

Electronic medical records in dermatology: Practical implications

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ABSTRACT

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Background: Electronic medical records (EMRs) can be of great use in dermatological data recording. Unfortunately, not many studies have been carried out in this specific area. **Aims:** We attempt to evaluate the use of an EMR system in dermatology, comparing it with a conventional paper-based system. **Methods:** Two hundred patient records of patients attending the dermatology outpatient department were studied over a 3-month period. Half the reports were entered in the conventional paper-based format while the other half was entered in an EMR system. The time taken for each consultation was recorded and the same was carried out for the first subsequent follow-up visit. **Results:** The average time taken for the completion of the EMR-based consultation for new cases was 19.15 min (range, 10–30 min; standard deviation, 6.47). The paper-based consultation had an average time of 15.70 min (range, 5–25 min; standard deviation, 6.78). The *P*-value (T-test was used) was 0.002, which was significant. The average time taken for consultations and entering progress notes in the follow-up cases was slightly less than 10 min (9.7) for EMR while it was slightly more than 10 min (10.3) for the paper format. The difference was not statistically significant. The doctors involved also mentioned what they felt were the advantages and disadvantages of the system along with suggestions for improvement. **Conclusion:** The use of an EMR system in dermatology (or for that matter in any specialty) may overawe most users at the beginning, but once a comfort level is established, EMR is likely to outscore conventional paper recording systems. More time-motion-case studies are required to ascertain the optimal usage of EMR systems.

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INTRODUCTION

Electronic medical records (EMRs) can be of great use in dermatological data recording. There is a lot that EMR can offer to the betterment of dermatology services in any center. Unfortunately, not many studies have been carried out in this specific area. We attempt to evaluate the use of an EMR system in dermatology, comparing it with a conventional paper-based system.

METHODS

Two hundred patient records of patients attending the Dermatology Outpatient Department during a 3-month period were included, which also included follow-up progress notes of the same patients. Half of these were entered totally in the electronic format while

the other half were in the conventional paper format. Four doctors who were familiar with the EMR system (who were using the system for more than 3 months) were involved in entering the notes and the cases were randomized among them. None of the doctors had any special training in the use of computers.

The EMR system used was the Amrita HIS® (Hospital Information System) developed indigenously by Amrita Enterprises, Kochi, India. The salient features of this EMR system include the patient demographics (which is entered automatically at the registration point), the patient case sheet [Figure 1] (including history, examination findings, diagnosis, prescriptions and lab/service orders, which are entered by the dermatologist), lab reports, radiology images (entered by the corresponding lab service centers or radiology

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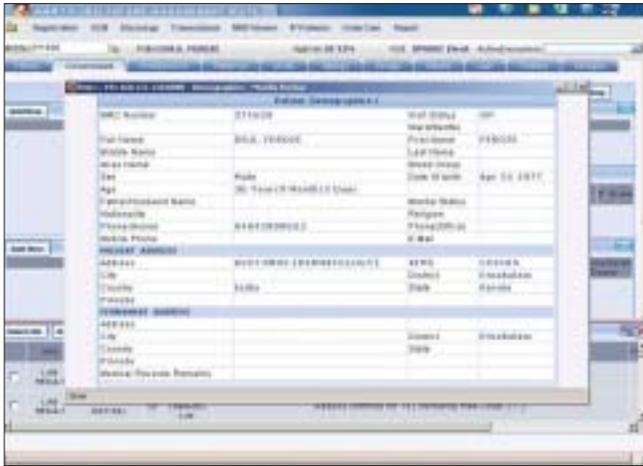


Figure 1: Demographics screen

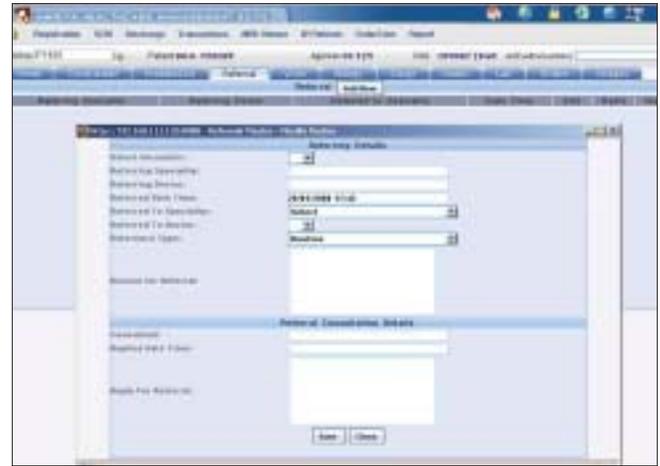


Figure 2: Referral screen

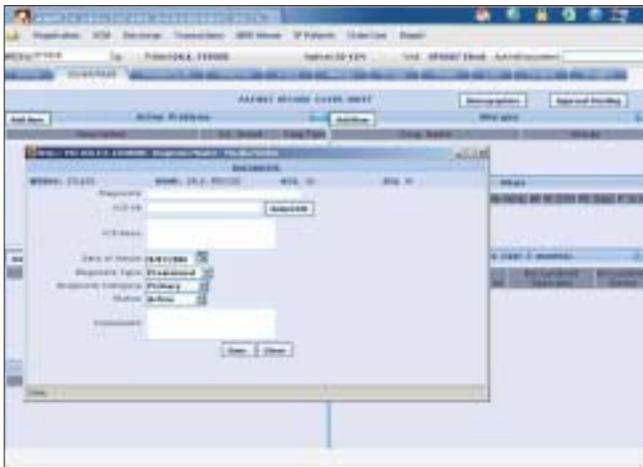


Figure 3: Active problems and ICD codes

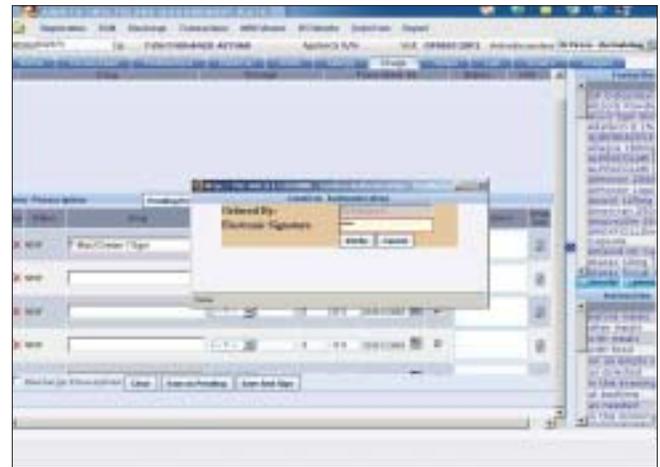


Figure 4: Digital signature

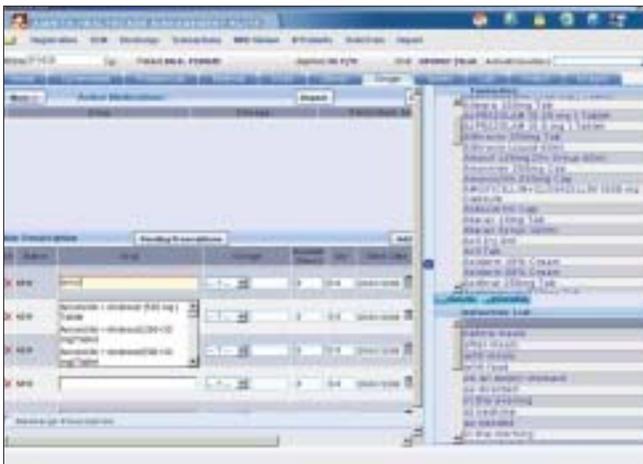


Figure 5: Prescription area

service centers), referral section [Figure 2] (where referrals to other departments can be entered and replies to referrals made) and special fill boxes for allergies and entering the International Classification of Diseases (ICD) codes for diseases [Figure 3].

RESULTS

Time

The average time taken for the completion of the EMR-based consultation for new cases was 19.15 min (range, 10–30 minutes; standard deviation, 6.47). The paper-based consultation had an average time of 15.70 min (range, 5–25 min; standard deviation, 6.78). The *P*-value (*T*-test was used) was 0.002, which was significant. The time taken was maximum for cases like exfoliative dermatitis and connective tissue disorders and also for cases requiring a longer prescription.

Second visit progress notes were also studied. The average time taken for consultations and entering progress notes in the follow-up cases was slightly less than 10 min (9.7) for EMR while it was slightly more than 10 min (10.3) for the paper format. The difference was not statistically significant (*T*-test, *P*-value > 0.05). We assume that this is partly because

all previous investigation reports, X-rays, electro cardiograms and other data, like reply to referrals are all present on the patient coversheet itself and can be retrieved easily from the EMR system. The doctors involved mentioned that comparatively much more time was used in the EMR in entering prescriptions and diagnosis/ICD codes.

Comparatively lesser time was used in the EMR for service ordering (like lab orders) and follow-up prescriptions (as there is an option for repeating the prescription with a single click). The difficulty of using multiple forms to fill in the patient details and required investigations for different categories, like serology, pathology or biochemistry, is avoided.

To summarize, although the time taken for initial data recording in the EMR format is comparatively high as compared with the normal paper-based consultations, there are valid advantages in the EMR system, which more than make up for the time factor. Moreover, the time factor is significant only in the initial entry. In the follow-up cases, the EMR system actually fared favorably compared with the paper format.

Some of the specific advantages and disadvantages of the EMR system that were noticed are summarized in Table 1.

Comfort

The younger dermatologists were more comfortable with the EMR system than the older dermatologists. Similarly, a familiarity with computers seemed to ease the transition to an EMR system.

Patient comfort: Contrary to expectation, there was not a single incident where the patient expressed any kind of discomfort with the dermatologist typing while taking a history.

DISCUSSION

Not many studies have specifically targeted the application of EMRs in dermatology. One of the primary applications of EMR in dermatology was as part of teledermatology records. In fact, EMRs or patient information record was defined as all information pertaining to the patient for providing care using telemedicine. This includes clinical as well as non-clinical information.^[1] However, as of now, EMR is used in the context of any medical record, not necessarily pertaining to telemedicine.

One of the primary advantages as far as using EMR in dermatology is the fact that dermatology outpatients include a large number of chronic diseases with a follow-up duration of years. The advantage of a streamlined, one-click retrieval for old records as compared with a bulky paper file cannot be understated. The same applies to investigation and treatment charts for people on prolonged treatment schedules.

Similarly, as dermatology patients are often on a long list of drugs and topicals, the ease of repeating only the necessary medication with a click of a button makes life easy for the dermatologist, especially as there is no question of losing old prescription notes.

Most EMR implementation exercises show a gradual but steady increase in the acceptance rate as doctors become more familiar with the system. It should also be noted that a lot of the advantages of an EMR system come through only when all departments start using it at the same time.^[2] Studies have shown that images are not used to track skin disease or integrated with EMRs nor are EMRs widely used, probably because of difficulty of use and limited computer literacy.^[3]

The issue of longer consultation times while using an

Table 1: Perceived advantages and disadvantages of the dermatology electronic medical record system

Perceived advantages	Perceived disadvantages
Better safety of data, digital signatures [Figure 4]	Typing speed-related issues
Legibility	Patient discomfort
Reduced prescription errors [Figure 5]	Software/hardware malfunctions
ICD codes and easy retrieval of old data	
Specialized forms, e.g. phototherapy dosage forms	
Automatic pharmacy link: cross-reactions/allergy notifications	
Immediate notification of investigation results/referral alerts	

EMR system has been studied by a number of authors. Most studies do not show a significant difference between adjusted average time for EMR and non-EMR consultations.^[4-6] However, there needs to be a lot of further refinement before EMRs can become more the norm rather than an exception.

With proper use, lifelong electronic health records can supply valuable information for research, quality management and health policies in addition to supporting the treatment of patients.^[7]

Further improvements/preferred additions in a dermatology-based EMR according to us would probably include features like:

1. Easy upload and retrieval of multiple patient images (including pre- and post-op images).
2. Incorporation of dermatoscopy/trichoscan software into the EMR.
3. EMR-based discussion forums/multiple referral platforms (where all dermatologists in an institution can view the patient details and images at the same time and offer replies to the referrals).
4. Incorporation of fixed treatment protocols that can be added on to the treatment plan on a single click (e.g., treatment protocol for exfoliative dermatitis).
5. Incorporation of easy scoring systems for disease severity, like the Psoriasis Area Severity Index.

In general, the future developments in EMR need to look more into the core needs of each specialty through the eyes of the health care professionals, patients as well as the health policies of the particular country. According to Häyrynen *et al*, the challenge for ongoing national health record projects around the world is to take into account all the different types of EMRs and the needs and requirements of the different health care professionals and consumers in the development of EMRs.^[8] The widespread implementation of health information technology in general has been limited by a lack of generalizable knowledge about what types of implementation methods will improve care and manage costs for specific health organizations. The reporting of health information technology development and implementation requires fuller descriptions of both the intervention and the organizational/economic environment in which it is implemented.^[9] Although most studies show a positive patient response to EMRs, patient confidentiality and the ethical-legal issues associated with it (especially in the context of

sexually transmitted diseases) may be another issue that needs to be looked at in detail. The requirement for patient consent in electronic records and the extent to which electronic patient data can be shared need to be delineated in clear terms, although a proper EMR system with good standards for authentication, authorization, auditing and accountability is likely to be more secure than a paper-based system.^[10-12]

The number of doctors using the system actively at our center at the time of submitting this article are too few to generalize the results. We also realize that the number of patients and time frame needs to be much larger to understand problems specific to dermatology in relation to an EMR system. However, we would like to reiterate that the aim of this report is merely to sensitise the readership to the potential of EMRs in dermatology and to stress on the point that each specialty has its own specific requirement as far as an EMR is concerned.

CONCLUSION

The use of an EMR system in dermatology (or for that matter in any specialty) may overawe most users at the beginning, but once a comfort level is established, EMR is likely to outscore conventional paper recording systems. The use of EMR routinely in dermatology clinics may be a long way away, but we feel that in the long run the advantages of such a system will be simply difficult to ignore. The linkage of long-term patient follow-up, including images to single-point retrieval, will really be useful in chronic dermatological diseases. A lot of user and software issues need to be ironed out before this becomes a reality. This article is basically meant only as a simple time-motion study, which aims to sensitize the dermatology readership to the potential of EMRs. It should be stressed that each specialty has its own needs when an effective EMR is to be designed. More detailed longitudinal studies are required to streamline the effective implementation of EMRs in dermatology.

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REFERENCES

1. Report of the technical working group on telemedicine standardization. Recommended guidelines and standards for practice of telemedicine in India. Technical working group for Telemedicine Standardization Department of Information Technology (DIT), Ministry of Communications and Information Technology (MCIT), Govt. of India. [updated on 2003 May]. Available from: <http://www.mit.gov.in/telemedicine>. [accessed on 2006 Jun 21].
2. Lium JT, Tjora A, Faxvaag A. No paper, but the same routines: a qualitative exploration of experiences in two Norwegian hospitals deprived of the paper based medical record. *BMC Med Inform Decis Mak* 2008;8:2.
3. Scheinfeld NS, Flanigan K, Moshiyakhov M, Weinberg JM. Trends in the use of cameras and computer technology among dermatologists in New York City 2001-2002. *Dermatol Surg* 2003;29:822-5.
4. Lo HG, Newmark LP, Yoon C, Volk LA, Carlson VL, Kittler AF, *et al.* Electronic health records in specialty care: A time-motion study. *J Am Med Inform Assoc* 2007;14:609-15.
5. Poissant L, Pereira J, Tamblyn R, Kawasumi Y. The impact of electronic health records on time efficiency of physicians and nurses: A systematic review. *J Am Med Inform Assoc* 2005;12:505-16.
6. Pizziferri L, Kittler AF, Volk LA, Honour MM, Gupta S, Wang S, *et al.* Primary care physician time utilization before and after implementation of an electronic health record: A time-motion study. *J Biomed Inform* 2005;38:176-88.
7. Gall W, Grossmann W, Duftschmid G, Wrba T, Dorda W. Analysis of EHRs for research, quality management and health politics. *Stud Health Technol Inform* 2008;136:425-30.
8. Häyrynen K, Saranto K, Nykänen P. Definition, structure, content, use and impacts of electronic health records: A review of the research literature. *Int J Med Inform* 2008;77:291-304.
9. Shekelle PG, Morton SC, Keeler EB. Costs and benefits of health information technology. *Evid Rep Technol Assess (Full Rep)* 2006;132:1-71.
10. Hassol A, Walker JM, Kidder D, Rokita K, Young D, Pierdon S, *et al.* Patient experiences and attitudes about access to a patient electronic health care record and linked web messaging. *J Am Med Inform Assoc* 2004;11:505-13.
11. McGilchrist M, Sullivan F, Kalra D. Assuring the confidentiality of shared electronic health records. *BMJ* 2007;335:1223-4.
12. Myers J, Frieden TR, Bherwani KM, Henning KJ. Ethics in public health research: Privacy and public health at risk: Public health confidentiality in the digital age. *Am J Public Health* 2008;98:793-801.