

Challenges of implementing Electronic Health Records in Gulf Cooperation Council Countries

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Abstract

Although many countries embraced computerisation, the implementation of Electronic Health Records (EHR) is not generating anticipated results. In order to address this issue, the author draws a four phased road map and undertook a study to understand the problems encountered before, during and after the implementation of Electronic Health Records. The author wishes to share the experience gained and progress made in eight countries, having served at national level as Senior Medical Record Consultant Adviser and visiting WHO Consultant, in GCC countries (Kuwait, Saudi Arabia, Bahrain, Qatar, UAE, and Oman), besides serving in Afghanistan and India. Upto 70-80 % of them have shown dramatic progress and their effective and efficient functioning is remarkable.

Keywords - eHealth Solutions; EHR; Electronic Health Records; GCC countries; EHR

Introduction

Manual medical records have undergone tremendous transformation since the world wars, particularly after the second one as the healthcare policy makers and healthcare providers have realised that good healthcare is possible only when scientific comprehensive and integrated medical records are maintained from birth to death. This includes information regarding birth, immunisation, child growth and periodic health problems and remedies provided. This has lead many nations to improve the medical record system by developing international and accreditation standards, disease classifications to improve the quality of medical records to provide the best possible healthcare to entire community and population as a whole. Good healthcare is possible only when scientific comprehensive and integrated medical records are maintained from birth to death.

A study was undertaken in order to understand the theme “Challenges of implementing Electronic Health Records in Gulf Cooperation Council (GCC) Countries” including the potential problems encountered before, during and after developing EHRs.

Material and method

The author wishes to share the experience gained in eight countries by serving in the Ministries of Health at national level as Senior Medical Record Consultant Adviser and visiting WHO Consultant from 1981-2008, in all the six GCC Countries. Apart from this, he also served in India and Afghanistan from 1966 to 1980. During the course of four decades, as a consultant, he has overseen the development of most neglected medical records, moving from virtually no systematic medical record services to the foundations of national EHR system in less than 20 years.

Table 1 . Area, population and life expectancy in GCC countries (4)

<i>Country</i>	Area in Sq. km	Population	Life Expectancy In years
Kuwait	17,820	2,418,393	77.2
Saudi Arabia	2,149,690	27,019,731	75.67
Bahrain	665	698,585	74.45
Qatar	11,437	885,359	73.9
UAE(Abu-Dhabi)	83,600	2,602,713	75.44
Sultanate of Oman	212,460	3,102,229	73.37

Table 2 - GDP, consultant served and number of hospitals in GCC countries (4)

<i>Country</i>	GDP	MR Consultant Year served	No. of Hosp. (Government)
<i>Kuwait</i>	\$21,600	1981-1986	13
<i>Saudi Arabia</i>	\$13,800	1986-1993	250
<i>Bahrain</i>	\$25,300	1993	3
<i>Qatar</i>	\$29,400	1997/2003	5
<i>UAE(Abu-Dhabi)</i>	\$49,700	2004-2005	7
<i>Sultanate of Oman</i>	\$14,100	1993-2004	41

Table 3. EHR implementation in the GCC countries (4)

<i>Country</i>	MRD* well-equipped Staff (un-trained)	MRD* lack policies & poor management	EHR vendor developed	EHR in- house developed
<i>Kuwait</i>	Yes	Yes	Yes	Partially
<i>S.Arabia</i>	No	Yes	Yes	-
<i>Bahrain</i>	Yes	Yes	Part.	Yes
<i>Qatar</i>	Yes	Yes	Yes	Partially
<i>UAE –A. –Dhabi</i>	Yes	Yes	Yes	-
<i>Sultanate of Oman</i>	No	Yes	Partially	Yes

The GCC countries had mixed progress; a few hospitals (5-10%) had a reputation of maintaining high standards, while in a majority of the hospitals, health record management was absent at the fundamental planning and budgeting levels of health services. During the late 1980s and early 1990s, GCC revolutionised the entire healthcare delivery system. Kuwait was ahead of other countries. In order to achieve paperless systems in healthcare environment, important components, for example; Health Information Management (HIM) education, creating HIM professionals, Information Technology (IT) and input of end users were exceptionally crucial. Implementing EHR was a challenge and one of the most complex projects. It requires an intensified focus on cooperation among work groups. During the course of his service, the following issues were observed and wherever possible suitable measures were adopted ^(1, 2, 5, 6, 7, 8 & 11).

Road map to develop good Medical Record Systems: The roadmap for development of medical records included four phases. The first phase surveyed the existing status of medical records. The second phase suggested appropriate systems, standards, policies and procedures. The third phase trained personnel, and organised the medical record departments. The fourth phase was dedicated to implementation of electronic health records.

Phase one: During the survey, the following medical record problems were noted in almost all the countries. For the purpose of implementing electronic health record, it becomes necessary to understand clearly the problems of manual medical record system so that one could prevent while implementing EHR.

There was no clear concept of Medical Record System earlier. Most of the hospitals were functioning without Medical Record Departments (MRD) and its functions were carried out by medical, nursing and paramedical staff. In some hospitals MRD's were so poorly organised that problems were commonplace. Missing records, non-availability of laboratory and radiology reports resulted in creation of new records and new investigation orders, on each visit by the patient and there was no continuity in patient care. There was repetition of doctor's work. For example, history documentation, physical examination, investigations and prescribing drugs, the hospital patient care services were chaotic with much confusion and duplication of work. This resulted in inefficient patient care, dissatisfaction among doctors, patients, as well as administrators besides increasing the exchequer's expenditure.

Phase two and three: During the second and third phase, several measures were adopted to address the problems noticed in the first phase by recruiting senior qualified professionals, continuous education, training and organising the MRD's in the hospitals. Medical Record Policies, standards, procedures and standardised medical record forms were introduced.

Phase four: The Fourth phase was dedicated to implementation of EHRs. During this phase, the author undertook the study of issues encountered in the process of EHR before, during and after implementation that would serve as a guiding factor while developing EHR or examining the in-house or vendor product. The findings are given below.

Results

In order to collect user feedback, address problems and accelerate the transition to an entirely electronic health record, a number of meetings, seminars, workshops and conferences were conducted in respective countries. The following issues were suitably addressed. The study

results were classified mainly into three categories such as Three Ts; Team (Men), Tactics (Process) and Technology.

Team (Men):

Lack of coordination between computer, medical/nursing and MR personnel

- Change mechanism was not fully practiced
- Existing manual system was not understood clearly by the vendor
- Entirety or phased implementation was not obvious
- All the physicians and others were not trained before Live
- Insufficient trainers
- Users were not involved in any analysis and redesign of their workflow
- Users were not involved in the specification of the customisable portions of the EHR
- Some physicians especially senior staff were not willing to undergo training
- Some never preferred to use computers by themselves
- Physician felt that their time was consumed due to computerisation
- Fear of using technology was a barrier to adoption of EHR
- Poor computer literacy
- Majority of old staff avoid new technology

Tactics (Process)

Extensive, intensive 24/7 support was not found

- Demonstrations either by the vendor or In-house IT staff was inadequate
- Evaluations such as surveys, interviews, and observations were not carried out
- Feedback from end users acceptance was not confirmed
- Technology evaluation related to reliability, performance measures, standards and interoperability, usability and usefulness were not clearly carried out
- Practical implementation schedule was unavailable
- Blood pressure and other tests cannot be found in the form of graphs
- Most physicians dislike typing history or notes
- Patients prefer personal attention
- Legal, security and privacy issues in the system were not considered
- Lack of guidelines for end users
- Management of events, incidents, problems and change were not effective
- Poor application design has become a barrier in adoption of EHR
- Adoption of EHR is affected due to the vendor instability and support
- Poor navigation is a significant barrier
- Contingency plan for system failure was missing
- Measures for security and confidentiality
- Encryption of digital signatures
- Legislation on national EHR policies and electronic auditing was not done
- Accreditation standards have not been incorporated
- Classification of disease list was not included
- Patients have to wait longer when computerisation was introduced
- Delay in budgetary approval hampers implementation

- Simultaneous maintenance of paper-based records causes delays

Technical:

High net work speed was not offered

- High capacity servers were not used
- Inadequate Testing such as ‘smoke’, ‘end to end’ and ‘volume’
- Inadequate IT support and maintenance
- Disaster recovery and daily back up data was faulty
- Poor network design created EHR problems
- Defect in UIN (unique identification number) for patients
- Not having well placed MPI in the system
- The s/w was inadequate to meet the interoperability and communication in EHR
- Clinical decision making was not user friendly
- Adequate hardware were not forthcoming
- Alerts, reminders, medical errors were not effective

Discussion

Most organisations have not made the transition from paper-based environment to an electronic environment in one quick and easy step. Those organisations initiates unplanned process, their progression to EHR has been incomplete. This is mainly due to lack of commitment, poorly managed HIM departments; untrained Medical Record (MR) staff. Whereas other organisations that had the foresight to plan and determine their steps along the way have accomplished full implementation. Many healthcare providers today are maintaining a “hybrid” health record. The EHR journey is one that will evolve over many years, requiring many change management dynamics that will challenge each of those involved with the process.

Implementation of EHR in GCC Countries had witnessed dramatic changes (70-80%) hospitals had improved functioning, regularised the patient flow, controlled investigations and drug prescriptions, saved medical, nursing and especially MR staff time. It has greatly streamlined financial collection, minimised workload, patient visits, writing, space for MR, manpower and cost. Comprehensive and accurate health information, diagnostic procedures, epidemiological studies, sharing of health information, security and confidentiality, backup facility and work productivity have seen improvement.

Conclusion

When developing software, the most important aspect is meticulous preparation of domain of all functions related to physician’s office, outpatient, emergency room, inpatient, operating theatre, intensive care unit, coronary care unit, lab, radiology, other imaging sections, medication, e-prescription, nursing, clinical reminders, medical specialties, documentation, flowchart and screen by database administrators and web designers prior to technical involvement, such as research and development, coding by programmers, incorporating EHR-related standards for example; HL7, ASTM, PACS, DICOM, NCPDP, SNOMED, ICD, CPT, HIPAA and JCAHO recommended accreditation standards, testing and re-testing, and mock and live operation by varied users before the software is finally released^(3,9).

Figure 1. Standards dealing with Health Care Data Exchange⁽⁹⁾

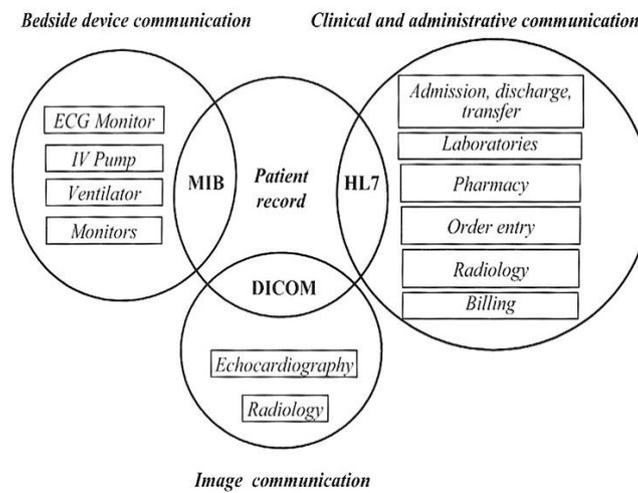
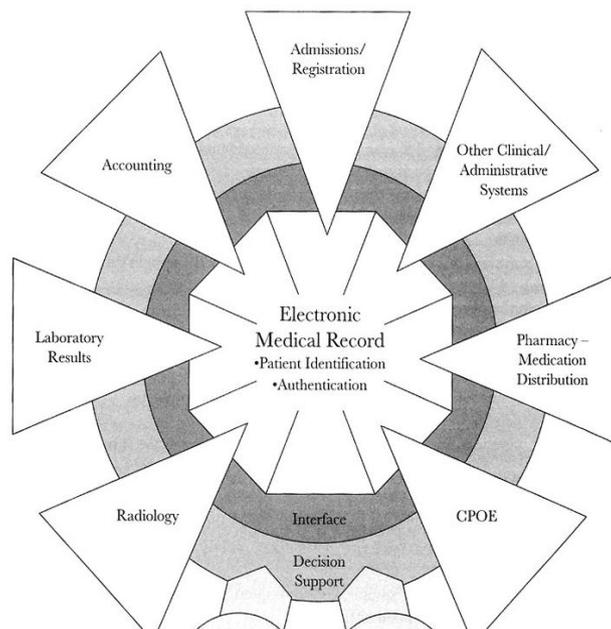


Figure 2. The Hub of the Clinical Information System⁽³⁾



The core capabilities that EHRs should possess are as follows:⁽¹⁰⁾

- **Health information and data.** Having immediate access to key information such as patients' diagnosis, allergies, lab test results, and medications will improve care-givers' ability to make sound clinical decisions in a timely manner

- **Result management.** The ability for all providers participating in the care of a patient in multiple settings to quickly access new and past test results will increase patient safety and the effectiveness of care
- **Order management.** The ability to enter and store orders for prescriptions, tests, and other services in a computer-based system should enhance legibility, reduce duplication, and improve the speed with which orders are executed
- **Decision support.** Using reminders prompts and alerts, computerised decision-support systems will help improve compliance with best evidence based clinical practices, ensure regular screenings and other preventive practices, identify possible drug interactions, and facilitate diagnoses and treatment
- **Electronic communication and connectivity.** Efficient, secure, and readily accessible communication among providers and patients will improve the continuity of care, increase the timeliness of diagnosis and treatment and reduce the frequency of adverse events.
- **Patient support.** Tools that give patients access to their health records, provide interactive patient education, and help them carry out home-monitoring and self-testing can improve control of chronic conditions, such as diabetes
- **Administrative processes.** Computerised administrative tools, such as scheduling systems, will improve efficiency of hospitals and clinics and provide speedy service to patients
- **Reporting.** Electronic data storage that employs uniform data standards will enable health care organisations to respond quickly to federal, state, and private reporting requirements, including those that support patient safety and disease surveillance
- **Alignment of Templates.** Methodical arrangement of templates and buttons should facilitate the users with easier and smooth flow of work that make users happy.
- **Significant Templates in one screen (area).** Facilitate busy physician to scan quickly to have comprehensive picture of past and present, investigation results, medications and care status in one screen will help in making convincing and quick decisions

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