A Study of Factors Influencing Health Managers' Acceptance of eHealth Services in the Kingdom of Saudi Arabia

Abdullah Alshahrani
Ministry of Health, Kingdom of Saudi Arabia
School of Pharmacy and Life Sciences,
Robert Gordon University, Aberdeen, UK
a.m.h.alshahrani@rgu.ac.uk

Katie MacLure
School of Pharmacy and Life Sciences,
Robert Gordon University, Aberdeen, UK
k.m.maclure@rgu.ac.uk

Abstract—**Electronic Health (eHealth) offers innovative solutions for improving the access and management of healthcare delivery. This study aims to explore factors that influence health managers' acceptance of eHealth services in the Kingdom of Saudi Arabia (KSA). It has been planned to be carried out in three phases: a Systematic Review (SR), a quantitative survey, and a qualitative interview. Inclusion and exclusion criteria for each phase were applied. Ethical approval to conduct the study had been gained. Thirty-nine factors were identified as influencing health managers' eHealth acceptance in KSA. The top influential factors were: (i) Availability of operational resources, (ii) Trust in confidentiality, security, and data privacy, (iii) Availability of qualified human resources, (iv) Information and Communication Technology (ICT) infrastructure and readiness, and (v) The quality of eHealth systems and applications. Findings from this research have drawn a clearer picture of the key challenges in health managers' acceptance of eHealth services in KSA. Areas for improvement are to be highlighted in the final analysis.**

Keywords - eHealth; acceptance; health managers; Kingdom of Saudi Arabia.

I. INTRODUCTION

Electronic Health (eHealth) is defined as the use of ICT for healthcare [1]. eHealth offers innovative solutions for improving the access to and management of healthcare delivery. The KSA is a country with one of the largest land masses and populations in the Middle East [2]. It has difficult geographical terrain, which makes the delivery of health services challenging. The Ministry of Health (MOH) is the main health provider in KSA, responsible for around 60% of all health services and facilities in the country. Private health sector and other government run health authorities are the providers for the remainder. Many initiatives to embrace technology in healthcare were launched by the MOH to advance the level of health technology acceptance. Despite the growth of eHealth publications in KSA, it is limited to only a few provinces and more research related to the end-users' acceptance of eHealth services is needed. The overall aim of this study is to explore the factors that influence health managers' acceptance of eHealth in KSA.

II. METHODS

In this section, the methods of conducting the three phases of the study are described.

A. 1st phase SR

The Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) checklist of 17 items was followed in writing the protocol for the systematic review [3]. The protocol was registered with the prospective register of systematic reviews (CRD Prospero) [4] and a scoping search was conducted in May, 2017.

Five databases, namely Association for Computing Machinery (ACM), Google Scholar, Medline, ScienceDirect, and Web of Science, were searched for articles published between January 1st, 1993 and May 1st, 2017. Studies included were peer-reviewed, full-text primary articles. One reviewer performed the searches; two reviewers independently screened the titles, then abstracts, followed by full articles. Exclusions were recorded, as indicated below. Three tools were applied, based on study design, to assess the quality of the articles that were included:

1. Questionnaire checklist developed by Crombie and adopted by the Centre of Evidence Based Management (CEBMa) [5].
2. Qualitative checklist provided by Critical Appraisal Skills Programme (CASP), Public Health Resource Unit [6].
3. Critical appraisal checklist developed by a group of researchers led by N. Mays for mixed methods studies [7].

B. 2nd phase survey

An online questionnaire was developed based on two sources; first, the findings from the SR, and second, the Unified Theory of Acceptance and Use of Technology (UTAUT) [8]. Professionals in KSA with a health management role were invited to take part. Participation links were distributed across social media platforms.

C. 3rd phase qualitative interviews

For more in depth exploration, semi-structured face-to-face and telephone interviews were conducted with health managers in Aseer province, KSA to address the geographical limitation of studies published to date. A draft

Copyright (c) IARIA, 2020. ISBN: 978-1-61208-763-4

interview schedule was developed based on the findings from phase 2 (survey). Invitations to participate in the study were emailed to all potential participants who met the inclusion and exclusion criteria. A study information sheet and consent form were attached to the invitation emails.

Ethical approval for conducting the 2nd and 3rd phases had been gained from:

1. Ethical Review Panel, School of Pharmacy and Life Sciences, Robert Gordon University, Aberdeen, UK.
2. Ethics Committee, Ministry of Health (MOH), Riyadh, Kingdom of Saudi Arabia.

III. RESULTS

A summary of findings from the three phases are presented in this section.

A. 1st phase SR

After duplicates were removed, 110 papers were screened, and 15 studies met the inclusion criteria (Table I). Thirty-nine influential factors were identified from the included studies. Two knowledge gaps were found: lack of eHealth studies from the perspective of health managers and the limitation of studies to few geographical areas in the country [9].

TABLE I. INCLUSION AND EXCLUSION CRITERIA FOR THE SYSTEMATIC REVIEW

Participants	**Inclusion**: • Health professionals (medical doctors, nurses, midwives, pharmacists, dentists, all other allied health professionals e.g. radiology and laboratory technicians). • Health IT professionals. • Health managers. **Exclusion**: • IT professionals who do not have a role in any health facilities and organisations
Interventions	**Inclusion**: The intervention for this study is eHealth. This systematic review aims to include all published articles and literature around eHealth adoption, acceptance, facilitators and barriers in Saudi Arabia from the views of multiple stakeholders. **Exclusion**: Studies that focus on pure technological infrastructure and products without the users views such as: health technology applications and Internet of Things (IoT) for health.
Studies	**Inclusion**: This systematic review focused on peer reviewed primary published articles and literature with all types of study design such as quantitative, qualitative and mixed methods. **Exclusion**: Reviews, blogs, books chapters, and health website contents were excluded.

B. 2nd phase survey

Findings showed the top influential factors to health managers' acceptance of eHealth services were: (i) Availability of operational resources, (ii) Privacy and security of health information, (iii) ICT infrastructure and readiness, (iv) Availability of qualified human resources, and (v) The quality of eHealth systems and applications (Figure 1).

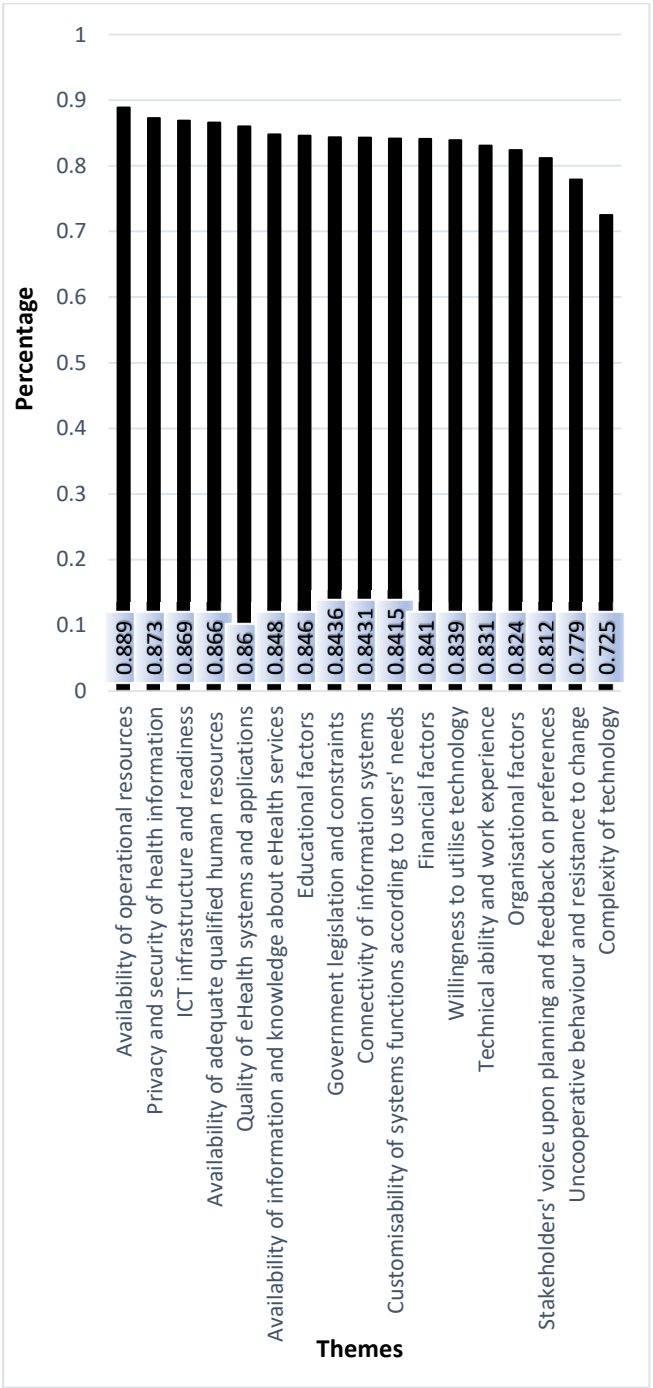

Figure 1. Factors influencing health managers' acceptance of eHealth services in KSA

C. 3rd phase qualitative interviews

Initial analysis confirmed the significance of the factors identified in the 2nd phase of the study. Further work will focus on mapping factors against UTAUT constructs and statistical analysis of the influencing predictors to behavioral intention and actual eHealth use behavior to give a holistic overview of the key challenges in accepting eHealth services in KSA.

IV. CONCLUSION

This study has been conducted by a multidisciplinary team focused on providing a holistic overview of challenges in health managers' acceptance of eHealth services in the KSA. A mixed methods approach was applied to strengthen the findings. It is suggested to apply caution upon interpretation of the results as they only showed the perspectives of health managers. Extending the research to cover the views of other health groups such as health professionals is recommended to draw a clearer picture that may represent KSA health workforce in general.

ACKNOWLEDGMENT

The authors thank the Ministry of Health, KSA represented by the General Directorate for Research and Studies and all participants that took part in both the questionnaire and the interviews.

REFERENCES

[1] World Health Organization. Strategy 2004-2007. eHealth for health care delivery, 2004, Available at: http://www.who.int/ehealth/about/en/ [accessed: March, 2020].

[2] World Atlas. Countries, Saudi Arabia, 2016, Available at: http://www.worldatlas.com/webimage/countrys/asia/sa [accessed: March, 2020]

[3] D. Moher et al., Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P). Systematic reviews, 4(1), 2015, pp. 1.

[4] A. Alshahrani, K. MacLure, and D. Stewart, Status of eHealth adoption and acceptance in the Kingdom of Saudi Arabia: a systematic review protocol, 2017, Available at: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017065009 , [accessed: March, 2020]

[5] I. K. Crombie, The pocket guide to critical appraisal: A handbook for health care professionals, 1997.

[6] Critical Appraisal Skills Programme (CASP), CASP systematic review checklist, 2013, Available at: http://www.casp-uk.net/casp-tools-checklists [accessed: March, 2020]

[7] N. Mays, E. Roberts and J. Popay, Synthesising research evidence. Studying the organisation and delivery of health services: Research methods, 2001, pp. 188-220.

[8] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, User acceptance of information technology: Toward a unified view. MIS quarterly, 2003.

[9] A. Alshahrani, D. Stewart, and K. MacLure, A systematic review of the adoption and acceptance of eHealth in Saudi Arabia: views of multiple stakeholders. International Journal of Medical Informatics. 2019; 128: pp.7-17.

Copyright (c) IARIA, 2020. ISBN: 978-1-61208-763-4