Journal of Health Informatics in Developing Countries

www.jhidc.org
Vol. 6 No. 1, 2012

Submitted: September 14, 2011 *Accepted: February 28, 2012*

Development of the Emergency Room Patient Record in Theodor Bilharz Research Institute Hospital

Mona EL-LAWENDI[a], Afaf EL-AYYAT[b], Mouchira ZAYED[a], Moaz ABDELWADOUD[b,1]

[a] *Public Health Department, Faculty of Medicine, Cairo University, Egypt*
[b] *Public Health Department, Theodor Bilharz Research Institute, Egypt*

Abstract. The primary aim of this study was to improve the quality of medical care in Theodor Bilharz Research Institute Hospital (TBRIH) through development of the most appropriate emergency room patient record. A hospital based interventional study was conducted in the period from October 2009 to May 2011 in TBRIH. The study sample is purposive for both the provisional and final record as well as the whole health team. The study involved situation analysis of the emergency room record cycle, assessment of the provisional record structure and quality, needs assessment of the health team and finally implementation and assessment of the final record form. As for the provisional record, data quality showed insufficient conciseness, where unclear signature forms, spelling mistakes and bad hand writing were common. Needs assessment of health team highlighted the need for: more spaces, classification of items, use of checklists with preference to make physicians responsible for diagnosis coding and training to improve documentation was recommended. Finally, a trial form was modified according to health team needs and national standards in order to develop the final form, where the newly added items, sub classifications as well as checklists showed obvious success. To conclude, the use of structured template design which was modified according to national standards and data quality was the key to ensure the applicability and convenience of the final record form.

Keywords. Emergency room; medical records; data quality; clinical coding.

1. Introduction

Emergency service requires immediate care to sustain life or to prevent critical consequences, so adequate information dealing with life and death situations must be readily available. Proper management would occur only when complete information about the patient had been commonly understood among members of health team; the correct and complete record could help provide such information [1].

A comprehensive form design is mandatory to assist in the efficient gathering of data and dissemination of information. In designing information systems for the emergency room, it should be standardized to achieve its required function in an optimum form through applying national and international standards of emergency room records. The quality of data in the emergency room medical record is the corner stone for a successful healthcare quality improvement process [2].

[1] Corresponding Author: Moaz Abdelwadoud, Associate Researcher, Public Health Department, Theodor Bilharz Research Institute, Giza, Egypt. E- mail: drmoaz@windowslive.com

Despite the importance of medical records to high quality and efficient care, management of medical records, particularly in developing countries, has not been a priority. Medical records in developing countries are generally inadequately supported and poorly managed, whereas in many high-income countries the medical records function is supported by extensive use of information technology [3].

According to the Egyptian Healthcare Accreditation Organization standards for hospitals, the emergency room medical record should respect specific criteria. There should be a medical record with a unique identifier for each patient; each medical record contains sufficient information to: identify the patient, including names, address and date of birth. The emergency room record should promote continuity of care, support diagnosis, justify the treatment and document the course and results of treatment. Healthcare may be fragmented if patients attend multiple sectors of the health system. The result may be "information gaps" if clinical information gathered by one healthcare provider is not communicated to others involved in a patient's care. Patients who present to emergency departments are especially susceptible to having information gaps. They usually are acutely ill, report quickly to the hospital at irregular hours. Thus continuity of care is markedly affected and as a result quality of medical care in the emergency room will be decreased [4,5].

To conclude, as a part of each hospital performance improvement activities, the hospital should regularly assess patient clinical record content and form as well as the completeness of patient clinical records. The previous facts caught our attention to the importance of development of emergency room medical record form to improve quality of medical care in Theodor Bilharz Research Institute Hospital. Therefore, this study was conducted to set a practical model for the required implementation steps to enhance the appropriate use for the emergency medical records in developing countries and its impact on the quality of clinical care .

2. Methods

The study was a hospital based interventional study, aiming at implementation of the most appropriate emergency room patient record in TBRIH. The study was conducted over a time period from October 2009 to May 2011.

The study sample included the following: A purposive sample from the provisional emergency room patient medical record, in which the highest month in flow in 2009 was collected with a total of 368 records. A whole sample of all health team dealing with the record during the study period including: (18 Physicians, 10 registry clerks, one data entry clerk, one medical record clerk). A purposive sample of the final record after two months of actual implementation with a total of 497 records.

Study tools included observation technique, non-structured interviews, observation checklists and questionnaires. Data was collected and computerized using Microsoft Excel 2010 then analyzed using SPSS 18 win package.

3. Results

a. Situational analysis of the emergency room record in Theodor Bilharz Research Institute Hospital:

The emergency room record is in continuation with the outpatient record; both services are complementary in provision. Upon arrival, the registry clerk registers the personal data in the emergency room record. After registration the emergency physician assesses the patient's situation and registers all clinical data in the emergency room record. Regarding admission, the specialized physician registers the clinical data in the admission sheet.

b. Assessment of the provisional emergency room patient record

Regarding the structure of administrative data, the time of discharge was absent, while the clinical data showed that physician's signature, title and date were also absent. The hospital no. was not properly used as "unique identifier" due to lack of efficient retrieval system. Concerning completeness of clinical data, the physical findings and physician's signature were the most complete items to be registered comprising 96.2 % of the records each. Instructions to the patient regarding medications and diet were least frequent in registration and were missing in 92.4 % and 96.5 % respectively. Regarding clarity, unclear signature, spelling mistakes and bad hand writing were obvious.

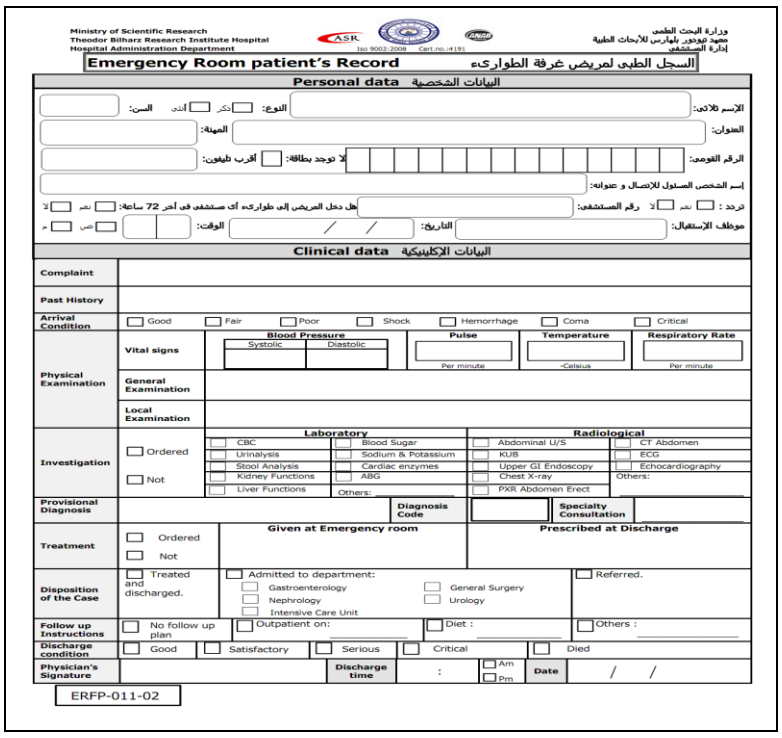
The demographic characteristics of patients revealed that males showed higher percentage than females (54.9% and 45.1% respectively). Elderly people were the most common; age group from 50-60 was the common among both males and females (24.5% and 25% of total age groups respectively. The nearest areas to the hospital were the drainage areas for most of cases; Warrak (the district where the hospital exists) was the most common in residence (31.5%) followed by the nearest areas in respective manner. Morbidity characteristics showed that most of patients were found to be visiting the emergency once per month (94.84%). The most common arrival condition registered by physicians was "Fair" comprising 32.34% of patients followed by good 30.2 % and poor 16.6 % respectively, meanwhile hemorrhage represented 8.2 % and coma 7.1 % of cases. Treated and discharged patients were the most common representing about half of the cases (49.46 %). Admitted cases represented about one third of the cases (31.52%). Satisfactory condition on discharge registered by physicians was the most common by 34.24% followed by good condition 15.8 %. The most frequent diagnosis was hematemesis (12.3 %) followed by renal colic (8.8 %) then hepatic encephalopathy with 8.2% of cases.

c. Needs assessments of health team filling the provisional record

The majority (83.3%) of health team found the provisional emergency room record items clear while (60%) of health team preferred checklists. Poor data quality included incompleteness of data, where lack of time accounted for (43.3%), while 80% of health team agreed on the need for training on registration. The majority of the physicians (66.7%) preferred to register the code from a list in the emergency room.

d. Implementation of the final emergency room patient record

The suggested trial was assessed through a questionnaire done with the whole health team as well as the Quality Management Committee Supervisor and the Supervisor of the Medical records unit. Then the final record form was designed and emergency room diagnosis codes list was added to guide physicians.



Ministry of Scientific Research
Theodor Bilharz Research Institute Hospital
Hospital Administration Department

وزارة البحث العلمي
معهد تيودور بلهارس للأبحاث الطبية
إدارة المستشفى

Emergency Room patient's Record السجل الطبي لمريض غرفة الطوارىء

Personal data البيانات الشخصية

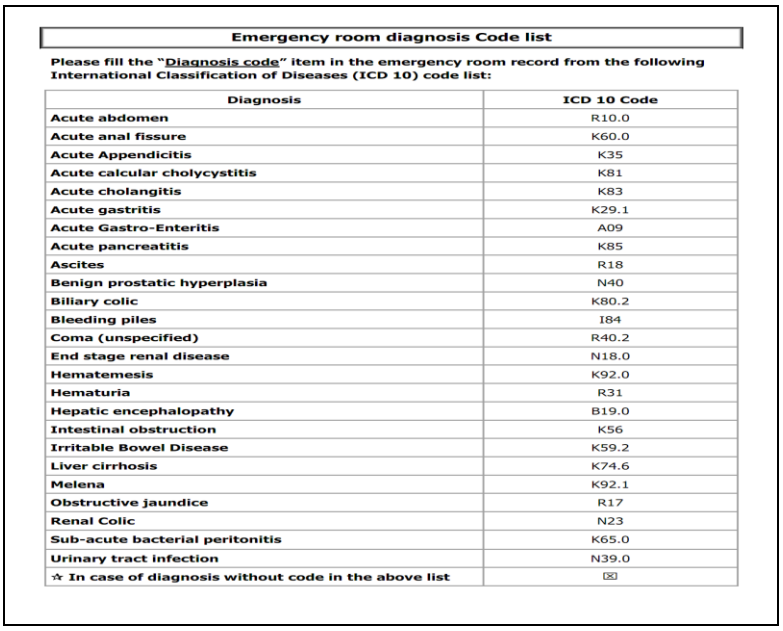
الإسم ثلاثي: | النوع: ذكر أنثى | السن:
العنوان:
المهنة: | الرقم القومي: لا توجد بطاقة | أقرب تليفون:
إسم الشخص المسئول للاتصال و عنوانه:
تردد : نعم لا | رقم المستشفى: | هل دخل المريض إلى طوارىء أى مستشفى فى آخر 72 ساعة: نعم لا
موظف الإستقبال: | التاريخ: / / | الوقت: ص م

Clinical data البيانات الإكلينيكية

Complaint						
Past History						
Arrival Condition	☐ Good ☐ Fair ☐ Poor ☐ Shock ☐ Hemorrhage ☐ Coma ☐ Critical					
Physical Examination	**Vital signs**	**Blood Pressure** Systolic / Diastolic	**Pulse** Per minute	**Temperature** -Celsius	**Respiratory Rate** Per minute	
	General Examination					
	Local Examination					
Investigation	☐ Ordered ☐ Not	**Laboratory**: ☐ CBC, ☐ Blood Sugar, ☐ Urinalysis, ☐ Sodium & Potassium, ☐ Stool Analysis, ☐ Cardiac enzymes, ☐ Kidney Functions, ☐ ABG, ☐ Liver Functions, Others:		**Radiological**: ☐ Abdominal U/S, ☐ CT Abdomen, ☐ KUB, ☐ ECG, ☐ Upper GI Endoscopy, ☐ Echocardiography, ☐ Chest X-ray, Others:, ☐ PXR Abdomen Erect		
Provisional Diagnosis		**Diagnosis Code**		**Specialty Consultation**		
Treatment	☐ Ordered ☐ Not	**Given at Emergency room**		**Prescribed at Discharge**		
Disposition of the Case	☐ Treated and discharged.	☐ Admitted to department: ☐ Gastroenterology, ☐ General Surgery, ☐ Nephrology, ☐ Urology, ☐ Intensive Care Unit		☐ Referred.		
Follow up Instructions	☐ No follow up plan	☐ Outpatient on:	☐ Diet :	☐ Others :		
Discharge condition	☐ Good	☐ Satisfactory	☐ Serious	☐ Critical	☐ Died	
Physician's Signature		**Discharge time** :	☐ Am ☐ Pm	**Date** / /		

ERFP-011-02

Figure 1. Final emergency room patient record.



Emergency room diagnosis Code list

Please fill the "Diagnosis code" item in the emergency room record from the following International Classification of Diseases (ICD 10) code list:

Diagnosis	ICD 10 Code
Acute abdomen	R10.0
Acute anal fissure	K60.0
Acute Appendicitis	K35
Acute calcular cholycystitis	K81
Acute cholangitis	K83
Acute gastritis	K29.1
Acute Gastro-Enteritis	A09
Acute pancreatitis	K85
Ascites	R18
Benign prostatic hyperplasia	N40
Biliary colic	K80.2
Bleeding piles	I84
Coma (unspecified)	R40.2
End stage renal disease	N18.0
Hematemesis	K92.0
Hematuria	R31
Hepatic encephalopathy	B19.0
Intestinal obstruction	K56
Irritable Bowel Disease	K59.2
Liver cirrhosis	K74.6
Melena	K92.1
Obstructive jaundice	R17
Renal Colic	N23
Sub-acute bacterial peritonitis	K65.0
Urinary tract infection	N39.0
☆ In case of diagnosis without code in the above list	☒

Figure 2. Emergency Room Diagnosis Code List.

e. Assessment of the final emergency room patient record

The final record form was redesigned after reforming the trial form with respect to the previous results of the suggested trial questionnaire, the new "Emergency room diagnosis codes list" form was added to the final record to guide the physicians in registering the diagnosis code of the most common diagnoses according to ICD 10. The sequence of items in the final record was not changed dramatically from that of the provisional record form to avoid inconvenience, the sequence seemed to be logic and easy in registration. The health team responsible for registration filled the items in the same order they asked the patients during their work. There were no unclear items in the record; health team could understand the items and the required data to be entered easily. Documentation showed that the box design was appropriate; the data registered were limited to the spaces present in the final record form with no overlapping with the neighboring spaces. Checklists for investigations and department of admission were properly registered in spite of poor completeness noticed.

Table (1): Summary table for the main differences between the provisional and the final emergency room record structure:

Point of comparison	Provisional record	Final record
1- Sequence of items	- Only 10% of health team found the sequence not properly done.	- No dramatic changes were done to the sequence to avoid inconvenience.
2- Clarity of items	- 16.7% of health team found unclear items. - The cause was related to need of sub classification of items.	- No unclear items were found. - Sub classification of items was done.

Point of comparison	Provisional record	Final record
3- Spacing	- Free space items. - Half of health team found the spacing insufficient.	- Box design was done. - Data registered were limited to the spaces present in the final record form with no overlapping with the neighboring spaces
4- Checklists	- Absent. - 60% of health team preferred checklists.	- Added to investigation and department of admission items (see below).
5- National identity no.	- Absent	- Added with check box for unavailability
6- Previous care	- Absent	- Added
7- Visit to an emergency room in the last 72 hours	- Absent	- Added
8- Diagnosis code	- Absent	- Added with diagnosis code list as a guide.
9- Specialty consultation	- Absent	- Added
10- Physician's signature	- Absent	- Added
11- Date of physician's signature	- Absent	- Added

4. Discussion

The outpatient clinic and the emergency room are working in a complementary way; where their numbering is in continuation to each other and the hospital number given in either cases is intended to be the unique identifier for the patient, this goes with the Egyptian Healthcare Accreditation Organization standards for hospitals (2007) which stated that "there should be a medical record with a unique identifier for each patient evaluated and treated". A follow up card is given to patients for retrieval of records and continuation of care, this goes with the Egyptian Healthcare Accreditation Organization standards for hospitals (2007) and The Joint Commission Accreditation Standards for Hospitals (2008) both respect that the emergency room record should promote continuity of care.(4,6) Unfortunately on implementation this was not efficient for retrieval of the hospital no, where most likely the patients in emergency are in hurry or don't care to bring it with them. If the patient forgets his follow up card he would be given a new number. This threats obviously the unique identifier on implementation and consequently continuity of care.

The administrative data elements in the provisional emergency room record showed that there was an emergency number in the provisional record in addition to the hospital number (Which is the unique identifier of the patient); the emergency number was not used by the registry clerks who were neglecting it to avoid duplication. The time of discharge was not in the elements of the administrative data of the provisional record, this is one of the elements which the Egyptian Healthcare Accreditation Organization standards for hospitals (2007) considered it to be included in the emergency room patient record. As regards for the clinical data, one of the most important criteria that were not complying with the standards, was the absence of physician's signature and its date as well as his/her title. This opposes the Egyptian Healthcare Accreditation Organization standards for hospitals (2007) which stated that:" the author of all entries in the medical record can be clearly identified by name and title" and The Joint Commission Accreditation Standards for Hospitals (2008)

which stated that “Every patient medical record entry identifies its author and when the entry was made in the record”.(4,6) Meanwhile the study reported that the physicians signed 96.2% of the sample records, this declares that it was absent in the record structure but considered in implementation.

Regarding the personal data, the most neglected data in completeness were: birth date which was not registered in all records in the sample taken, telephone and occupation were missing in 84.8% and 90.8% respectively and residence was complete in only 12 % of sample. Regarding clinical data, data quality assessment showed that the following elements were obviously missing: instructions to the patients about diet (96.5 %), instructions to the patients about medications in (92.4 %), treatment (63.3 %) and condition on discharge (45.7 %). The previously mentioned incomplete elements were obligatory in the emergency room form. The Egyptian Healthcare Accreditation Organization standards for hospitals (2007) stated that:” The medical record of every patient receiving emergency care includes at least the following items: time of arrival and discharge, conclusions at termination of treatment, patient’s condition at discharge, patient’s destination at discharge and follow up care instructions”.(4) Items were found to be clear in(83.3%) of records, this is supported by results of a previous study that stated a well-designed form permits ease of entry, conveys instructions clearly, and is efficient to use [7].

Half of the health team reported that the spacing was insufficient; this indicates that spacing is an important issue to be considered in the final record form and this goes with the concept that states forms should be functional and spacing should allow sufficient room to record the data being requested. Checklists were preferred by 60%, this result comes in agreement with the finding which stated that template and predesigned data records performed better than free text records regarding data quality and would affect time spent for documentation [8]. The need for training was agreed by 80% of the health team for improvement of documentation. This goes in accordance with results of the study which showed a trend for trained emergency physicians to score higher than non-trained physicians in documentation assessment [9].

The assessment of the final form implementation revealed that its structure was convenient; the sequence, clarity and spacing were properly done with acceptance of newly added box design and checklists. Some of the newly added items in the final form were registered as: National identity no. of patients, the previous care was documented, visit to the emergency room in last 72 hours and the diagnosis code was registered by the physicians. The modified items in the final emergency room record declared that the modifying items to sub-classifications as well as changed others into checklists succeeded obviously.

5. Conclusions:

The importance of customization of emergency medical record in developing countries to satisfy the national and international standards of emergency room record as well as the required needs and demands of the health team is mandatory. Therefore, as part of each hospital performance improvement activities, the hospital should regularly assess patient clinical record content and form as well as the completeness of patient clinical records to ensure the applicability and convenience of emergency record. The above

developed implementation model for development of emergency medical record in TBRIH could be easily implemented in similar health institutes in developing countries.

Absence of efficient retrieval system for patients' data is a threat causing information gaps. The provisional record form applied the standards with absence of few elements. Data quality assessment showed almost the same attitude among physicians and registry clerks with insufficient conciseness showed by physicians.

Patients seeking emergency characteristics revealed that they were mostly elderly people with slight dominance of males; nearby areas were the main source of cases, general condition of most cases was relatively good with high prevalence of liver and GIT cases and one third of cases were admitted. Emergency room health team needs assessment highlighted that they needed: more spaces for documentation, classification of items for better use, preserving time via decreasing the number of items and use of checklists and they preferred to make physicians the responsible for documenting the code of the diagnosis according to ICD 10. The results demonstrated the emphasis on the need of training to improve documentation in the emergency room.

The structured template design used as a trial for practical assessment before the final form implementation ensured its appropriateness. Modification of the trial according to the health team needs (taking into consideration the adherence to national standards and data quality results) required hard work, yet it produced a highly accepted form. The assessment of the final form implementation revealed that its structure was convenient. Generally, the newly added items in the final form were registered with sufficient data quality compared to the attitude of the health team revealed from the assessment of the provisional form. The modified items declared that the sub-classifications as well as checklists used showed obvious success.

6. Recommendations:

Continuous improvement of data quality in emergency department is mandatory for quality of care at the hospital level. Reviewing and redesigning the emergency room form according to the up to date needs of the emergency room. Uniform supervision strategy, routine checks on data quality elements are obligatory.

Support from the hospital managerial staff to ensure participation and administrative support with timely reporting of the feedback to the stakeholders and managers. Education and training programs for emergency room staff to improve data quality, evaluation of such training programs is recommended for its success. Incentives and punishments should be implemented to ensure seriousness. Further, the factors examined in this study can be useful guides in the establishment of a cost-effective electronic medical record system for the emergency room in Theodor Bilharz Research Institute Hospital.

References

[1] WH. Cordell, J.M. Overhage and J.F. Waeckerle, Strategies for improving information management in emergency medicine to meet clinical, research, and administrative needs. *The Information Management Work Group*. *Annals of Emergency Medicine* **31(2)** (1998), 172–178.

[2] (WHO), Improving Data Quality: A Guide for Developing Countries, World health organization, regional office for the western pacific, 2003.

[3] R. Wong and E. Bradley, Developing patient registration and medical records management system in Ethiopia, *International Journal for Quality in Health Care* **21** (2009), 253–258.

[4] Egyptian Healthcare Accreditation Organization standards for hospitals, Information management, 48-51, 2007

[5] S. Andrew, A.J. Forster, I.G. Stiell and C.V. Walraven, Prevalence of information gaps in the emergency department and the effect on patient outcomes, *Canadian Medical Association Journal* (2003), 169–170.

[6] The Joint Commission on Accreditation of Healthcare Organization (JCAHO), standards for hospitals, 3rd edition 2008.

[7] Davis, Nadinia and LaCour, *Introduction to Health Information Technology*, Saunders, Philadelphia, PA: W.B., 2002.

[8] F.C.Y Lee, W.F. Chong, P Chong and S.B.S. Ooi, The emergency medicine department system: a study of the effects of computerization on the quality of medical records, *European Journal of Emergency Medicine* **8** (2001), 107-115

[9] E. Maniago and B. Ardolic, Documentation accuracy: does emergency medicine residency training make a difference? , *Annals of Emergency Medicine* **46** (2005), no. 3.

.

.