Factors Influencing the Adoption of Electronic Health Record Systems in Developing Countries: A Case of Uganda

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Abstract

Electronic Health Records Systems are important Technology that is beneficial to improving the health care delivery inline of (i) providing accurate, up to date and complete data, (ii)sharing electronic information between patients and clinicians securely (iii) helping providers to effectively diagnose patients, reduce medical errors and provide safer care (iv) quick access to patient records for more coordinated efficient care (v) improving patient and provider interaction and communication (vi) enabling safer more reliable prescriptions (vii) reduction of costs, reduced paper work, reduced duplication of testing and general improved health. Despite all the benefits provided by Technology, there is little interest and limited adoption of Electronic Health Record Systems by the Health Sector in developing countries to compete in today's market globally geared by new technology. The aim of this paper is to review factors for low adoption of Electronic Health Record Systems in context of developing countries. The factors that can influence the adoption include the need for involvement and participation of all stake holders in the health sector, availability of dedicated users and having a good change management strategy and leadership, effective leadership and effective communication, training staff and time management are key, also evaluation of organizational needs is important for fostering the implementation of electronic health record systems.

Keywords: Electronic health record systems; EHR adoption; develooping countries; EHR implementation.

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1. Introduction

The Health Sector around the world are increasingly adopting the Electronic Health Records systems (EHR) driven by the advancements in Information and Communication Technologies (ICTs). Electronic Health Records System is a digital mechanism of capturing patient information, storing and continued use by authorized health care providers to effectively deliver health care services [14]. However, it is a big challenge to implement the EHR systems in Health care service centre in context of developing countries because technology adoption and use depends on a number of factors. For example, the acceptance of technology at organizational and individual levels may be influenced by the factors in the area in which the EHR is implemented [13]. Low usage of EHR in the developing countries is a consequence of poor adoption by organizations and users [4,5]. Developing countries is a general terms used to refer to a group of countries that require equitable and sustainable social and economic growth. Reference [15] classified such countries as low income countries with the national income (GNI) per capita $995 or less.

2. Methodology

A systematic literature review, based on papers published from 2010 to 2019, concerning the facilitators and barriers for the adoption and use of Electronic Health Records in developing countries was conducted. Data was gathered using five databases: Google scholar, Journals of Health and Medical Informatics, BMC Health services research, Pub Med Health, EBSCO. Studies were included in the analysis if they had issues relation to adoption facilitators and barriers of EHR in developing countries, implementation of EHR in developing countries and factors affecting implementation of EHR in developing countries.

3. Findings

The findings were summarized in the facilitators and barriers table after the authors choice of articles for the literature review. Before creation of the findings table duplicate articles were taken care of not to confuse the findings. Then analysis of individual articles was done to identify the factors affecting the adoption and use of EHR in developing countries. The factors were compiled into a frequency table to aid the analysis and discussion of findings. Results are summarized in table 1 and the factors the frequency table 2. The systematic analysis of literature revealed many facilitators and barriers of adoption and use EHR in context of the developing countries. The facilitators to adoption and use of EHR included accesses to complete information, accurate and error free information, efficiency and quality health services cost saving, and information security while the barriers included inadequate ICT skills and training, inadequate financial and equipments, poor implementation planning, negative perceptions.

Table 1: Results from the review of Literature

Authors	Facilitators	Barriers
Boonstra & BroeKhius, 2010	Change management Emerging payment methods Perceived ease of use	Costs of ICT equipment Inadequate training and skills Attitude Resistance Organisational barriers
Castilo, Martinez & Pulido, 2010	Error reduction Quality Efficiency Better health outcomes	Attitude Interoperability Lack of enough time Lack of expert support Cultural
Yan, Gardner & Baier, 2012	Emerging payment methods Good communication with EHR developers Efficiency Quality	Costs Attitude Skills and training Lack of interoperability Resistance Unreliable power supply Security Staff retention Improper planning Understaffing
Boonstra, Versluis and Vos, 2014	Efficiency Quality Error reduction	Costs Skills and training Attitude Skills and training
Namakulla and Kituyi, 2014	Quality Efficiency Perceived ease of use Time saving	Skills and training Attitude Resistance Cultural Costs Security
Kiberu and his colleagues 2014	Quality Efficiency Error reduction	Skills and training Lack of interoperability Resistance Unreliable power supply
Akomolafe, 2014	Quality Efficiency	Attitude Risks Improper implementation Cost Security
Kihuba, 2014	Quality Efficiency Time saving	Skills and training Lack of interoperability Resistance Unreliable power supply Improper planning
Hsieh, 2015	Perceived ease of use Perceived usefulness	Attitude Risks Improper implementation Cost Political influence Cultural
Cucciniello, Lapsley, Nasi and Pagliari, 2015	Efficiency Management & staff support Training programs Error reduction	Attitude Cultural Costs Technophobia Improper planning Understaffing

Muhaise and Habiinka,2016	Management support Quality Efficiency Training staff	Costs Attitude Skills and training Lack of interoperability Resistance Unreliable power supply
Mosweu, Bwalya and Mutshwewa, 2017	Perceived usefulness	Attitude Technophobia Resistance Improper planning
Mathal, Shiratudin and Sohel, 2017	Quality Efficiency Perceived ease of use	Attitude Resistance Costs Security Understaffing
Ondieki F, 2017	Efficiency Quality Time saving	Time Resistance Cost Skills and training
Muhaise and Kareyo, 2017	Efficiency Quality Perceived usefulness Resource supply Management support Training staff	Costs Skills and training Power supply Security Attitude Resistance Lack of expert support
Furusa and Coleman, 2018	Efficiency Quality Perceived usefulness Time saving	Skills and training Understaffing Costs Power supply Lack of expert support
Katurura and Cilliers , 2018	Institutional pressure and completion Chromic care management Perceived ease of use	Skills and training Costs Power supply Political influence Resistance Improper implementation
Adedeji, Irionye, Ikono and Komolafe, 2018	Efficiency Quality Patient follow up	Skills and training Resistance Attitude Lack of expert support Security

Table 2: factors frequency

Factors	Total Occurrences
Facilitators	
Better health outcomes	1
Change management	1
Chromic care management	1
Efficiency	14
Emerging payment methods	2
Error reduction	5
Good communication with EHR developers	1
Institutional pressure and competition	1
Management & staff support	1
Management support	2
Patient follow up	1
Perceived ease of use	5
Perceived usefulness	4
Quality	13
Resource supply	3
Time saving	4
Training programs	6
Barriers	
Attitude	13
Costs	13
Cultural	4
Improper implementation	3
Improper planning	4
Inadequate training and skills	5
Interoperability	6
Lack of enough time	2
Lack of expert support	4
Organisational barriers	1
Political influence	2
Power supply	3
Resistance	12
Risks	2
Security	5
Skills and training	12
Staff retention	3
Time	2
Technophobia	2
Unreliable power supply	4
Understaffing	5

3.1 Facilitators

The facilitating factors identified included: better health outcomes change management, chromic care management, efficiency, emerging payment methods, error reduction, good communication with EHR developers, institutional pressure and competition, management & staff support, patient follow up, perceived ease of use, perceived usefulness, quality, time saving, training programs. The factors better health outcomes change management, chromic care management, efficiency, quality patient follow up form are concerned with ability of EHR to facilitate quality health services provision in terms of easy to access patient records and management, rapid information exchange, electronic schedule of patients' appointments and alerts for adherence to drugs and likely drug side effects. Error reduction was another benefit cited: the error reduction in form of patient prescriptions, drug dispensing and records capture. Perceived ease of use and perceived usefulness

3.2 Barriers

The barriers indentified through the review to influence the adoption and use of EHR in developing countries include: attitude, costs, cultural, improper implementation, improper planning, inadequate training and skills, interoperability, lack of enough time, lack of expert support, organizational barriers, political influence, power supply, resistance, risks, security, skills and training, staff retention, time, technophobia, unreliable power supply, understaffing. Negative attitude towards the technology innovations in health were identified as a critical issue, costs for start up of EHR projects in terms of purchase of required ICT infrastructures and resources like internet, inadequate financing, organizational cultures and resistance to change. Some health practitioners preferred the status quo of using manual forms citing insecurity about patient records and the practitioners' fallback position in case things go wrong about patient management. Lack of skills and training in ICT facilities usage was another issue seen. Lack of expert support related to technical support from the software developers, absence of ICT technical staff

4. Conclusions

 The review examined factors that influence the adoption and use of EHR in context of developing countries. The information generated by this study is paramount for MoH Uganda to benchmark and effectively take decision as policy makers to increase the adoption and use of EHR in all health facilities in Uganda.

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