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ORIGINAL ARTICLE

Completion of Electronic Medical Records in General Clinics at Yousif Engineer Health Centre in Bahrain – A Clinical Audit

Zahra Ayoob[1,*], Ismaeel Bakhsh[2], Amna Shehab[2], Fatema Almousawi[2], Mahmood Alawainati[2], Zahra Zabar[2]

[1]Resident in Family Physician Residency Program, Ministry of Health, Bahrain

[2]Department of Family Medicine, Ministry of Health, Manama, Bahrain.

***Corresponding author:**
Zahra Ayoob, Resident in Family Physician Residency Program, Ministry of Health, Bahrain, Tel: (+973) 33521930, Email: Zahra.ayoob@windowslive.com

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Abstract

Background: Electronic medical records have largely replaced the conventional, paper-based documents, in many parts of the world, including Bahrain, due to increased portability, and easy accessibility. In primary-care setting in Bahrain, physicians use the SOAP note to document the patient's medical history. The aim of this audit is to estimate the rate of completion of documentation of patient's medical records by the physicians in Yousif Engineer Health Center using SOAP note in I-SEHA.

Methods: Yousif Engineer Health Center, which is the largest health centre in terms of coverage and number of visits, was the target of this audit. The date selected, by simple randomization, was November 15th, 2017. Night shifts, weekends, and records, documented by trainee residents, were excluded from the analysis. On that day, 11 physicians were on duty, with 426 records. Every physician was considered as a cluster, and approximately 35 % (n = 147) of the total records (n = 426), were included in the analysis using systematic selection.

Results: A total of 147 records were analyzed. The SOAP note was complete in 1 (1 %), partially complete in 142 (96 %), and incomplete in 4 (3 %), of the records. Subsequently, each part of SOAP note was separately assessed. For the Subjective part, 16 (11 %) were complete, 125 (85 %) partially complete, and 6 (4 %) incomplete. For the Objective part, 8 (6 %) records were complete, 37 (25 %) partially complete, and 102 (69 %) incomplete. The Assessment part was complete in 141 (96 %) and incomplete in 6 (4 %) of the records. The Plan part was complete in 127 (86 %) and incomplete in 20 (14 %) of the records.

Conclusion: In comparison to other studies assessing the competition of electronic medical records, this audit showed a substandard completion rate of 1 %. Accordingly, recommendations were formulated, which can be adopted to improve the electronic medical documentation.

Keywords: Electronic medical records; I-SEHA; Bahrain; SOAP; Primary healthcare

Introduction

Over the past 10 years, several electronic systems have replaced the existing traditional methods, in almost all the practical fields, including the medical practices. For instance, medical records, which play an essential role in the process of providing integrated medical services, have evolved rapidly and become the standard of care, in many countries. Electronic Medical Records (EMRs) are "computerized medical information systems

that collect, store, and display patient information, to create legible and organized recordings, and to access clinical information of patients". [1]

Although physicians are legally and ethically obligated to document accurate, objective, and comprehensive information, obtained during each clinical encounter, it is equally important to maintain the quality of these records, despite the transition to EMRs. Additionally, completion of the clinical information, benefits the patient directly by reducing the number of investigations (Quaternary prevention)[2], medical errors, and time of each encounter. Furthermore, it also affects the overall care indirectly, by facilitating the process of data retrieval, for research purposes.[3, 4] However, these benefits vary, depending on the structure, extractability, quantity, and quality of the documented data.

Medical records can be documented by applying various methods, one of the globally used means are the Subjective, Objective, Assessment, and Plan notes (SOAP note), which are implemented in Bahrain, in both paper-based and EMRs.[5,6]

Bahrain is a small country (780 km^2), with a population of 1.45 million, where the government provides access to almost all healthcare services, through a network of primary, secondary, and tertiary healthcare facilities.[7,8] For example, there are 28 primary health centers that act as the first entry points to medical services. Yousif A. Rahman Engineer Health Center (YAEHC) is one of these, that provides primary medical services to the public.[9]

The aim of this audit is to assess the completion of the medical records, according to the SOAP notes in the new electronic system (I-SEHA) by physicians, in YAEHC. This topic is of high priority, according to the recommended tool for prioritising Clinical Audit Topics.[10]

Materials & methods

Sampling

The audit was conducted in YAEHC, which is the largest health center, in terms of coverage and number of visits, in Bahrain. To ensure the accuracy of our data, we selected a day through a simple randomization technique of noting dates in a sheet of paper and mixing them up in a bowl. The 15th of November, 2017 was selected as result. The practicing physicians (n = 11) were on duty on the selected date, with 426 records.

A systematic selection of 30 % of each physician's list was conducted (every third patient), starting from the fifth patient on each list. However, owing to the presence of missed appointments, the next medical record was selected, and we continued to include every third record from the new selected one. The data used was kept confidential, and was not shared with other parties.

All patients' data were anonymous in the process of data analysis. A permission letter was obtained from both the Head of Training Directorate and the Health Center doctor in-charge (for accessing the I-SEHA).

Inclusion and exclusion criteria

The completed EMRs, in the morning duty (from 07:00 to 14:15) of the general clinics on November 15th, 2017, were eligible for the audit. Considering the varying duration of consultation, our exclusion criteria were specialized clinics (non-communicable diseases and central diabetic clinics), double-appointment consultations (periodic exam, pre-marital screening, and pre - employment examination), and records documented by trainee doctors, as longer consultation was allocated. Night shifts were excluded from the audit, owing to the fact that the consultation time is shorter, in comparison to the morning shift. Missed appointments were also excluded. Thus, we analysed 147 medical records, which was more than 30 % of the total number of patients consulted on that shift (n = 426).

Case definition

Completeness of the subjective part was assessed based on the presence of recorded chief complaint (s) and any additional information i.e., if the chief complaint and any further information were written. However, if the chief complaint was not documented, this part was considered incomplete. Moreover, if the chief complaint (s) was mentioned alone, with no further information documented, this part was considered partially completed.

We assessed the completeness of the objective part using documentation of two measures: documented vital signs (heart rate, blood pressure, temperature, respiratory rate, oxygen saturation, and/or weight) and examination of any system or organ. If none of these measures were documented, this part was considered incomplete. Presence of either one was defined as partially complete.

Assessment part was categorized complete or incomplete if the assessment was documented or not, respectively. Additionally, we considered documenting any part of the plan (Reassurance, Advise, Prescription, Referral, Investigation, Observation, Prevention, or promotion: RAPRIOP) as essential, to fit the complete criteria, whereas the contrary was considered as incomplete. Case definition has been described in Table 1 and was adapted from Chapter 3 "The complete medical record and electronic charting" by Heller M.[11]

Data collection

We designed a data collection tool to assess the completeness of each EMR, based on the previously mentioned factors of the case definition (Appendix 1).

Audit Criteria

All EMRs (I-SEHA) should be completed, according to SOAP notes in YAEHC.

Audit Standard

At least 60% of EMRs should be completed according to SOAP notes by physicians in YAEHC. Given the limited number of similar published audits, this standard was the mean of two studies conducted to evaluate the documentation of the EMRs, as sown in Table 2.[12, 13]

Table 1. Case definition

	Complete	Partially complete	Incomplete
Subjective	Chief complaint (s) and additional information	Only the chief complaint (s)	No chief complaint
Objective	Vital Sign (s) and documented examination	Vitals Sign (s) or documented examination	No vital sign (s) and no examination
Assessment	Documented Assessment	N/A	No documented assessment
Plan	Any part of RAPRIOP[II]		N/A

N/A: Not applicable; *RAPRIOP*: Reassurance, Advise, Prescription, Referral, Investigation, Observation, Prevention or promotion

Table 2. Audit Standard

	Study number 1[12]	Study number 2[13]	Mean
Subjective part	44 %	32 %	38 %
Objective part	67 %	62 %	64.5
Assessment part	74 %	90%	82 %
Plan part	98 %	38 %	68 %
Overall adequacy of the medical records	52 %	18 % Poor 62 % Moderate 20 % Good	57 %

Results

A total of 147 medical records were reviewed to assess the documentation of SOAP notes. For the Subjective part, 16 (11%) medical records were complete, 125 (85%) were partially complete, and 6 (4%) were incomplete (Figure 1).

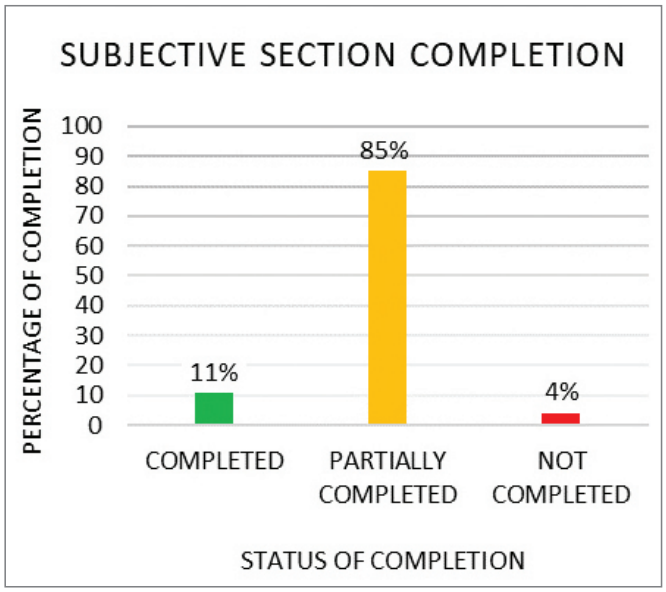

Figure 1. Subjective part completion

Of the total 147 EMRs, 8 (6%) medical records were complete in the objective part, 37 (25%) were partially complete, and 102 (69%) were incomplete (Figure 2).

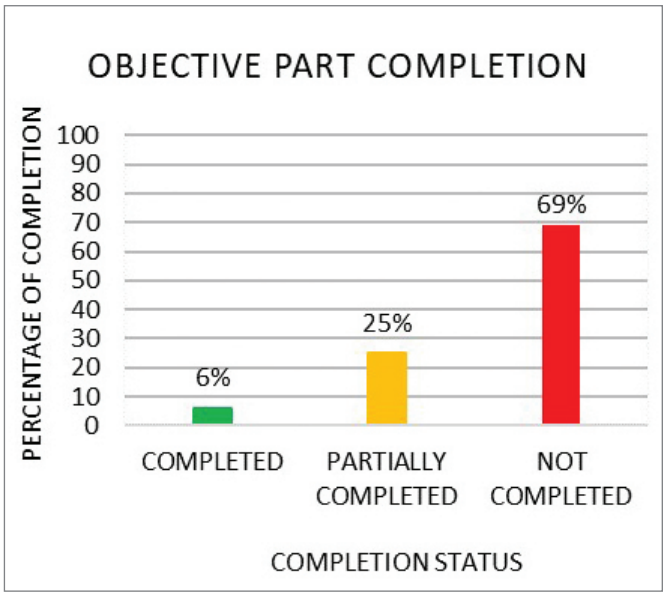

Figure 2. Objective part completion

The assessment part was complete in 141 (96%) out of the 147 medical records, and was incomplete in 6 (4%; Figure 3). The Plan part was complete in 20 (14%) and incomplete in 127 (86%) of the records (Figure 4).

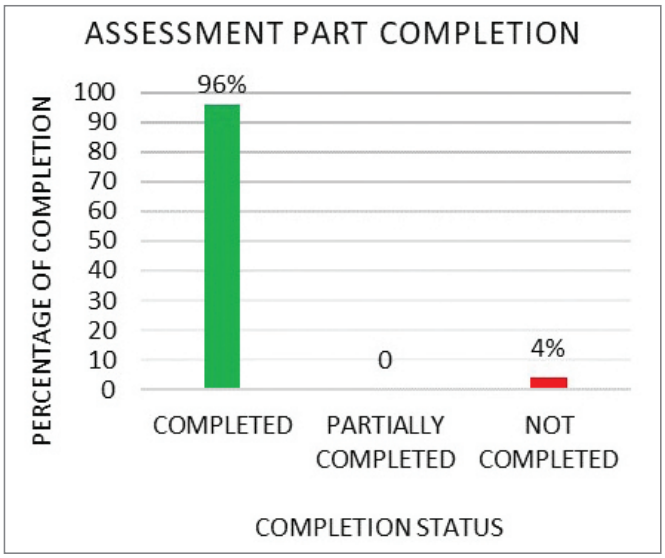

Figure 3. Assessment part completion

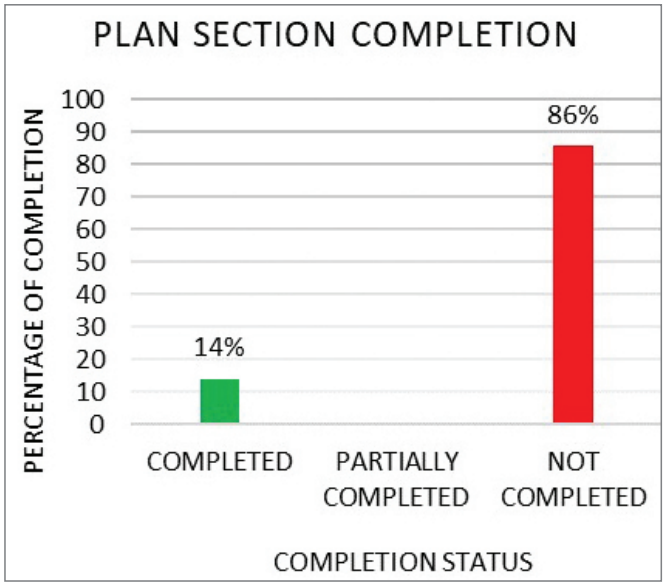

Figure 4. Plan part completion analysis

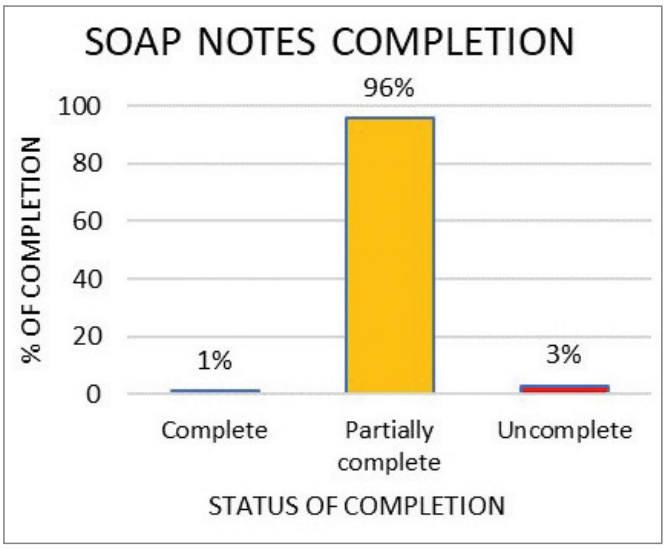

Figure 5. Overall completion of SOAP notes

The overall completion of SOAP notes is described in Figure 5. SOAP notes were complete in 1 (1%), partially complete in 142 (96%), and incomplete in 4 (3%) medical records.

Discussion

Literature review revealed that there are notable variations between the studies, in terms of EMR documentation. For instance, Sriha et al., 2015 concluded that 52% of EMRs were completed in Tunisia.[12] This figure was higher in Finland, where a similar study revealed a completion rate of 62%.[13]

In our audit, there was a remarkable difference in the completion of EMRs components. For example, there were higher completion rates in the Subjective and the Assessment parts, while the other parts were lagging behind. This can be attributed to the fact that EMRs system mandates completing these parts.

In addition, other factors can explain the low overall completion rates, which can be divided into three categories; system, doctors, and patient's factors.

System's Factors

Assigning short consultation time (eight minutes per patient), encountering emergency cases, and registering extra patients 'over the list', impose additional stress on the doctor to complete the work within the allocated time.[14] Moreover, limited manpower per shift will overburden the available staffs with additional workload to accommodate the patients. Given these circumstances, doctors may find it difficult to complete the EMRs.

Doctor's Factors

One of the major concern of the physicians was the limitation of the basic technical computer skills, as they are essential for the process of record keeping. Furthermore, lack of the continuous training and evaluation of the physician's skills in handling the electronic system, affects the acceptance of using EMRs, adversely.

Since communication skills are an integral part of the consultation, some physicians perceive that the electronic system is a breach of the doctor-patient relationship. Maintaining eye contact with patients was a priority to have more face time and less screen time. Interestingly, a systematic review showed that "quality of care, patient safety, and provider/patient relations, were not, positively or negatively, affected by systems implementation".[15]

Patient's Factors

Few patients who are critically ill, mentally ill, or with special needs, and extremes of age, may play a role in the low documentation rates.

Recommendations

Considering the importance of documentation in clinical practice, a set of recommendations are suggested in relation to the doctors and the EMR system. Continuous doctor's training, evaluation, and a sustained auditing process is imperative to be maintained. Improvements to the EMR system are necessary to be put into effect, to increase the documentation rate (Table 3).

Limitations

Few limitations were encountered during the data collection, such as limited number of computers, slow EMRs software (I-SEHA), frequent technical glitches, and interruptions. Also, this audit was conducted in one health center, and in morning shifts. Further audits are warranted to compare the outcome among different shifts and in multiple health center with larger sample size. Moreover, we studied the documentation rate of EMR, regardless of whether the case encountered by the physicians needed documentation, physical examination or lab investigations or not, which may affect the results of the Objective part. To the best of our knowledge, there are no similar studies in our region, to validate our results against.

Table 3. Recommendations

Recommendations	Benefits	Implementation
System		
Improving EMR system (I-SEHA)	- Timesaving documentation. - Less screen time and more face-to-face time during consultation. - Decrease documentation errors	- Frequent system updates based on user's feedback. - Modify the system to be more user friendly (e.g. Checklists and templates) - Perform a click analysis that facilitate sending feedbacks and opinions instantly to IT helpdesk.
Creating an integrated EMR system		Recorded data (e.g. vital signs, medications, reports, referrals, requests) simultaneously appear in the same visit sheet.
Considering more mandatory parts	Increase documentation rate.	Prescriptions, requests, reports cannot be generated unless all the SOAP notes components in progress sheets were filled.
Doctors		
Continues training and evaluation	Improving technical skills of doctors and ensuring full awareness of system updates and innovative features.	- Providing mandatory CME courses about EMR system annually. - Implement courses to improve doctor's computer skills.
Sustained auditing process	Improving the documentation quality and quantity.	Conducting qualitative studies to identity barriers to and facilitators of proper documentation.
Enhancing reward System	Cost effective documentation	Positively reinforcing documentation by distinction awards and salary premiums.
Annual clinical appraisal		Including the documentation in the annual professional appraisal.

Author Contributions

All authors have conducted the audit, written the article, reviewed it, performed the literature review and approved the final manuscript.

Conflict of Interest

Authors have no conflict of interest to declare.

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References

1. Ajami S, Bagheri-Tadi T. Barriers for Adopting Electronic Health Records (EHRs) by Physicians. Acta Inform Med. 2013;21(2):129-34.

2. Martins C, Godycki-Cwirko M, Heleno B, Brodersen J. Quaternary prevention: reviewing the concept. Eur J Gen Pract. 2018;24(1):106-111.
3. Scholte M, van Dulmen SA, Neeleman-Van der Steen CW, van der Wees PJ, Nijhuis-van der Sanden MW, Braspenning J. Data extraction from electronic health records (EHRs) for quality measurement of the physical therapy process: comparison between EHR data and survey data. BMC Med Inform Decis Mak. 2016;16(1):141.
4. Biron P, Metzger MH, Pezet C, Sebban C, Barthuet E, Durand T. An information retrieval system for computerized patient records in the context of a daily hospital practice: the example of the Léon Bérard Cancer Center (France). Appl Clin Inform. 2014;5(1):191-205.
5. Moghaddasi H, Mohammadpour A, Bouraghi H, Azizi A, Mazaherilaghab H. Hospital Information Systems: The status and approaches in selected countries of the Middle East. Electron Physician. 2018;10(5):6829-6835.
6. Mitsuishi F, Young JQ, Leary M, Dilley J, Mangurian C. The Systems SOAP Note: A Systems Learning Tool. Acad Psychiatry. 2014;40(1):164-71
7. Bahrain Ministry of Health. Primary Health care. Manama: Ministry of health; 2018. Available from: https://www.moh.gov.bh/Ministry.
8. Khalaf AJ, Whitford DL. The use of complementary and alternative medicine by patients with diabetes mellitus in Bahrain: a cross-sectional study. BMC Complement Altern Med. 2010;10:35. Published 2010 Jul 14. doi:10.1186/1472-6882-10-35
9. Bahrain Ministry of Health. Primary Health care. Manama: Ministry of health; 2018. Available from: https://www.moh.gov.bh/Content/Files/Publications/statistics/HS2016/PDF/Chapters/Primary%20H ealth%20Care%20_%20 MoH%202016.pdf. [Accessed 19 November 2018].
10. Developing a clinical audit programme [Internet]. Healthcare Quality Improvement Partnership. 2016. Available from: https://www.hqip.org.uk/wp-content/uploads/2018/02/developing-a-clinical- audit-programme.pdf [Accessed 19 November 2018].
11. Heller M. Clinical Medical Assisting: A Professional, Field Smart Approach to the Workplace [Internet]. 1st ed. Cengage Learning; 2008 [cited 17 November 2018]. Available from: http://assets.cengage.com/pdf/smp_3510_heller_chapter3.pdf
12. Sriha Belguith A, Elmhamdi S, Bouanene I, Ben Saad M, Ben Salah A, Harizi C, et al. Quality of the medical record notification in primary health care. Tunis Med. 2015 Mar;93(3): 148-52.
13. Vainiomäki S, Kuusela M, Vainiomäki P, Rautava P. The quality of electronic patient records in Finnish primary healthcare needs to be improved. Scand J Prim Health Care. 2008;26(2):117-22
14. Mathioudakis A, Rousalova I, Gagnat AA, Saad N, Hardavella G. How to keep good clinical records. Breathe (Sheff). 2016;12(4):369-373.
15. Ludwick,Dave&Doucette,John.(2009).Primary Care Physicians' Experience with Electronic Medical Records: Barriers to Implementation in a Fee-for-Service Environment. International journal of telemedicine and applications. 2009. 853524. 10.1155/2009/853524.

Data Collection Form

Audit Title: Completion of Electronic Medical Records in General Clinics at Yousif Engineer Health Centre in Bahrain

Appendix 1

CPR		**Nationality**	O Bahraini O Non-Bahraini
Age		**Form Number**	
Gender	O Male O Female	**Family Physician**	

No.	Question		
1	Did the family practitioner complete the **subjective section**?		
	• Patient complaint	☐ Yes	☐ No
	• Duration of the complaint	☐ Yes	☐ No
2	Did the family practitioner complete the **objective section**?		
	• Any Vital Sign	☐ Yes	☐ No
	• Organ / System + Finding	☐ Yes	☐ No
3	Did the family practitioner complete the **assessment section**?	☐ Yes	☐ No
4	Did the family practitioner complete the **plan section**?		
	• Reassurance	☐ Yes	☐ No
	• Advice	☐ Yes	☐ No
	• Prescribe	☐ Yes	☐ No
	• Referral	☐ Yes	☐ No
	• Investigations	☐ Yes	☐ No
	• Observation and follow up	☐ Yes	☐ No
	• Prevention and health promotion	☐ Yes	☐ No

STATUS*	☐ COMPLETED	☐ PARTIALLY COMPLETED	☐ NOT COMPLETED

* Please refer to the case definition