

Completeness of Radiology Request Forms at Hawassa University Comprehensive Specialized Hospital, Sidama Region, Ethiopia

Andargie Baye Abegaz^{1*} and Emmet Kebede Worassa²

¹Department of Medical Radiology Technology, College of Medicine and Health Science, Hawassa University, Hawassa, Ethiopia

²Department of Biomedical Engineering, College of Medicine and Health Science, Hawassa University, Hawassa, Ethiopia

*Corresponding Author

Andargie Baye Abegaz, Department of Medical Radiology Technology, College of Medicine and Health Science, Hawassa University, Hawassa, Ethiopia.

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Abstract

Background

Radiology request forms are essential communication tools between the physician and the radiologist. Complete, accurate and justified radiological examination requests are prerequisite to radiological exposures. However, global research showed evidence of high numbers of incomplete and inaccurate requests as well as that up to 77% radiological exposures are unjustified. This research is designed to measure the completeness, of Computed Tomography (CT), Magnetic resonance imaging (MRI), Ultrasound and X-ray request forms sent from different units to departments of radiology at Hawassa University Comprehensive Specialized Hospital (HUCSH). This research had positive effects on optimization of radiation protection.

Method

Hospital based cross sectional study design was conducted to assess the completeness of Radiology request forms at the radiology department of HUCSH. A review of all consecutive request forms received during data collection time (CT Scan, MRI, and Ultrasound) and for x-ray by using systematic random sampling method to assess the completeness of filling of the forms, details of clinical information, previous exposure and information about the requesting physician. Probability sampling method (stratified and systematic random sampling) used to select 385 request forms over a period of one month.

Result

This study generally demonstrated many of the data on the request form were incompletely filled. Patient's full name, Age, Gender, Requested anatomic body part, MRN were the highest filled data in all the requests with a frequency of 98.4%, 98.2%, 97.4%, 99.7%, 96.1%. In contrary, the least filled data were Previous imaging history (5/385 (1.3%)), Address (6/385 (1.6%)), History of previous IV contrast reaction (22/385 (5.7%)), Relevant lab information ((23/385) (6%)) and History of allergy (94/385 (24.4%)), had low filling rate for all modalities.

Conclusion

The completeness of the Radiology request forms was substandard and it should be improved.

Keywords: CT Scan, MRI, Ultrasound, X-Ray

1. Introduction

Radiological Request Forms (RRF) is template forms whose form fields define minimum radiology request information required by a radiology department to review the justification of the request. It is essential communication tool between the clinician and the radiologist/radiographer to ensures that the correct procedure is performed on the correct patient. These request forms contain the

patients' biodata and clinical background, which are very helpful in the overall interpretation of radiologic images and give optimal and relevant reports [1]. Accordingly, their complete, proper and adequate filling of the columns of information on the request form with legible handwriting are hence, of paramount importance for providing optimal and appropriate radiologic investigation, to give appropriate diagnosis/differential diagnosis and avoid unnecessary

radiologic procedures and radiation exposure [3]. Most of these parameters also fall under the core of International Patient Safety Goals (IPSGs) [2].

There is no unique standardized format for radiology request forms available. However, it is mandatory that all request forms prescribed should contain the patient’s name, age, address, MRN, telephone number, ward, clinical background, imaging modality requested, the specific question to be answered, the name and signature of referring clinician and the name of the consultant responsible for patient’s care[1]. A study undertaken in Pakistan at the department of radiology of Khyber teaching hospital, shows forms the total of 444 requests, it was revealed that clinical history of the patient was provided in 79.5%, probable clinical diagnosis was mentioned in 30%, and specific question was asked in 35% and non-standardized abbreviations were used in 6.5%. Also, history of allergy was missing in all requests. In a research done at TASH on the completeness of ultrasound requests forms on a total of 218 requests. It revealed that 100% of the request had patients’ name, 97.7% had father’ name, 77.7 had patients’ age and 75.2% had patient’s gender specifications. The patients, MRN were specified only in 86.7%; detail clinical data were given in 84.4% of the cases. Requesting physician name was mentioned in 83.3% of the requests while only 3.7% and 2.8% had filled the column for the relevant laboratory data and previous exposure history, respectively[3].

The importance of complete and accurate Radiology request forms cannot be overstated, as it reduces the number of unnecessary radiographic examinations performed, prevents unnecessary delays, and facilitates concise radiographic diagnosis. IAEA reported high global number (up to 77%) of unjustified radiological examination which is most of the time occurred due to incomplete request forms[7]. Previous reports have shown that up to 20% of radiographic examinations are clinically useless due to inappropriate or incorrect request [6]. This study aimed to assess the completeness of RRFs at HUCSH in CT scan, MRI, ultrasound and X-ray RRFs and to the best of our knowledge, no such study has been conducted at HUSCH.

2. Method and Materials

The study was conducted in HUSCH, Sidama, Ethiopia at the

department of radiology. It is estimated that about 50-60 x-ray, 20-30 CT scan, 30-40 US and 15-20 MRI are done each day at the department. All CT, MRI, Ultrasound and X-ray scan request forms registered from August 21, 2023 to September 19, 2023 that fulfilled the inclusion and exclusion criteria were reviewed at the radiology department of HUCSH. Stratified probability sampling and systematic random sampling method was used in the study. The sample size was calculated by using single population proportion formula by using proportion of writing clinical data on radiology request form. It was determined by calculating sampling interval (K) for systematic random sampling. The sampling formula used in this study is described in equation.

$$\text{Necessary sample size} = \frac{(Z - \text{score})^2 * (\text{standard deviation}) * (1 - \text{standard deviation})}{(\text{margin of error})^2}$$

A confidence level of 95% with a standard deviation of 0.5, and a confidence interval (margin of error) of $\pm 5\%$ was chosen.

2.1. Inclusion and Exclusion Criteria

All CT, MRI, US and X-ray scan request forms from different departments and units of HUCSH was included. However, all CT, MRI, ULTRAOUND and X-ray scan request forms referred from other institution to our department and radiology requests written in other request forms like lab request, pharmacy requests were excluded from the study.

2.2. Data Collection

A total of 385 RRF that fulfil the inclusion criteria was kept for further study. From those data, a total of 100 RRF was obtained for each x-ray, CT-scan, MRI and 85 data were found for ultrasound. The request collected by kobo toolbox in digital way.

3. Result

A) X-Ray RRF Demographic Data

From the data that assessed during data collection period 99% of X-ray data filled patient name, anatomic body part and MRN. The next highest complete filling rate achieved by the date of the examination requested were Age, Gender of the patient, Date of examination requested which had the filling rate of 98%, 98% and 92% respectively. The detailed demographic data with additional RRF lists is described in table1.

No	Demographic data and additional information	Expected standards	Completely filled by %
1	Patient’s full name	100%	99
2	Age	100%	98
3	Gender	100%	98
4	Address	100%	0
5	Requested anatomic body part	100%	99
6	Referring unit department	100%	41
7	MRN	100%	99
8	Date of examination requested	100%	92
9	Relevant Clinical data	100%	69
10	Relevant lab information	100%	0

11	Requesting physician	100%	70
12	Requesting physician's signature	100%	58
13	History of allergy	100%	17
14	History of previous IV contrast reaction	100%	2
15	Previous imaging history	100%	1

Table 1: Demographic Data and Additional Information for X-Ray

B) CT-scan RRF Demographic Data

For CT-scan anatomic body part completely filled 100% patient name, Age, Gender, MRN, requesting physician and requesting physician's signature filled were 95%, 99%, 96%, 96%, 93% and 93% respectively. For MRI patient name and anatomic body

part completely filled 100% the next highest filling rate achieved was Age, Gender, MRN with a percentage of 98%, 97%, and 92% respectively. The detailed result of CT scan RRFs filled is described in the table 2.

No	Demographic data and additional information	Expected standards	Completely filled by %
1	Patient's full name	100%	95
2	Age	100%	99
3	Gender	100%	96
4	Address	100%	4
5	Requested anatomic body part	100%	100
6	Referring unit department	100%	42
7	MRN	100%	96
8	Date of examination requested	100%	80
9	Relevant Clinical data	100%	78
10	Relevant lab information	100%	12
11	Requesting physician	100%	93
12	Requesting physician's signature	100%	93
13	History of allergy	100%	18
14	History of previous IV contrast reaction	100%	9
15	Previous imaging history	100%	1

Table 2: Demographic Data and Additional Information for CT-Scan

C) MRI RRF Demographic Data

For MRI patient name and anatomic body part completely filled 100% the next highest filling rate achieved was Age, Gender,

MRN with a percentage of 98%, 97%, and 92% respectively. The detailed result of MRI scan RRFs filled is described in the table 2.

No	Demographic data and additional information	Expected standards	Completely filled by %
1	Patient's full name	100%	100
2	Age	100%	98
3	Gender	100%	97
4	Address	100%	1
5	Requested anatomic body part	100%	100
6	Referring unit department	100%	31
7	MRN	100%	92
8	Date of examination requested	100%	72
9	Relevant Clinical data	100%	84
10	Relevant lab information	100%	9
11	Requesting physician	100%	80
12	Requesting physician's signature	100%	85

13	History of allergy	100%	24
14	History of previous IV contrast reaction	100%	0
15	Previous imaging history	100%	3

Table 3: Demographic Data and Additional Information for MRI

D) Ultrasound RRF Demographic Data

For ultrasound anatomic body part MRN, and patient name filled 99%, Age, Gender, requesting physician and requesting physician's

signature filled were 98%, 98%, 70%, and 58% respectively. The detailed result of ultrasound RRFs filled is described in the table 4.

No	Demographic data and additional information	Expected standards	Completely filled by %
1	Patient's full name	100%	99
2	Age	100%	98
3	Gender	100%	98
4	Address	100%	0
5	Requested anatomic body part	100%	99
6	Referring unit department	100%	41
7	MRN	100%	99
8	Date of examination requested	100%	92
9	Relevant Clinical data	100%	69
10	Relevant lab information	100%	0
11	Requesting physician	100%	70
12	Requesting physician's signature	100%	58
13	History of allergy	100%	17
14	History of previous IV contrast reaction	100%	2
15	Previous imaging history	100%	1

Table 4: Demographic Data and Additional Information for Ultrasound

The Previous imaging history (5/385(1.3%)), Address (6/385(1.6%)), History of previous IV contrast reaction (22/385(5.7%)), Relevant lab information ((23/385) (6%)) and History of allergy (94/385(24.4%)), had low filling rate for all modalities. Table 5 describes the obtained result from the total 358 data sets in detail.

No	Demographic data and additional information	Expected standards	Completely filled by %	Incompletely filled frequency
1	Patient's full name	100%	379(98.4%)	6(1.6%)
2	Age	100%	378(98.2%)	7(1.8%)
3	Gender	100%	375(97.4%)	10(2.6%)
4	Address	100%	6(1.6%)	379(98.4%)
5	Requested anatomic body part	100%	384(99.7%)	1(0.3%)
6	Referring unit department	100%	147(38. %)	238(61.8%)
7	MRN	100%	370(96.1%)	15(3.9%)
8	Date of examination requested	100%	310(80.5%)	75(19.5%)
9	Relevant Clinical data	100%	306(79.5%)	79(20.5%)
10	Relevant lab information	100%	23(6%)	362(94%)
11	Requesting physician	100%	303(78.7%)	82(21.3%)
12	Requesting physician's signature	100%	288(74.8)	97(25.2%)
13	History of allergy	100%	94(24.4%)	291(75.6%)
14	History of previous IV contrast reaction	100%	22(5.7%)	363(94.3%)
15	Previous imaging history	100%	5(1.3%)	380(98.7%)

Table 5: Demographic Data and Additional Information for all Modality

4. Discussion

Physicians often need the help of radiological investigations and radiologists to settle patients' diagnosis and contemplate proper, targeted, efficient and cost-effective patient management. As it is always said optimal patient care can be achieved if team approach between different departments is established in the health care centers. Unfortunately, this is not usually the case as there is little opportunity to discuss cases among the concerned departments. And radiological request forms are usually the only means of communication between a radiologist and a clinician. Hence, complete and proper filling of radiological request forms should be given due emphasis in order to get best results in terms of accurate radiologic diagnosis or differential diagnosis and to avoid unnecessary medical care delay or management, cost and radiation exposure.

In our study the demographic data and clinical information that is supposed to guide the radiologist on some disease condition regarding reporting of the radiological investigation is defective and this will pose difficulties for radiologists while trying to write the report. This study demonstrated 99.7% filling rate of Requested anatomic body part, Patient's full name (98.4%), Age (98.2%), Gender (97.4%) and MRN (96.1%) have highest filling rate recorded. However, previous imaging history least completed column (5/385) demonstrating lesser rate to (1.3%). The significance of knowing the name of the referring doctors lies on when further clinical information is required to discuss with and inform alternative and better imaging modalities or if there is a finding revealing emergency/life threatening condition requiring to intervene urgently.

This finding is comparable with one study at Black lion hospital on audit of ultrasound requests on 2014, where 84.4 % of referring physicians mentioned clinical data on RRFs [3]. But higher than audit of CT request at the same institution on 2017, where only 46% of referring physicians write relevant clinical data [7]. R Akinola et al, at Lagos State University Teaching Hospital show almost all referring physicians, 99.3% mention clinical information on RRFs which is higher than our study. Chukuemeka Agi PJA et al, 2015 also showed better practice of writing clinical data than this study where 91.7% of physicians write and this study showed 75.5% filled relevant clinical data.

5. Conclusion

The findings of this study showed that radiological investigation forms are still incompletely and inadequately filled. Our study indicated most of demographic data and additional information is under expected standard. This will have effect on the quality and the overall service provided by the radiologist and may have effect sometimes on clinical decisions and outcomes. There is need to encourage the managing clinician to complete and adequately fill all the required information into the request form and appreciate its importance to patient's management. This can be achieved by increasing the awareness of referring clinicians through repeated continue medical education in conjunction with the radiologists and the need for a regular clinical-radiological meeting.

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