fully filled. In their study, all the names and surnames were filled as opposed to the present study. Only 3 (2.1%) addresses were fully filled in this study, contrary to the findings by Depasquale and Crockford who found 77% fully filled addresses in their study⁴. This study revealed that less than 20% of the clinical history was detailed, in keeping with the findings by Depasquale and Crockford, ⁴ and only 41% asked specific questions that need to be addressed by the radiological examination in the present study. The examination was actually able to give a conclusive answer to the questions asked in all these cases. This can be compared to the findings by Nedumaran who claimed that radiological reports explicitly addressed the questions in 91.3% of hospital reports, 90% of A&E reports and 85.7% of GP reports ⁶.

Unlike Cohen et al, ⁹ who provided clinical indication in only 71% of the request forms, it was given in all cases in this study; while the clinical diagnosis was only given in 1.4% cases. Ninety seven percent of the consultant in charge was filled in, similar to the findings by Depasquale and Crockford, ⁴ and less than half (40.0%) of the medical officer's identification were legible on the forms in the present study. This is however much less than findings by Cohen et al, ⁽⁹⁾ where the medical officer's names were provided in 86% cases. In this study, approximately 24.4% of these were written as names, 15.6% as names and signature while the majority, 60% of them just signed.

All the forms had abbreviations especially in the fields of the wards/clinic, the age and clinical diagnosis with relevant details. Most abbreviations used were often not universally accepted ones, such as SOL(space occupying lesion), CVA (cerebrovascular accident), MVA (we do not know what this means), MCA (middle cerebral artery), CVD (chronic vascular disease), CLD (chronic liver disease), PLCC (Primary liver cell carcinoma), AVM (arteriovenous malformation), NPC (nasopharyngeal carcinoma), TIA (transient ischemic attack), CN (cranial nerve), HT (hypertension), CA (carcinoma), RIF (right iliac fossa), LOC (we do not know what this means), Outp_x (outpatient), Dz (disease), A (adult), R (right), L (left), Lt (left), RE (right eye), R/o (rule out), ²⁰ (secondary), Paed. (pediatrics), Surg. (surgery), ? (query), # (fracture).

From result five governmental hospitals and one private center were involved in this study. The governmental hospitals were: military hospital, Khartoum hospital (Both emergency department and the internal department of the x-ray), Alban gadeed hospital, Ibn sina hospital, Academy hospital and Alzytona hospital and their results were 74%,38%,36%,24%,94%,30% and 54% respectively. And this indicated that Alzytona specialized hospital provide the highest percentage (94%) and Alban gadeed hospital provide the lowest percentage, filling of pt information (age) were: 80%, 2%, 0%, 4%, 58%, This informs that military hospital and Ibn sina hospital provide the highest percentage (76%) and Academy and Alban gadeed has lowest percentage (0%).

This is higher that provided by the both previous studies, (quality of radiology requisition) and radiological examination request forms whose results was 71%, And this showed that when military and Ibn sina hospitals compared with the previous studies in clinical indications, military hospital and Ibn sina specialized hospital (76%) better than M.Cohen et al (2006) which scored 71% in clinical indication , (pt condition) all hospitals ignore the filling of pt condition on the request form. , (pt history) 8%, 2%, 0%, 0%4%, 0% and 60% respectively. This indicated that alzytona hospital provides the highest percentage (60%) but other hospitals ignore the filling of pt history on the x-ray request form.,date of exam on the x-ray request form 96%, 82%, 94%, 26%, 98%, 54%and 82% respectively. This indicated that Ibn sina hospital provided the highest percentage (98%) and Alban gadeed provide the lowest percentage (26%) in filling date of the exam on the x-ray request form.

last menstrual period (LMP) 21.42%, 0%, 0%, 0%, 24%, 0% and 4.34% respectively. This indicated that most hospitals ignore providing of LMP on the request forms. ,clearness of the requested examination 94%, 80%, 84%, 64%, 90%, 70%and98% respectively. This indicated that all hospitals provide request forms with relatively clear requested examination,The result of providing of previous examination 8%, 2%, 0%, 0%, 4%, 0%and60% respectively. And this indicated that most hospitals did not state clearly the information about the previous x-ray exams.,physician name on the request form 90%, 78%, 92%, 82%, 80%, 78%and94% respectively. This indicated all hospitals provide physician name on the x-ray request forms.

0% and 66% respectively. This indicated that military hospital provided the highest percentage and (80%) and Khartoum hospital (emergency) and Academy hospital provided the lowest percentage 0%. , (sex) 88%,2%,0%,0%,60%,0%and 62% respectively. This indicated that in exception to Military hospital providing highest percentage of pt sex on the request form (88%) and Khartoum (internal depart), Alban gadeed and Academy hospitals has lowest percentages (0%). (clinical indication) 76%,2%,2%,0%,76%, 0% and 70% respectively.

The total percentage of filling of x-ray request forms element: the highest percentage is found at Alzytona specialized hospital (60.03%) and the lowest percentage is found at Alban jaded hospital (18.18%). These indicated that Alban gadeed shows the lowest percentage that needs quick processing.

The applied x-ray request from in the hospitals under study with standard x-ray request form regarding the elements which suppose to be found on the x-ray request form, there was a shortage of some elements on the applied x-ray request forms.

The percentage of similarity of standard elements in the hospitals (Military, Alzytona, Khartoum emergency dept, Khartoum internal dept, Academy, Alban gadeed and Ibn sina) were 80%,100%,60%,60%,30%,30% and 100% respectively .

The results of questionnaire of physician: it found that the applied x-ray request form was not available approved by 50% of physician. Also it found that the pt age, sex and clinical indication was very important to be written in the x-ray request form for optimizing the diagnosis of the image approved by 70% of physician.

The results of questionnaire of technologists: it found that the appropriate patient data was not provided in the x-ray request forms approved by 60% of technologists. We asked the technologists about the return back the patient with request incomplete data, 50% of them not return back, 30% return back and remain sometime.

Also it found that the write indication and clinical history if not found in the x-ray request forms affected on diagnosis of radiographs approved by 95% of technologist. 70% of technologists agree about the written the name or signature on request forms.

CONCLUSION

In conclusion the complete filling of request form elements reduce the repetition and unnecessary patient dose , Providing patient history and clinical indication is of vital importance; regarding to the answers provided by the technologists and physician questionnaire form , Most hospitals under study ignore the filling of last menstrual period [LMP] on the x-ray request form regarding to the result obtained from the 50 request forms which were collected from the hospitals under study, Filling of x-ray request form is better in the internal department that of the emergency departments. This formation is providing by the result of collected request forms , Some of applied request forms are well designed but they are not properly filled, other not available as information obtained from the questionnaire forms, Also it found that the x-ray request form in Alzytona hospital and Ibn sina hospital which scored 100% of elements were typical to the standard x-ray request form. The study recommended that the Ministry of Health should provide well designed x-ray request formulas that ease its filling. Each x-ray request form that transferred to the radiology department must be completed legibly with relevant patient data, clinical information, patient symptoms and relevant past history to ensure that the request can be clinically justified. As an alternative, a computerized system with certain software that did not allow any incomplete request form to be sent can be used. As well as The radiologic technologist should responsible to modify each x-ray request form prior the examination. Each department should evaluate the x-ray request form that transferred to it; each 6 months at least, to know whether the request justify the dose. The radiologic technologist should print his name or signature on the x-ray request form. By applying this points the health service will be improved.

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