Factors Affecting Acceptance of Electronic Medical Records System in Murang'a County Referral Hospital in Murang'a County, Kenya

Geoffrey Karanja Muiruri [1*], George O. Otieno [2] and Josephat Kiongo [3]

[1, 2] Department of Health Management and Informatics, Kenyatta University, Kenya
[3] Department of Nursing, Chuka University, Kenya

Abstract

Background: The acceptance of Electronic Medical Records systems deployed at healthcare facilities by the government, private institutions and Facility Based Organizations is paramount in achieving the intended outcomes of the systems. However, many systems face acceptance barriers. The application of Electronic Medical Records system has gained popularity and is widely used in Kenyan hospitals today. Many studies have been conducted in other countries to study the factors influencing acceptance and utilization of EMR technology, but still a few numbers of studies exist in Kenya. This study seeks to find out factors influencing acceptance of electronic medical records system in public health facilities using a case study of Murang'a County Referral Hospital in Murang'a County. Electronic Medical Records assists in collection, storage and retrieval of patient's data which can summarized to give brief overview of the patient's medical history as well as other health indices and workload reports.

Methods: In this study, the target population was 217 employees on permanent, contract and temporary terms at the Murang'a County Referral Hospital. These were selected from a population of 500 staff. To choose the participants, Stratified sampling method was used as it is a non-bias method that gave realistic and accurate representative data of the target population. The tool used in this research was a questionnaire. Both structured and unstructured questionnaires were used. A Pre-test was conducted at Kenneth Matiba Eye and dental Hospital in Kenol Murang'a. The filled questionnaires were first edited for completeness and clarity. Quantitative data analysis was used in the study. The data collected was coded and analyzed using SPSS v20 and Microsoft Excel 2019. Descriptive Statistics using cross tabulation was used to describe the relationship between the independent and dependent variables.

Results: The findings showed that majority (61%) of respondents had diploma qualifications as their highest level of education and huge number of respondents (76%) had comparable work experience ranging between 1 and 5 years. This study also revealed that 82% of the respondents had received some training on EMRs and 91% had computers in their departments .Most of the respondents considered commitment of management to implementation of EMRs remained neutral (M=3.08.The study findings showed that 85% of the respondents were in agreement that EMR quickens clinical decision-making process and another 92% agreed that EMR makes it easier to retrieve medical records. Majority of the respondents (81%) felt that it was difficult to create time to study EMR system with (M=1.2).

Conclusion: As such, so as to enhance acceptance of EMR, Adequate staffing and adequate incentives to adoption of EMRs ought to be explored. Also, Guidelines on data privacy and security ought to be developed and enforced. It is envisioned that by mainstreaming EHR/EMR content in basic healthcare, curricula will entrench them to the health sector. This research recommends that future endeavors should explore more issues that may encourage the acceptance of EMR.

Keywords: Workload, Capacity, User Perception
* Corresponding author: jeffmuiruri@gmail.com

1. Introduction

Electronic Medical Records (EMRs) systems are useful in addressing shortcomings observed in the use of manual records such as errors, enhancing communication among service providers and health institutions, improving proficiency and efficiency in service provision and lowering costs (Ministry of Health {MoH}, 2010). With advances in information communication technologies (ICT), EMRs have become the preferred method for records and information management in healthcare (Samadbeik et al., 2020). Raymond et al (2015) also observed comparable drop in medical faults and improved readability as additional benefits while Jensen et al (2012) where apt to observe convenient and reliable billing methods as well as having a data storehouse for future research and other managerial functions as additional benefits of EMR. Abdel-Wahab, Omer, and Attalla, (2008) concluded that over a quarter-century existence of EMR was a testimony to continuing improvement in the healthcare industry.

In systemic review on factors influencing use of ICT by health professionals, Gagnon, et al. (2010) concluded that the leading reasons for adoption and use of EMRs were perceived usefulness and ease of use. Moreover, there are many studies vouching for improved primary healthcare services and consumer experience as a result of computerized health records (Lee et al., 2018; Singh & Muthuswamy, 2013; Marques *et al.*, 2011; Gagnon *et al.*, 2010).

The American Institute of Medicine (2001) informed that utilization of IT in health institutions led to realization of the quality improvement matrix that include safety, effectiveness, patient-centeredness, timeliness, efficiency and equity. Studies done in middle- and low-income countries point to limited use of health information decision making. Health workers at institutions in such jurisdictions show that Health Information Systems (HISs) such as EMRs usually act information conduit with seldom application for decision-making in the clinical area and broader patient care endeavors. For example, Gebre-Mariam, Borycki,

Kushniruk, and Ellen (2012) noted that in countries like Mozambique, Mongolia and South Africa health data was gathered for government decision making but not by clinicians. Elsewhere in Sub-Saharan Africa, those who venture into implementing IT- based solutions contend with multiplicity of hardships occasioned by limited financial support, absence of computer hardware and software, lack of secure physical space and weak administrative support (Sood et al., 2008; Bra, Monteiro & Sahay, 2004).

Digitization in Kenya is on upward trajectory with mobile phone technology adoption and penetration being rated favorably. However, adoption of such technologies in the various sectors of the economy is uneven with healthcare lagging behind. As a result, possible to emphatically report on Kenyan adoption of EMRs and the attendant factors due to paucity of data. In spite of the significance of such undertakings in the health industry, there is paucity of knowledge on their acceptance in the Kenyan context. This study offers some answers to the current need by exploring the acceptance of EMRs in Murang'a County Referral Hospital. The Kenyan MoH has highlighted on the necessity to better application of information technologies to health. In the HIS strategic plan (2009-2014) improved application of ICT is envisioned. With this objective at hand, the MoH, through the HIS, undertook EMRs rationalization exercise. Health Information is one of the investment areas identified in the n ministry's Health Sector Strategic and Investment Plan (2014-2018) for improved orientation and harmonization of health care resources.

2. Materials and methods

Research Design

This study adopted a cross-sectional descriptive study design to meet the objectives. The study design was also to provide the researcher with wide-ranging, in-depth and genuine information from the actual respondents and also present both qualitative and quantitative data (Mugenda and Mugenda, 2003).

Variables

The dependent variable in this study was acceptance of EMRs system in Kenya's public health facilities while independent variables were workload, user perception, health infrastructure and users' capacity.

Location of the Study

The study was carried out in Murang'a County Referral Hospital. This is the county referral Hospital which is a good representation of the public healthcare services as it offers all the basic health services as well as specialized treatment. The hospital also has EMR systems in its medical and administrative operations.

Study Population

The population of this study consisted of medical and paramedical staff working in Murang'a County Referral Hospital. These are people who deal with patients either directly through curative, promotive and preventive services or through management of medical services.

Sampling Techniques and Sampling Size

Sampling techniques

The study adopted stratified sampling technique. Stratified sampling is a non-bias method that gave representative data of the target population. This ensured that at least participants from all the departments in the hospital are selected while at the same time every member of the population had equal chance of participating in the study.

Sample Size

Out of a population of 500 staff working at Murang'a County Referral Hospital, 217 employees on various terms of employment were sampled using the Krejcie and Morgan (1970) formula.

$S=X^2NP\ (1-P)\ +d^2\ (N-1)\ +X^2P\ (1-P)$

S= Required sample size

X^2= The table value of chi-squire for 1degree of freedom at the desired confidence level (3.841)

N= Population size

P= The population proportion (assumed to be 50 since this would provide the maximum sample size)

d= The degree of accuracy expressed as a proportion (0.5)

Data collection tools

Self-administered questionnaire was used for data collection. The questionnaire included a range of items that covered adequately all the research questions. Both structured and unstructured questionnaires was used.

Validity of the Research Instruments

Structured questionnaires were used because they are specific in the kind of responses elicited and are perfect for a large group of respondents within time and resource constraints. Biases and prejudices in responses are also reduced or avoided. Questionnaires are excellent in minimizing respondent biases and prejudices since one can only respond to items using provided alternatives.

Reliability of the Research Instruments

The consistency of the instrument was established by conducting a pre-test of Kenneth Matiba Eye and dental Hospital in Kenol Murang'a. Ten questionnaires were distributed to the respondents located in that Hospital. Internal consistency reliability estimate was given by Cronbach Alpha reliability coefficient of a minimum of 0.7 or higher which is agreed "acceptable" for exploratory or pre-test studies (Whitley 2009; Robinson 2002; Hinton et al., 2004).

Data Collection Techniques

The various departments in the hospital were used as strata for sample selection. Data collection was done by administering the questionnaires to the sampled population as per the selection criteria.

Data Analysis

Questionnaires and data were coded and checked for completeness. The data entered in Microsoft excel (2010). This was later uploaded to IBM's Statistical Package for Social Scientists (SPSS) version 20 software. The data obtained from the research instruments was summarized using descriptive statistics. Frequencies, percentages, and means were used. The results were presented in distribution tables and figures for ease of explanation.

Logistical and Ethical Considerations

The proposal was submitted to Kenyatta University graduate school for consideration and approval. It was also be submitted to an Ethical Review Committee before approval for commencement of the study.

The researcher wrote an introductory letter to respondents was attached to the questionnaire assuring them that the research was purely for academic purposes. The research processes and procedures were conducted in conformity with ethical requirements for respect for human dignity and study protocols involving human subjects. Participation was on free-will after informed consent. Furthermore, respondents were free to opt-out at whatever point they wished. Moreover, the research employed an effective study design with a sample selection that was appropriate for the purpose of the study. The researcher sought consent from the County Director of Health (CDH) from Murang'a County before administering the study.

3. Results

Effect of Capacity in the adoption of EMR

Regarding effect of capacity of employees on acceptance of EMRs systems in Murang'a County Referral Hospital, the respondents were asked to state the extent to which the knowledge Capacity of staff influences the acceptance of EMRs systems. The results are presented in table 1 and show that the respondents considered commitment of management to implementation of EMRs remained neutral (Mean=3.08) with the role played by EMR vendors being rated as favorable (Mean=2.96). Moreover, respondents were undecided on the impact of training on EMR usage and operations (Mean=2.74). Health care workers felt that there were no awareness forums on EMR adoption (Mean=2.45) as well as outreach programmes for EMR (M=2.30).

Effect of User Perception in adoption of EMR

The study sought to assess how User Perception by health care workers influences the acceptance of EMRs system in Murang'a County Referral Hospital in Murang'a County. The results are as shown in table 2. The study findings showed that 85% of the respondents were in agreement that EMR quickens clinical decision-making process and another 92% agreed that EMR makes it easier to retrieve medical records. Regarding patient waiting time, 84% of the respondents agreed that EMR reduced patient waiting time. Additionally, 88% of the respondents implied that they preferred using EMR for their day-to-day operations. Conversely, 76% disagreed that switching from paper based to EMR system with affect their general performance. On the area of confidentiality and medical errors, 91% of the respondents agreed that EMR will positively address each of them. On whether EMR improved quality of care, only 68% of the respondents agreed with 18% disagreeing. When asked on whether EMR improved security of patient information, majority of the respondents (82%) disagreed.

Effect of Workload in the adoption of EMR

The study sought to establish how Workload influences the acceptance of EMR systems in Murang'a County Referral Hospital in Murang'a County by health care workers. The results are as shown in table 3. From the findings, out of the 171 respondents, most (53%) agreed that the daily workload is overwhelming (mean=3.6) and that they worked beyond working hours due to high daily patient turn-ups (mean=3.6). Majority of the respondents (81%) felt that it was difficult to create time to study EMR system with (mean=1.2). Most staff were ambivalent about staff adequacy in their various departments (mean=2.7) and whether work scheduling increased workload (mean=2.6). Most of the respondents were not sure whether EMR system increased the time spent with each patient (mean=2.6) though they were of contrary view that adoption of EMR system will increase the overall workload (mean =2.0).

Table 1: ***Effect of Capacity on use of EMR***

	1	2	3	4	5	Mean
Commitment to EMR implementation by management	22.1	42.9	32.9	0	2.1	3.08
EMR vendor follow-up on the usage of resources and facilities	15.4	44.2	28.8	2.7	9	2.96
Training on EMR usage & operations	26.7	37.9	22.9	4.5	8	2.74
Awareness forums on EMR adoption	15.4	44.2	28.8	2.7	9	2.45
Outreach programmes for EMR	7.1	12.5	20	7.5	53	2.30

Key: 1 = Strongly Disagree 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Table 2: Effect of Perception on adoption of EMR systems

	1	2	3	4	5	Mean
An EMR system quickens the process of clinical decision-making	0	1	14	53	32	4.15
EMR system makes retrieval of medical records easier	1	1	6	46	46	4.33
EMR reduces patient waiting	1	1	14	46	38	4.17
EMR improves confidentiality of patients' records	0	0	8	47	44	4.36
EMR system can help reduce medication/prescription errors	0	0	8	39	53	4.44
EMR makes it easy to maintain a patient appointment system	0	1	10	40	49	4.36
EMR system can improve the patients' overall quality of care	1	17	14	48	20	4.26
I prefer an EMR system for my day-to-day operations	1	0	11	38	50	4.34
I feel much in control while using paper-based system than EMR	25	21	19	14	21	2.85
Changeover to EMR will affect with my general output	36	40	14	3	7	2.04
EMR assure me of patient information safety	48	34	11	2	5	1.88

Key: 1 = Strongly Disagree 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Table 3: Influence of workload and the adoption of EMR

	1	2	3	4	5	Mean
Daily workload is overwhelming in this department	0%	17%	30%	40%	13%	3.6
In this department we have adequate staff to offer the services required	25%	34%	12%	23%	9%	2.7
In this department, the work schedule (shift) helps to reduce the daily workload	1%	31%	42%	17%	9%	2.2
Using the EMR system increases the amount of time spent with each patient	0%	1%	40%	35%	25%	2.6
I mostly work beyond my working hours because of	6%	11%	29%	41%	12%	3.6

high daily Patient's turn-up.						
I find it easy to spare time to learn the EMR system.	46%	35%	17%	2%	0%	1.2
Acceptance of EMR system will increase workload.	13%	30%	40%	16%	1%	2.0

Key: 1 = Strongly Disagree 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

4. Discussion

Embracing EMRs is critical to rationalizing essential processes in the health care industry, unite happenings across various health care organizations, cut down health care expenses, improve health information and health program management for improved patient care outcomes. Retrieval of files uses a lot of time and consumes lots of workman hours. There exists a knowledge gap in the literature on embracing EMRs among various cadres of healthcare professionals. The Kenyan government being cognizant of the essential role played by in realizing the Vision 2030 economic blueprint has made tremendous investments and policy declarations in the sector. Notwithstanding the potentials and interest in EMRs worldwide in regard to quality improvement, the overall take-up rate is relatively low, and are faced with several challenges. The study examined how knowledge capacity, EMR infrastructure, user perception and workload affected the adoption of EMR systems in public health facility in Kenya's Murang'a County. The study was successful in addressing the research objectives and the research questions. Following the study findings presented and discussed above, the study conclusions are as follows:

Knowledge was a crucial contributor to adoption of the EMR system. This agrees with other research findings. For example, Dutta and Hwang (2020) and Kruse et al (2018) in systematic review of the literature on EMRs observed that physicians were hesitant to adopt EMRs due to concerns on system complexities and technical knowhow.

Further, the findings indicated that presence of EMR infrastructure affected adoption of EMR. Alongside other factors, Lee et al (2018), Oumer et al (2014) and Almarzouqu, Aburayya and Sallum (2022), found infrastructure to be key in the success of implementing EMRs. Also, the findings indicated that user perception influenced adoption of EMR. Fraser and others (2022) noted that favorable user perception was a strong motivator in adoption and successful continued use of EMRs even in situations where resources were limited. Enhancement of user involvement in EMR implementation was found to be a mitigating factor to user perception (Chirchir et al., 2021).

Workload related factors were found to influence and correlated to the adoption of EMR. In the current study, staff decried the shortage of staff as compared to the prevailing workload and concerns that adoption of EMRs would lead to increased workload. This is in agreement with the findings Kruse et al (2018) and Dutta and Hwang (2020) in which physicians wondered that adoption of EMR would increase their workload. This may be partly due to lack of involvement of users during conceptualization and sourcing of EMRs systems.

Regarding data confidentiality and security, healthcare workers in this study were concerned that patient confidentiality and data security were not assured with EMRs. This may be because of misunderstanding of ICT security systems as well as mistrust between users and vendors. Keshta and Odeh (2021) noted that despite the benefits associated with EMRs and desire by many governments to adopt the same, uptake has been relatively low majorly due to concerns related to patient confidentiality and data security.

Conclusion and recommendations

The results from this research have policy propositions on the input and output in the public health sector. Consequently, from the findings on the factors affecting acceptance of electronic medical records system in Kenya's public health facilities by health care workers, the subsequent recommendations were made as follows; Guidelines on data privacy and security ought to be developed and enforced. Vendors, users and beneficiaries including patients should be trained on their roles, rights and obligations regarding data security. Continuous improvement to ward off malicious attacks and other threats should be explored and financed. Adequate staffing and adequate incentives to adoption of EMRs ought to be explored. Probably this might mitigate for workload burden. Because studies explore original information, the findings of this study are not exhaustive due to vibrant transformations in electronic data management, especially EMRs systems hence need for more research.

Conflicts of interest

Neither during nor after the study, the authors declared any conflicts of interest.

References

Abraham, C., Nishihara, E., & Akiyama, M. (2011). Transforming healthcare with information technology in Japan: A review of policy, people and progress. *International Journal of Medical Informatics*, *80*:157-70.

Almarzouqi, A., Aburayya, A., & Salloum, S. A. (2022). Determinants predicting the electronic medical record adoption in healthcare: A SEM-Artificial Neural Network approach. *Plos one*, *17*(8), e0272735.

Aqil A., Hozumi D. & Lippeveld T. (2009). PRISM framework: A paradigm for shift for strengthening and evaluating

routine health information systems. Health and Policy Planning,24,217–228.

Baran J., Kalogriopoulos N.A., Nimunkar A.J. & Webster JG. (2009). Electronic Medical Record Systems for Developing Countries: Review: Engineering in Medicine and Biology Society.

Boniol, M., Kunjumen, T., Nair, T. S., Siyam, A., Campbell, J., & Diallo, K. (2022). The global health workforce stock and distribution in 2020 and 2030: a threat to equity and 'universal'health coverage. *BMJ Global Health*, *7*(6), e009316.

Boonstra, A., & Broekhuis, M. (2010). Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC health services research*, *10*(1), 1-17.

Canada Health Infoway and Health Council of Canada (2006). Beyond good intentions: accelerating the electronic health record in Canada. Policy Conference Montebello, QC, Canada.

Chebole, G. C. (2015). *Factors influencing adoption of electronic medical record systems in public health facilities in Kenya: a case of Nakuru county* (Doctoral dissertation, University of Nairobi).

Chetley A. (2006). Improving health, Connecting People: the role of ICTs in the Health Sector of Developing Countries.

Chirchir, L. K., Aruasa, W. K., & Chebon, S. K. (2021). Technical factors influencing electronic health records adoption by nurses at Moi Teaching and Referral Hospital, Kenya. *African Journal of Science, Technology, Innovation and Development*, *13*(5), 551-558.

Chronaki, C. E., Kontoyiannis, V., Mytaras, M., Aggourakis, N., Kostomanolakis, S., Roumeliotaki, T., Tsiknakis, M. (2007). Evaluation of shared EHR services in primary healthcare centers and their rural community offices: The twister story. In *Annual International Conference of the IEEE Engineering in Medicine and Biology - Proceedings* (pp. 6421–6424). doi:10.1109/IEMBS.2007.4353826.

Cline, S. (2012). About Health IT in North Carolina. *N. D. o. H. a. H. Services*, NC Department of Health and Human Services.

Cruicksack, J., Carl, P., & Jon, P. (2012). Personal Health Records: Putting Patients in Control. Retrieved from *www.2020health.org/dms/2020health/.../2020PHRreport_ ONLINE.pdf*

David Muchangi Mugo, D. N. (2014). Determinants of Electronic Health in Developing Countries. *International Journal of Arts and Commerce*, *3*(3), 49–60.

Davidson, E., & Heslinga, D. (2007). Bridging the IT Adoption Gap for Small Physician Practices: An Action Research Study on Electronic Health Records. *Information Systems Management*, *24*, 15–28. doi:10.1080/10580530601036786.

DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, Kaushal R, Levy DE, Rosenbaum S, Shield AE, Blumenthal D: Electronic Health Records in Ambulatory Care - A National Survey of Physicians. *New England Journal of Medicine* 2008, 359(1):50-60. doi:10.1377/hlthaff.23.2.116

Dutta, B., & Hwang, H. G. (2020). The adoption of electronic medical record by physicians: A PRISMA-compliant systematic review. *Medicine*, *99*(8).

Ellingsen G., Faxvaag A. & Lærum H., (2001). Doctors' use of electronic medical records systems in hospitals cross sectional survey.

Fraser, H. S. F., Mugisha, M., Remera, E., Ngenzi, J. L., Richards, J., Santas, X., Naidoo, W., Seebregts, C., Condo, J., & Umubyeyi, A. (2022). User Perceptions and Use of an Enhanced Electronic Health Record in Rwanda With and Without Clinical Alerts: Cross-sectional Survey. *JMIR medical informatics*, *10*(5), e32305. https://doi.org/10.2196/32305

Ford EW, Menachemi N, Phillips MT (2006). Predicting the adoption of electronic health records by physicians: When will health care be paperless? Journal of the American Medical Informatics Association. 13, 106-112

Gatero, G. M. (2010). Utilization of ICTs for accessing Health Information by Medical Professionals in Kenya: A Case Study of Kenyatta National Hospital. *Journal of Health Informatics in Developing Countries*.

Greenhalgh, T., Wood, G. W., Bratan, T., Stramer, K., & Hinder, S. (2008). Patients‟ attitudes to the summary care record and HealthSpace: qualitative study. *BMJ (Clinical Research Ed.)*, *336*, 1290–1295. doi:10.1136/bmj. a114

ITU (2013). ICT facts and figures. Retrieved from http://www.itu.int/en/ITUD/ Statistics/Documents/facts/ICTFactsFigures2013.pdf

Jha, A. K., Bates, D. W., Jenter, C., Orav, E. J., Zheng, J., Cleary, P., & Simon, S. R. (2009). Electronic health records: Use, barriers and satisfaction among physicians who care for black and Hispanic patients. *Journal of Evaluation in Clinical Practice*, *15*, 158– 163. doi:10.1111/j.1365-2753.2008.00975.

Juma, K., Nahason, M., Apollo, W., Gregory, W., & Patrick, O. (2012). Current status of e-health in Kenya and emerging global research trends 1.

Kemper, A. R., Uren, R. L., & Clark, S. J. (2006). Adoption of electronic health records in primary care pediatric practices. *Pediatrics*, *118*, e20–e24. doi:10.1542/peds.20053000

Khalifehsoltani, S. N., & Gerami, M. R. (2010). E-health Challenges, Opportunities and Experiences of Developing Countries. *International Conference on e-Education, e-Business, e-Management, and e- Learning*, Sanya, China.

Kruse, C. S., Stein, A., Thomas, H., & Kaur, H. (2018). The use of electronic health records to support population health: a systematic review of the literature. *Journal of medical systems*, *42*(11), 1-16.

Lee, Y. T., Park, Y. T., Park, J. S., & Yi, B. K. (2018). Association between Electronic Medical Record System Adoption and Healthcare Information Technology Infrastructure. *Healthcare informatics research*, *24*(4), 327–334. https://doi.org/10.4258/hir.2018.24.4.327

Lewandowski, S., O'Connor, P. J., Solberg, L. I., Lais, T., Hroscikoski, M., & Sperl-Hillen, J. M. (2006). Increasing primary care physician productivity: A case study.

American Journal of Managed Care, *12*, 573–576. doi:3201 [pii]

Loomis, G. A., Ries, J. S., Saywell, R. M., & Thakker, N. R. (2002). If electronic medical records are so great, why aren't family physicians using them? *The Journal of Family Practice*, *51*, 636–641. doi: jfp_0702_00636 [pii]

Ludwick, D. A., & Doucette, J. (2009). Primary care physicians‟ experience with electronic medical records: Barriers to implementation in a fee-for-service environment. *International Journal of Telemedicine and Applications*. doi:10.1155/2009/853524

Makori, A. C., Musoke, M., & Gilbert, M. (2013). User issues on the adoption of health informatics systems in level 5 hospitals in Nyanza, Kenya. *Interdisciplinary Journal of Contemporary Research in Business*; *5*(1)

Meade, B., Buckley, D., & Boland, M. (2009). What factors affect the use of electronic patient records by Irish GPs? *International Journal of Medical Informatics*, *78*, 551–558. doi: 10.1016/j.ijmedinf.2009.03.004

Menachemi, N., Langley, A., & Brooks, R. G. (2007). The use of information technologies among rural and urban physicians in Florida. *Journal of Medical Systems*, *31*, 483–488. doi:10.1007/s10916-007-9088-6

Micevska, M. (2005). Telecommunications, Public Health, and Demand for Health-Related Information and Infrastructure. *Information Technologies and International Development*, *2(3)*, 57–72

Miller, R. H., & Sim, I. (2004). Physicians' use of electronic medical records: barriers and solutions. *Health Affairs (Project Hope)*, *23*, 116–26.

Ministry, M. S., & Health, P. (2010). Standards and Guidelines for Electronic Medical record Systems in Kenya. *Information Systems*.

Morris, C. J., Savelyich, B. S. P., Avery, A. J., Cantrill, J. A., & Sheikh, A. (2005). Patient safety features of clinical computer systems: questionnaire survey of GP views. *Quality & Safety in Health Care*, *14*, 164–168. doi:10.1136/qshc.2004.011866

Mosse, E. L. & Sahay, S. (2005). The Role of Communication Practices in the Strengthening of Counter Networks: Case Experiences from the Health Care Sector of Mozambique. *Information Technology for Development, 11*(3), 207-225.

Msukwa MKB. (2011). User Perceptions on Electronic Medical Record System (EMR) in Malawi University of Malawi.

Muathe, S. M. A, Wawire, N. H., Ofafa, G. A. (2013). An empirical study on the relationship between organizational factors and adoption of ICT among Health-related SMEs in Nairobi, Kenya. *International Journal of Arts and Commerce, 2(3)*

Nyella, E. & Mndeme, M. (2010). Power Tensions in Health Information System Integration in Developing Countries: The Need for Distributed Control. *Electronic Journal of Information Systems in Developing Countries, 43*(4), 1-19.

Omary, Z., Lupiana, D., Mtenzi, F., & Wu, B. (2010). Analysis of the Challenges Affecting E- healthcare Adoption in Developing Countries: A Case of Tanzania Analysis of the Challenges Affecting E-healthcare Adoption in Developing Countries: A Case of Tanzania. *International Journal of Information Studies*, *2*(1), 38–50.

Ouma, S., & Herselman, M.E. (2008). E-health in Rural Areas: Case of Developing Countries. International Journal of Biological and Life Sciences, 4(4), 194-200.

