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## مجلة أريد الدولية للعلوم والتكنولوجيا

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### **Physicians' Use, Perceptions and Attitude Toward Electronic Medical Record in Iraq**

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استخدام وتصور واتجاه الأطباء تجاه السجلات الطبية الإلكترونية في العراق

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**ABSTRACT**

Physician acceptance is critical to the widespread adoption of Electronic Medical Records (EMRs). The main objective of this research is to explore physicians' perceptions of EMRs' function importance, anticipated usage, and their attitudes and opinions regarding EMRs in the sole organization that implemented EMRs in Kurdistan, Iraq. This cross-sectional study was conducted on 150 specialist physicians randomly selected from Faruk Medical City in Sulaimani City, Kurdistan, Iraq, using a self-administered questionnaire. The main findings of this study indicate that the greatest important functions were the display of lab results, clinical notes, and reports, as well as the display of time-trended clinical data and physician order entry (tests and medication orders) with a percentage of 100%. while the least important functions were the reporting of medical management & disease management, and nuclear medicine with percentages of (89.3%), and (72.7%) respectively. In addition, the results showed that the respondents used six out of 19 EMR functions at least weekly, agreed on the need for an EMR system implementation, and expressed overall support for EMRs. All the respondents (100%) perceived that EMRs would enhance the quality of care and reduce errors, improve the quality of practice (i.e., work-life), and have a positive impact on the cost and security of patients' information. Most of the respondents (92.7%) also anticipated an increase in practice productivity with EMRs and recognized the necessity of spending time for training (94%). The study concluded that the respondents had a positive attitude toward EMRs. The main recommendation was to conduct a systematic examination of physician perceptions related to EMRs as both vendors and healthcare organizations can facilitate physician acceptance and ultimately the rate of adoption and utilization. This study would help them to design targeted education to demonstrate the advantages of EMRs and further improve physician perceptions toward EMRs.

**Keywords:** Electronic Medical Records; physician acceptance; Use of medical record; Tertiary referral centers; Kurdistan Iraq.

**الملخص:**

قبول الطبيب أمر بالغ الأهمية لاعتماد واسع النطاق للسجلات الطبية الإلكترونية. الهدف الرئيسي من هذا البحث هو استكشاف تصورات الأطباء لأهمية وظيفة السجلات الطبية الإلكترونية، والاستخدام المتوقع والمواقف والمعتقدات العامة في المنظمة الوحيدة التي تتبنى سجلات السجلات الطبية الإلكترونية في كردستان العراق. أجريت الدراسة المقطعية على 150 طبيباً متخصصاً تم اختيارهم عشوائياً من مدينة فاروق الطبية في مدينة السليمانية، كردستان، العراق باستخدام استبانة تم إجراؤه ذاتياً. تتمثل النتيجة الرئيسية لهذه الدراسة في أن العناصر ذات الأهمية الكبرى لجميع المستجيبين (100%) هي عرض نتائج المختبر، وعرض الملاحظات والتقارير السريرية، وعرض البيانات السريرية ذات الاتجاه الزمني، وإدخال أوامر الطبيب (الاختبارات وطلبات الأدوية). الوظائف التي تم تصنيفها كواحدة من أقل الوظائف أهمية، تقارير الإدارة الطبية وتقارير إدارة الأمراض (89.3%) والطب النووي (72.7%). أعرب جميع المستجيبين عن أن السنة من وظائف السجلات الطبية الإلكترونية التسعة عشر ستستخدم أسبوعياً على الأقل، ووافقوا على وجوب تنفيذ نظام السجلات الطبية الإلكترونية، واقترحوا الدعم الشامل للسجلات الطبية الإلكترونية. اعتقدت العينة بأكملها (100%) أن السجلات الطبية الإلكترونية ستحسن جودة الرعاية وتقلل من الأخطاء، وتحسن جودة الممارسة (أي الحياة العملية)، وللسجلات الطبية تأثير إيجابي على تكلفة وأمن معلومات المرضى. يعتقد الغالبية أنه ستكون هناك زيادة في إنتاجية الممارسة مع السجلات الطبية الإلكترونية (92.7%) وتحتاج الطبية الإلكترونية إلى قضاء وقت في التدريب (94%). خلصت الدراسة إلى الموقف الإيجابي تجاه السجلات الطبية الإلكترونية. تتمثل التوصية الرئيسية في إجراء فحص منهجي لتصورات الأطباء للأطباء فيما يتعلق بالسجلات الطبية الإلكترونية؛ حيث يمكن لكل من مقدمي الخدمات الصحية ومؤسسات الرعاية الصحية تسريع قبول الطبيب؛ وفي النهاية معدل الاعتماد والاستخدام. ستساعد هذه الدراسة على تصميم التعليم المستهدف لإثبات مزايا السجلات الطبية الإلكترونية وتحسين تصورات الأطباء حول السجلات الطبية الإلكترونية.

## Introduction

The recording and documentation of events during the patient's consultation with the health professional is one of the tasks performed in medical care. [1] Traditionally, clinical documentation has been handwritten on forms and filed into paper medical records. However, the shortcomings of paper records are well known [2]. Handwritten medical records can be illegible, incomplete, and poorly organized, making it difficult to ensure quality of care. [3]

The advent of computer technology has introduced enormous possibilities for digitalization of healthcare services. It started with the transformation of paper-based health/medical data into paperless electronic medical records.[4] Electronic medical record (EMR) is the electronic version of paper-based records in which data is generated by one or more encounters in any care delivery setting stemming from the interoperability of multiple providers. [5] The data is easy to store, update, and exchange between healthcare institutions and providers anywhere and anytime.[6] [7]

Studies show that the adoption of an EMRs system in the healthcare system has the potential to transform healthcare in terms of saving costs, reducing medical errors, improving service quality, increasing patients' safety, decision-making, saving time, data confidentiality, simplifying reports to view long continuum of patients' medical histories and sharing medical information [8] [9] [10] [11] [12] [13] [54] From the perspective of healthcare staffs, EMRs systems will significantly reduce doctors' and nurses' workload, especially in dealing with a large amount of patient's medical records, removing data redundancies. Many researchers stated that EMRs help in effective physician-patient communication which is important for patient satisfaction, treatment adherence, and health outcomes. [17] [18] There is a growing demand to extract large data sets from the EHR for administrative reporting, clinical audits, and research. [7] [20] [9] [15] [16] [8] [9].

Despite the high expectations and interest in adopting and using EMR systems, its overall adoption rate is relatively low, especially in resource-limited countries where high disease prevalence and incidence rates are predominant. [8] [21] [22] [23] As indicated by various studies, the adoption and use of EMR systems in developing countries is in its embryonic stage for several reasons. [21] [22] Users' attitudes, knowledge, technical skills, functionality of the working environment/infrastructure, and lack of adequate resources are pointed out as important determinants for the functionality of the adopted EMR system. [24] Healthcare infrastructures, health professionals' attitudes, and awareness levels, lack of proper management, resource shortage, skill-related issues, users' resistance, policy-related issues, poor commitments of staff, and poor maintenance services are other reasons for the limited adoption and use of EMR systems in developing countries. [25] [26]

Understanding physician perceptions of ERMs will allow for the development of targeted education to demonstrate the advantages of EMRs and further improve the use of EMRs among physicians. [27] Implementation of electronic medical records has become a major priority in health care. [28] Ministry of Health started the transformation to paperless records and adopted EMRs in the largest multispecialty tertiary referral center in Sulaimani city in Kurdistan, Iraq namely the Faruk Medical City. There is a deficiency of available data and a lack of research regarding the level of adoption and usage of electronic medical records in the Faruk Medical City in Sulaimani City, Kurdistan, Iraq. This urges the need to find context-specific evidence on the level of adoption, EMR implementation, utilization, and barriers to not using the system. This research tried to pinpoint the level of EMR utilization and give an insight into EMR acceptance and other issues related to electronic medical records. This study will provide basic data for future research.

## Methodology

To assess physician perceptions related to EMRs, a cross-sectional survey of 150 specialist physicians affiliated with Faruk Medical City (tertiary referral center) in Sulaimani City, Kurdistan, Iraq was conducted. The study was approved by the local ethical committee, and managers, and informed consent was obtained from all participants in this study. The study's questionnaire was sent to 190 physicians by email from September to October 2020. The response rate was 78.9% (150 physicians). The authors used a valid and reliable questionnaire. This questionnaire is based on previous EMR research focusing on critical success factors, physician acceptance/resistance, and functionality. [29] [30] Individual sections of the questionnaire addressed: data requirements (inpatient and/or outpatient), use of existing systems, the importance of EMR functions, anticipated utilization of EMR functions, and general perceptions regarding the need and usefulness of an EMR. The questionnaire also invited respondents to share their general concerns regarding EMRs.

The questionnaire consisted of two parts. The first section included questions about physician demographics (age, gender, specialty, and work age). The second section included questions about respondents' perceptions and attitudes related to EMRs using a Likert scale ranging from "agree" to "disagree". The Likert scales were collapsed into a dichotomous variable, "agree", "slightly agree", "disagree" and "no comment" for this analysis. A six-point Likert scale from "very important" to "very unimportant" was used to determine respondents' anticipated utilization of EMR functions. The responses were entered into a spreadsheet and the data entry was verified manually for accuracy. The collected data were analyzed using SPSS v. 12 (SPSS, Chicago, IL, USA) and  $\chi^2$  test, with  $P < 0.05$  considered statistically significant. The percentages and their 95% confidence intervals are presented.

## Results

Table 1 shows that the age of the majority of physicians was less than 50 years (85.3%), and more than three-quarters of the study sample were male (77.3%). The study sample was distributed in the different departments including medical specialties (Dermatologist, Cardiologist, internal medicine, neurology,) Psychiatry, Pediatrics, Surgery (Neurosurgery, GYN/OB, Surgery, ENT, Ophthalmologist, Urologist, Orthopedics), and others (Radiologists, Anesthesiologists, Pathologists, ...etc.).

Table 2 demonstrates respondents' access to computer and clinical data required related to inpatient vs. outpatient data. A significantly greater proportion (75.3% vs. 24.7%) of physicians have owned a computer vs. haven't owned a computer. Physicians' access to computers either at the office or hospital (80.7%, 86.0%) respectively. Physicians who had formal computer training (74.7%) are greater than physicians who hadn't formal computer training (25.3%). A significantly greater proportion (90.7%) of physicians reported requiring access to inpatient versus outpatient data (87.3%).

Table 3 summarizes the respondents' perceptions regarding the importance of specific EMR functions. Respondents considered all the EMR functions presented to be at least slightly important. The table shows the items of greatest importance to all respondents (100%) are a display of lab results, the display of clinical notes and reports, time trended clinical data display, and physician order entry (tests and medication orders). The functions that rated as a moderate degree of importance were a display of height, weight, and allergies (97.3%), medical management reporting and notification by diagnoses (96.9%), preventative health reminders (96%), display of radiology reports and entry/display of diagnoses and medications were (95.3%), structured documentation (templates) & workflow inbox for office and/or hospital results (94.7%),

prescription alerts drug-drug, allergy and dose checking and formulary management (94.6), prescription writing (94%), decision support (guidelines, expert logic, reminders/alerts) (93.7%), display of radiology images (92.1%), display of demographics (92%) and finally display of other ancillary clinical data (90%). Physicians rated the following functions as one of the least important functions medical management reporting and disease management reporting (89.3%) and nuclear medicine (72.7%).

Table 4 summarizes respondents' Anticipated Utilization of EMR Functions. Percentage responses for these functions show that 4 of the 19 EMR functions would be used by participants at least some patients daily. (91%-96.7%) of respondents in this study expressed 4 of the 19 EMR functions would be used by at least some patients daily. While (80%-88.7%) expressed that 6 of the 19 EMR functions would be used by at least some patients daily and (70%-79.9%) of them expressed that 2 of the 19 EMR functions would be used by at least some patients daily. Less than half of the sample (40%) reported that 1 of the 19 EMR functions would be used by at least some patients daily. The findings reflect the increasing importance of the electronic record by increasing the percentages using the EMR functions daily. All the respondents in this study (100%) expressed that 6 of the 19 EMR functions would be used at least weekly and (92%) of respondents in this study expressed 2 of the 19 EMR functions would be used at least weekly. Finally, (60%-89.3%) of respondents expressed that 1 of the 19 EMR functions would be used at least weekly.

Table 5 summarizes respondents' general attitudes and perceptions regarding EMRs, including familiarity with functions and benefits, impacts, usage/training, and overall value and need for adoption. Both the frequent rating for each item and the percentages "agreeing" and "disagreeing" are presented. These percentages were calculated by collapsing a Likert scale from Agree to Disagree. All respondents (100%) agreed that an EMR system should be implemented,



suggested overall support for EMRs, and expressed that physicians were familiar with EMR functions and benefits. The whole sample (100%) expressed that EMRs would improve the quality of care and reduce errors, improve the quality of practice (i.e., work-life), EMRs have a positive impact on the cost and security of patients' information. Also, (100%) of the respondents felt that the EMRs response time for patients was an issue and that the implementation of EMRs needs training and agreed that the implementation of EMRs facing physician resistance. Finally, (100%) of physicians both show their resistance to EMRs and their positive attitude to implement EMRs. The majority believed that there will be an increase in practice productivity with EMRs (92.7%) and EMRs need spend time for training (94%). Regarding other items, namely perception about the patient's acceptance of EMRs, perception about the complexity of EMRs, and positive perception about the privacy of EMRs, the response was (86%) (82%) and (79.4%) respectively.

## **Discussion**

The path to quality improvement and financial gain with EMRs lies in getting the greatest number of physicians to use the system. [22] The main objective of this research is to explore physicians' perceptions of select EMR functions and general attitudes and beliefs in the only organization that adopts EMRs in Kurdistan, Iraq. There were Differences noted in access requirements for inpatient and outpatient clinical data likely reflect differences in medical practice. While many of the respondents cared for both inpatients as well as outpatients, some physicians dealt strictly with outpatients while others restricted their practice to inpatients (table 2).

In Table 3 the findings reflect the increasing importance of the EMR by increasing the percentages using the EMR functions on a weekly basis. This finding is supported by another study. [31] Despite the promise of EMRs to offer health reminders and decision support at the point of care these functions along with medical management reporting, they were rated the least

important by respondents. Physicians rated management reporting – disease management reporting (89.3%) as the least important functions are medical (Table 3). These findings agreed with the perspective of physicians in another two studies conducted by Meinert 2005 and Lakbala 2014. [30] [32] Not a surprise that the anticipated utilization of functions is highly correlated with perceived importance. The findings in Table 4 reflect the increasing EMR importance by increasing the percentages of using EMR functions on a weekly basis. This finding is supported by other studies. [30] [32] The majority of respondents believed that there will be an increase in practice productivity with EMRs (92.7%) (Table 5). This perception may reflect time savings. [33]

All participants reported that the improvement in patient care quality could be credited to the EMR system. [36] [37] [38] [39]. On the contrary, two studies assumed that an EMR system is time-consuming, creates an additional workload to record data to the system, and requires computer skills [47] [48]. More than ninety percent of the respondents expressed doubt that physicians would devote the time required for EMR training, but more than three-quarters of the physicians felt usage would have to be mandated (table 5). These findings are in accordance with other studies. [31] [33] [41] [50] [51] [52] [53] [54] This finding was reported in other studies. [13] [32] [40] [41] [42] [43] [44] [45] [46].

Nearly half of the respondents (50.6%) mentioned that the complexity of EMRs is an issue of the implementation system. This finding was reported by other studies. [49] [29] [31] More than half of respondents (52.0%) mentioned both show their resistance to EMRs and their positive attitude to implement EMRs (82.7%). This is an interesting result that physicians' resistance may be due to EMR issues, usefulness, and ease-of-use of the technology than EMRs' function and benefits.

The fact that about-half (50.7%) of the participating physicians expressed concern that

physicians in general Physicians are familiar with EMR functions and benefits. This means that the other half was unfamiliar with EMR functions, and the benefit suggests a lack of prior knowledge may have influenced responses. The extent to which the findings were affected by these limitations is unknown. Although unfamiliar with EMR, the findings illustrated a significant percentage of physicians may be unwilling to devote sufficient time to EMR training. Incentives, motivation, staff support, leadership commitment, and policies could help with this issue.

Most physicians did not fully appreciate the functionality and benefits that could be attained by EMR. This was reflected in the rating of functions. Physicians that have historically relied on memory and personal judgment to address preventative health issues may be hesitant to rate preventative health reminders higher in importance as it could be construed as an indictment of their current practice. The moderate importance rating for a digital workflow inbox indicates, that most physicians did not fully appreciate this functionality nor the benefits it would afford clinical staff. Despite the promise of EMRs to offer health reminders and decision support at the point of care, these functions along with medical management reporting were rated the least important by respondents. This is like the finding of other studies. [30] [32]

Structured documentation (templates) and physician order entry 0 may have been rated as a moderate degree of importance as physicians have developed strategies and methods for quickly completing these common tasks. In the case of documentation, physicians frequently utilize dictation with abbreviations and common entries that are transcribed into “richer” notes. Orders, typical in well-defined sets, are easily and quickly issued verbally to clinical staff for execution and documentation. EMR software should have the ability to limit access to various portions of the record to users. About half of physicians (50.6%) mentioned the complexity of EMRs as an issue of the implementation system. This finding is supported by other studies. [34] [49]

## Conclusions

Despite the positive effects of using EMRs in medical practices, the adoption rate of such systems is still low, and they meet resistance from physicians. For the positive impact of available EMR systems on patient safety, physicians must be able to use these systems effectively. The use and adoption of electronic medical record systems (EMRs) depend on various factors, such as user and system attributes, support from others, and organizational and environmental facilitators. Conversely, the difficulty of using EMRs and the non-use of specific functions are influenced by the presence of barriers. Based on this systematic investigation of physician perceptions toward electronic medical records (EMRs), it is essential for both vendors and healthcare organizations to facilitate physician acceptance and ultimately the rate of adoption and utilization of EMRs. This study seeks to help them design targeted education to illustrate the benefits of EMRs and further advance physicians' perceptions of EMRs. The implementation of an EMR system requires good planning, strong physician leadership, training, and supportive staff. A range of policy options could be used to expedite the development of EMR. Moreover, further research about the effect of the adoption of EMR on the quality of care is required.

## References

1. Pan American Health Organization, “Electronic Medical Records in Latin America and the Caribbean: An Analysis of the current situation and recommendations for the Region”. Washington, DC: PAHO, 2016.
2. Institute of Medicine, “The Computer-Based Patient Record: An Essential Technology for Health Care”. Washington, DC: National Academy Press, 1997.
3. A.S. Young, G. Sullivan, M.A. Burnam, R.H. Brook, Measuring the quality of outpatient treatment for schizophrenia. *Arch Gen Psychiatry*, 55(6) (1998) 7 –11.
4. W.W. Stead, B.J. Kelly, R.M. Kolodner, “Achievable Steps Toward Building a National Health Information Infrastructure in the United States”. *J Am Med Inf.*, 12(2) (2005) 20–113.
5. Texas Medical Association (TMA). “EMR or EHR? What’s the Difference?” 2010. Available: <http://www.texmed.org/template.aspx>. [Accessed:12-December 2020].
6. R.H. Dolin, L. Alschuler, S. Boyer, C. Beebe, F.M. Behlen, P. V. Biron, and, S. A. Shabo, “HL7 Clinical Document Architecture, Release 2”. *Journal of the American Medical Informatics Association, JAMIA*, 13(1) (2005) 30-9.
7. M. Anshari, M.N. Almunawar, L.S. Ariff, A. Al-mudimigh, “Customer Relationship Management and Big Data Enabled: Personalization & Customization of Services”. *Applied Computing and Informatics*, 15(2) (2019) 94-101.
8. S.P. Sood, S.N. Nwabueze, V.W.A. Mbarika, N. Prakash, S. Chatterjee, P. Ray, P. Pradeep, S. Mishra, “Electronic medical records: A review comparing the challenges in developed and developing countries”. 41st Annual Hawaii International Conference on System Sciences, Waikoloa, HI, USA, (2008).
9. T. Mengesha, “Electronic solutions for Ethiopian health sector: Electronic medical record (EMR) system”. Oulu, Finland: Oulu University of Applied Sciences, (2011).
10. W.E. Rex, H.B. Lizabeth, “Developing patient registration and medical records management system in Ethiopia”. *International Journal for Quality in Health Care*. 21(4) (2009) 8-253.
11. Z. Omary, D. Lupiana, F. Mtenzi, B. Wu, “Analysis of the challenges affecting e-healthcare adoption in developing countries: A case of Tanzania”. *International Journal of Information Studies*. 2(1) (2010) 38-50.
12. M. Anshari, M.N. Almunawar, “Tracking Future Path of Consumers’ Empowerment in E-Health,” *Int. J. E-Health Med. Commun.* 6(3) (2015) 63–76.
13. R. Hillestad, J. Bigelow, A. Bower, F. Girosi, R. Meili, R. Scoville, R. Taylor, “Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, and Costs”. *HEALTH AFFAIRS*. 24(5) (2005)1103-17.
14. A. Hoerbst, E. Ammenwerth, “Electronic health records. A systematic review on quality requirements”. *Methods Inf Med*. 49(4) (2010) 320–36.
15. K. Häyrynen, K. Saranto, P. Nykänen, “Definition, structure, content, use and impacts of electronic health records: a review of the research literature”. *Int J Med Inform.* 77(5) (2008) 291–304.
16. W. Levinson, D. Roter, J.P. Mullooly, V.T Dull, R. Frankel, “Physician-patient

communication. The relationship with malpractice claims among primary care physicians and surgeons". *J. Am. Med. Assoc.* 277 (7) (1997) 553–59.

17. M.N. Almunawar, M. Anshari, M.Z. Younis, A. Kisa, "Electronic Health Object: Transforming Static to Interactive and Extensible Healthcare Systems", *Inq. J. Heal. Care Organ. Provision, Financ.* 52 (2015).
18. M. Anshari, M.N. Almunawar, L.S. Ariff, A. Al-mudimigh, "Customer Relationship Management and Big Data Enabled: Personalization & Customization of Services". *Applied Computing and Informatics.* 15(2) (2019) 94-101.
19. A.D. Black, J. Car, C. Pagliari, C. Anandan, K. Cresswell, T. Bokun, M.B. Brian, R. Procter, A. Majeed, A. Sheikh, "The impact of eHealth on the quality and safety of health care: a systematic overview". *PLOS Med.* 8: e1000387, (2011).
20. World Health Organization. Regional Office for the Western Pacific, "Electronic health records: manual for developing countries. Manila: WHO Regional Office for the Western Pacific, (2006).
21. A. Boonstra, M. Broekhuis, "Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions". *BMC Health Services Research.* 10(23) (2010) 1-3.
22. S.R. Simon, R. Kaushal, P.D. Cleary, C.A., Jenter, L. A Volk, E.G. Poon, Correlates of electronic health record adoption in office practices: a statewide survey". *Journal of the American Medical Informatics Association.* 14(1) (2007) 110-117.
23. T. Biniam, F. Flirtz, "Comprehensive Evaluation of Electronic Medical Record System Use and User Satisfaction at Five Low-Resource Setting Hospitals in Ethiopia". *JMIR Med Inform.* 3(22) (2015) e22.
24. R.M. Kamadjeu, E.M. Tapang, R.N. Moluh, "Designing and implementing an electronic health record system in primary care practice in sub-Saharan Africa: a case study from Cameroon". *Inform Prim Care.* 13(3) (2005) 179- 86.
25. S.T. Peek, E.J. Woutersa, H.J. Van, K. G. Luijkx, H.R. Boeije, H.J. Vrijhoef, "Factors influencing acceptance of technology for aging in place: A systematic review. *Int J Med Inform.* 83(4) (2014) 235-48.
26. G.A. Loomis, S. Ries, R.M. Saywell, N.R. Thakker, "If electronic medical records are so great, why aren't family physicians using them?" *J Fam Pract.* 51(7) (2002) 636–41.
27. B.N. Doebbeling, A.F. Chou, W.M. Tierney, "Priorities and strategies for the implementation of integrated informatics and communications technology to improve evidence-based practice". *J Gen Intern Med. Suppl 2* (2006) S50-7.
28. T. Handler, "CPR generations: an update" (Report No: TU-12-9718). Gartner Group, (2001).
29. D.B. Meinert, "Resistance to electronic medical records (EMRs): a barrier to improved quality of care". *Issues in Informing Science & Information Technology.* 2 (2005) 493–504.
30. L. Gastaldi, E. Lettieri, M. Corso, C. Masella, "Performance improvement in hospitals: leveraging on knowledge asset dynamics through the introduction of an electronic medical record". *Measuring Business Excellence.* 16 (4) (2012) 14-30.
31. P. Lakbala, K. Dindarloo, Physicians' perception and attitude toward electronic medical

- record. Springer Plus, 3 (2014) 63.
32. N.W. Treister, "Physician acceptance of new medical information systems: the field of dreams". *Physician Exec.* 24(3) (1998) 20–4.
  33. R.H. Miller, I. Sim, "Physicians' use of electronic medical records: barriers and solutions". *Health Aff (Millwood)*. 23(2) (2004)116–26.
  34. C.S Silow, J.N. Edwards, D. Rodin, "Using electronic health records to improve quality and efficiency: the experiences of leading hospitals". *The Commonwealth Fund*. 17 (2012) 1–38.
  35. D.I. Thompson, J. Osheroff, D. Classen, D.F. Sittig, "A review of methods to estimate the benefits of electronic medical records in hospitals and the need for a national benefits database". *J Healthc Inform Manag.* 21(1) (2007) 6–8.
  36. P.G. Shekellee, S.C. Morton, E.B. Keeler, "Cost and benefits information technology". *Evid Rep Technol Assess.* 132 (2006) 1–71.
  37. N. Xiao, R. Sharman, R. Singh, G. Sin, "Meaningful use of ambulatory EMR: does it improve the quality and efficiency of health care?". *Health Policy and Technology.* 1(1) (2012) 28–34,
  38. J. Gold, D. Reyes-Gastelum, J. Turner, D.H. Dele, "A quality improvement study using fishbone analysis and an electronic medical records intervention to improve care for children with asthma". *Am J Med Qual.* 29(1) (2014) 70-7.
  39. D.B. Hier, "Physician buy-in for an EMR". *Health Inform.*19(10) (2002)37–40.
  40. D. Bates, A. Gawande, "Improving safety with information technology". *N Engl J Med.* 348(25) (2003) 26–34.
  41. I. Valdes, D.C. Kibbe, G. Tolleson, M.E. Kunik, L.A. Petersen, "Barriers to proliferation of electronic medical records". *Informat Prim Care.* 12(1) (2004) 3–9.
  42. W.D. Soper, "Why I love my EMR. *Fam Pract Manag*". 9(9) (2002) 35–8.
  43. P.C. Waegemann, "The vision of electronic health records". *J Med Pract Manage.* 18(2) (2002) 63–5.
  44. N. Menachemi, A. Langley, R.G. Brooks, "The use of information technologies among rural and urban physicians in Florida". *J Med Syst.* 31(6) (2007) 83–88.
  45. G.A. Loomis, S. Ries, R.M. Saywell, N.R. Thakker, "If electronic medical records are so great, why aren't family physicians using them?", *J Fam Pract.* 51(7) (2002) 36–41.
  46. A. Mahendra, J. Silabutra, B. Keiwkarnka, "Midwives' intentions regarding use of electronic medical records in health centers in Lebak district, Banten province, Indonesia". *J Pub Health Dev.* 9(3) (2011) 257-271.
  47. M. Gebre-Mariam, "Exploring Challenges in Patient Monitoring and Clinical Information Management of Antiretroviral Therapy (ART) and the Perceived Usefulness of Electronic Medical Records (EMR system) in HIV Care in Ethiopia". MSc thesis. Ontario, Canada: Western University, (2010).
  48. J.P. Burns, "Complexity science and leadership in healthcare". *J. Nurse Adm.* 31(10) (2001) 474–82.
  49. R. M. Rahal, J. Mercer, C. Kuziemy, S. Yaya, "Primary Care Physicians' Experience Using Advanced Electronic Medical Record Features to Support Chronic Disease Prevention and Management: Qualitative Study", *JMIR Med Inform.*;7(4) (2019) e13318. doi:

10.2196/13318. PMID: 31782742

50. H. F. Al Otaybi, R. M. Al-Raddadi, F. H. Bakhamees, “Performance, Barriers, and Satisfaction of Healthcare Workers Toward Electronic Medical Records in Saudi Arabia: A National Multicenter Study”, 14(2) (2022) e21899. doi: 10.7759/cureus.21899. eCollection, PMID: 35155041
51. P. R. Van, A. Schrijvers, A. Boonstra, K. Roes, “Medical Specialists' Perspectives on the Influence of Electronic Medical Record Use on the Quality of Hospital Care: Semistructured Interview Study”. *JMIR Hum Factors*; 8(4) (2021) e27671. doi: 10.2196/27671., PMID: 34704955.
52. Y. Zurynski, L.A. Ellis, H. L. Tong, L. Laranjo, R. Clay-Williams, L. Testa, I. Meulenbroeks, C. Turton, G. Sara, “Implementation of Electronic Medical Records in Mental Health Settings: Scoping Review”. *JMIR Ment Health*. 7;8(9) (2021) e30564. doi: 10.2196/30564., PMID: 34491208.
53. M. Filipec, G. Brumini, “Attitude of physiotherapists toward electronic health record in Croatia”, eCollection (2019). doi: 10.1186/s40945-019-0062-7, PMID: 31660205.
54. Hani J. Kbash and Salwan K.J. Al-Ani , The Educational Aspects of Electronic Components and Their Related Circuits, *ARID International Journal for Science and Technology (AIJST)*,4(8), (2021), 9-39, <https://doi.org/10.36772/arid.ajst.2021.481>



**Table 1***Respondents, profile*

VARIABLE	NO.(RATIO%)
<b>Age</b>	
<35	41(27.3)
35-50	87(58)
>50	22(14.7)
<b>Gender</b>	
Male	106(77.3)
Female	44(22.7)
<b>Specialty</b>	
Medical specialties (Dermatologist, Cardiologist, Internal Medicine, Neurologist)	30(20.0)
Psychiatry	7(4.7)
Pediatrics	23(15.3)
Surgery (Neuro Surgery, OB/GYN, Surgery, ENT, Ophthalmologist, Urologist, Orthopedics)	59(39.3)
Others (Radiologists, Anesthesiologists, Pathologists,...etc.)	31(20.7)

\*OB/GYN: *obstetrics & gynecology.*\*\* E.N.T: *ears, nose and throat.***Table 2***Respondents' Access to Computer and Clinical Data Required*

VARIABLE	YES	NO
<b>Own a computer</b>	113(75.3)	37(24.7)
<b>Place of access to computer:</b>		
Office	121(80.7)	29(19.3)
Hospital	129(86.0)	21(14.0)
Formal computer training	112(74.7)	38(25.3)
<b>Clinical data required:</b>		
Inpatient	136(90.7)	14(9.3)
Outpatient	131(87.3)	28(18.7)

**Table 3***Respondents' perceptions regarding the importance of specific EMR functions.*

<b>Function</b>	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Ordinary</b>	<b>No Important</b>	<b>Very Unimportant</b>
<b>Display of lab results</b>	132(88)	14(9.3)	4(2.7)	-	-	-
<b>Display of radiology reports</b>	124(82.7)	11(7.3)	8(5.3)	6(4.0)	1(0.7)	-
<b>Display of clinical notes and reports</b>	124(94.7)	20(13.3)	6(0.4)	-	-	-
<b>Display of height, weight and allergies</b>	69(46.0)	72(48.0)	5(3.3)	3(2.0)	1(0.7)	-
<b>Nuclear medicine</b>	45(30.0)	37(24.7)	27(18.0)	24(16.0)	12(8.0)	5(3.3)
<b>Display of radiology images</b>	73(48.7)	52(34.7)	13(8.7)	6(4.0)	4(2.7)	2(1.3)
<b>Entry/Display of diagnoses and medications</b>	92(61.3)	38(25.3)	13(8.7)	5(3.3)	1(0.7)	1(0.7)
<b>Display of other ancillary clinical data</b>	43(28.7)	54(36.0)	38(25.3)	8(5.3)	5(3.3)	2(1.3)
<b>Prescription alerts drug-drug, allergy and dose checking and formulary management</b>	72(48.0)	56(37.3)	14(9.3)	7(4.7)	1(0.7)	-
<b>Display of demographics</b>	57(38.0)	62(41.3)	19(12.7)	6(4.0)	4(2.7)	2(1.3)
<b>Time trended clinical data display</b>	81(54.0)	53(35.3)	16(10.7)	-	-	-
<b>Structured documentation (Templates)</b>	61(40.7)	63(42.0)	18(12.0)	5(3.3)	3(2.0)	-
<b>Physician order</b>	108(72.0)	39(26.0)	3(2.0)	-	-	-

entry (tests and medication orders)						
Prescription writing	91(60.7)	35(23.3)	15(10.0)	9(6.0)	-	-
Workflow inbox for office and/or hospital results	78(52.0)	52(34.7)	12(8.0)	8(5.3)	-	-
Decision support (guidelines, expert logic, reminders/alerts)	81(54.0)	38(25.3)	22(14.7)	7(4.7)	2(1.3)	1(0.7)
Preventative health reminders	75(50.0)	46(30.7)	23(15.3)	5(3.3)	1(0.7)	1(0.7)
Medical management reporting – notification by diagnoses	89(59.3)	40(26.3)	17(11.3)	1(0.7)	1(0.7)	1(0.7)
Medical management reporting – disease management reporting	84(56.0)	36(24.0)	14(9.3)	12(8.0)	3(2.0)	1(0.7)

**Table 4**  
*Anticipated Utilization of EMR Functions.*

Function	More Patient/Daily	Some Patient/Daily	Weekly	Monthly	Every 3 Months	Never
Display of lab results	135 (90.0)	15 (10.0)	-	-	-	-
Display of radiology reports	90 (60.0)	30 (20.0)	30 (20.0)	-	-	-
Display of clinical notes and reports	109 (72.7)	28 (18.7)	13 (8.6)	-	-	-
Display of height, weight and allergies	113 (75.3)	16 (10.7)	5 (3.3)	9 (6.0)	7 (4.7)	-
Nuclear medicine	44 (29.3)	16 (10.7)	31 (20.6)	13 (8.6)	29 (19.4)	17 (11.4)

<b>Display of radiology images</b>	<b>58</b> <b>(38.7)</b>	<b>47</b> <b>(31.3)</b>	<b>33</b> <b>(22.0)</b>	<b>12</b> <b>(8.0)</b>	-	-
<b>Entry/Display of diagnoses and medications</b>	<b>82</b> <b>(54.6)</b>	<b>61</b> <b>(40.6)</b>	<b>7</b> <b>(4.8)</b>	-	-	-
<b>Display of other ancillary clinical data</b>	<b>77</b> <b>(51.3)</b>	<b>43</b> <b>(28.6)</b>	<b>18</b> <b>(12.0)</b>	<b>12</b> <b>(8.0)</b>	-	-
<b>Prescription alerts drug-drug, allergy and dose checking and formulary management</b>	<b>91</b> <b>(60.7)</b>	<b>59</b> <b>(39.3)</b>	-	-	-	-
<b>Display of demographics</b>	<b>82</b> <b>(54.7)</b>	<b>40</b> <b>(26.7)</b>	<b>11</b> <b>(7.3)</b>	<b>9</b> <b>(6.0)</b>	<b>5</b> <b>(3.3)</b>	<b>3</b> <b>(2.0)</b>
<b>Time trended clinical data display</b>	<b>79</b> <b>(52.7)</b>	<b>41</b> <b>(27.3)</b>	<b>18</b> <b>(12.0)</b>	-	-	<b>12</b> <b>(8.0)</b>
<b>Structured documentation (Templates)</b>	<b>94</b> <b>(62.7)</b>	<b>51</b> <b>(34.0)</b>	-	<b>5</b> <b>(3.3)</b>	-	-
<b>Physician order entry (tests and medication orders)</b>	<b>121</b> <b>(80.7)</b>	<b>29</b> <b>(19.3)</b>	-	-	-	-
<b>Prescription writing<sup>0</sup></b>	<b>126</b> <b>(84.0)</b>	<b>14</b> <b>(9.3)</b>	<b>10</b> <b>(6.7)</b>	-	-	-
<b>Workflow inbox for office and/or hospital results</b>	<b>105</b> <b>(70.0)</b>	<b>28</b> <b>(18.7)</b>	<b>17</b> <b>(11.3)</b>	-	-	-
<b>Decision support (guidelines, expert logic, reminders/alerts)</b>	<b>61</b> <b>(40.7)</b>	<b>77</b> <b>(51.3)</b>	<b>12</b> <b>(8.0)</b>	-	-	-
<b>Preventative health reminders</b>	<b>67</b> <b>(44.7)</b>	<b>74</b> <b>(49.3)</b>	-	<b>9</b> <b>(6.0)</b>	-	-
<b>Medical management reporting – notification by diagnoses</b>	<b>95</b> <b>(63.3)</b>	<b>4</b> <b>(36.7)</b>	-	-	-	-
<b>Medical management reporting – disease management reporting</b>	<b>98</b> <b>(65.3)</b>	<b>37</b> <b>(24.7)</b>	-	<b>15</b> <b>(10.0)</b>	-	-

**Table 5**  
*Perception and Attitudes Regarding EMRs.*

<b>Attitude/beliefs</b>	<b>Agree</b>	<b>Slightly Agree</b>	<b>Disagree</b>	<b>No Comment</b>
<b>Physicians are familiar with EMR functions and benefits</b>	<b>76(50.7)</b>	<b>74(49.3)</b>	<b>-</b>	<b>-</b>
<b>EMR Functions and Benefits</b>				
<b>EMRs improve quality of care and reduce errors</b>	<b>124(82.7)</b>	<b>26(17.3)</b>	<b>-</b>	<b>-</b>
<b>EMRs improve quality of practice (i.e., work life)</b>	<b>133(88.7)</b>	<b>17(11.3)</b>	<b>-</b>	<b>-</b>
<b>EMRs increase practice productivity (i.e., patients per day)</b>	<b>97(64.7)</b>	<b>42(28.0)</b>	<b>11(7.3)</b>	<b>-</b>
<b>Physicians will devote the time required for EMR Training</b>	<b>65(43.3)</b>	<b>77(51.3)</b>	<b>8(5.4)</b>	<b>-</b>
<b>EMRs induced hard work</b>	<b>78(52)</b>	<b>47(31.3)</b>	<b>28(18.7)</b>	<b>-</b>
<b>EMRs need spent time for training</b>	<b>80(53.3)</b>	<b>61(40.7)</b>	<b>9(6)</b>	<b>-</b>
<b>EMR benefits outweigh the costs</b>	<b>122(81.3)</b>	<b>28(18.7)</b>	<b>-</b>	<b>-</b>
<b>EMRs Issue</b>				
<b>Impact on cost</b>	<b>78(52)</b>	<b>72(48)</b>	<b>-</b>	<b>-</b>
<b>Impact on security</b>	<b>109(72.6)</b>	<b>41(27.4)</b>	<b>-</b>	<b>-</b>
<b>Patient acceptance</b>	<b>75(50)</b>	<b>54(36)</b>	<b>21(14)</b>	<b>-</b>
<b>Privacy</b>	<b>93(62)</b>	<b>26(17.4)</b>	<b>31(20.6)</b>	<b>-</b>
<b>Complexity</b>	<b>76(50.6)</b>	<b>47(31.4)</b>	<b>27(18)</b>	<b>-</b>
<b>Response time for patient</b>	<b>61(40.6)</b>	<b>89(59.4)</b>	<b>-</b>	<b>-</b>
<b>Training needs</b>	<b>97(64.7)</b>	<b>53(35.3)</b>	<b>-</b>	<b>-</b>
<b>Physicians' resistance</b>	<b>78(52)</b>	<b>72(48)</b>	<b>-</b>	<b>-</b>
<b>An EMR system should be implemented</b>	<b>124(82.7)</b>	<b>26(17.3)</b>	<b>-</b>	<b>-</b>

**Abbreviations:**

**EMRs:** Electronic medical Records.

**GYN:** Gynecology.

**OB:** Obstetric.

**ENT:** Ear, Nose & Throat.