Journal of Health Informatics in Developing Countries
http://www.jhidc.org/
Vol. 16 No. 2, 2022

Submitted: Aug 20th, 2022 Accepted: Oct 28th, 2022

Exploring the awareness of public health professionals about electronic health records during the Covid-19 pandemic

Aseel A. Alshathri[1], Thamer Al-Edresee*[1,2]

[1] College of Public Health & Health Informatics, King Saud bin AbdulAziz University for Health Sciences, Riyadh, Saudi Arabia.

[2] King Abdullah International medical research center, Riyadh, Saudi Arabia

Abstract

Background: Electronic health records (E.H.R.s) are expected to maximize public health outcomes, as they can be a valuable tool to make informed decisions and promote health surveillance. It has been widely utilized in several countries. However, limited evidence has been reported regarding its progress and effectiveness for public health in the Kingdom of Saudi Arabia.

Aims: This study aimed to identify the most relevant public health functions of E.H.R.s that are necessary for providers to deliver the best public health measures. It also examined the current status of public health-integrated E.H.R.s. It suggested and highlighted the recommendations that E.H.R.s could implement in the future to improve the quality of public health in Saudi Arabia.

Methods: Fifty-two certified public health specialists in Saudi Arabia received an electronic survey through professional and social networks like Twitter and LinkedIn. The survey was hosted on Google Docs. The invitation included a description of the survey, and the participants were asked to respond to five open-ended questions on the basis of their field experience as public health specialists in Saudi Arabia. Responses were analyzed using theme-based qualitative analysis.

Results: The utilization of E.H.R.s for public health in the Kingdom is still in its infancy and needs much support. The information currently available in E.H.R.s that was most relevant to public health specialists was immunization and infectious disease reporting.

Conclusion: This study identified several gaps, such as the segmented use of E.H.R.s in different settings in Saudi Arabia, indicating a great need for E.H.R. equality and interoperability, as well as the need for public health specialists to have a deeper knowledge of the utilization, current developments, and emerging patterns and trends of E.H.R.s.

Keywords: Utilization; E.H.R.s; Electronic; Health; Record; Public health; Kingdom of Saudi Arabia.

*Thamer Al-Edresee; M.B.B.S, Ph.D. Assistant professor, College of Public Health & Health Informatics, King Saud bin AbdulAziz University for Health Sciences, Riyadh, Saudi Arabia; Email: edreesit@ksau-hs.edu.sa.: .

1. Introduction

In recent years, the medical field has shifted from paper-based health records to electronic health records (E.H.R.s). E.H.R.s presents a great opportunity, as they can lead to many improvements in the management and promotion of public health in various settings [1, 2].

E.H.R.s can improve public health outcomes [3, 4] by actively and efficiently gathering data that can be used for quality improvement. This data is also usable and shareable across healthcare organizations, thus improving public health reporting and surveillance by facilitating organizations in collecting standardized, systematic data. An example of E.H.R. utilization for public health in Saudi Arabia is the Health Electronic Surveillance Network (HESN). HESN was developed better to assist public health professionals throughout the Kingdom in detecting, responding, preventing, and controlling disease and injury. HESN also aids in monitoring the population's health status; these aims were addressed by incorporating all public health programs in Saudi Arabia into the Public Health Information System (PHIS). Decision-makers can use PHIS to manage more effectively by providing timely, high-quality data.

E.H.R.s can also enhance reporting capabilities by transmitting syndromic surveillance data, immunization registries, and electronic laboratory reports, allowing providers to submit public health data to public health officials. Having E.H.R.s for the entire population and better data improves the ability to address patients' desires for better health care [3,5]. This study aimed to explore the potential uses of E.H.R.s for public health in Saudi Arabia to optimize and transform public health practice, research and learning in the Kingdom.

2. Subjects and Methods

2.1 Study Area and design

This study conducted a web-based survey involving public health specialists working in different locations in the Kingdom of Saudi Arabia. The approach adopted for this study was a qualitative exploratory research design.

2.2 Study Participants:

Inclusion/exclusion criteria:

Participants in this study were required to be Saudi citizens who were licensed and practicing public health professionals with at least one year of experience in hospitals or public health organizations in Saudi Arabia.

2.3 Sample Size

This study aimed to collect between 45 and 55 responses; the sample size was chosen based on our connections' estimation, and the saturation level that was applied. We applied convenience sampling because the principal investigator is an employee of the Ministry of Health, which presented opportunities

to connect with many public health professionals.

2.4 Data Collection Methods, Instruments Used, Measurements

The data collection method of the proposed study is collected by surveying public health specialists. Using Google Docs, a web-based survey containing five open-ended questions was distributed from June 1 to July 30, and data analysis followed.

Audio-recorded interviews were the first choice for the data collection method. However, electronic surveys were used instead because of the COVID-19 lock-own, which was in effect during the data collection period.

2.5 Data Management and Analysis Plan

Theme-based analysis (cutting and sorting). In which "[quotations or expressions that seem important are identified and called exemplars, and then the quotations or expressions are arranged in piles of things that fit together" [5,6], was conducted.

3. Results

3.1 Descriptive Analysis

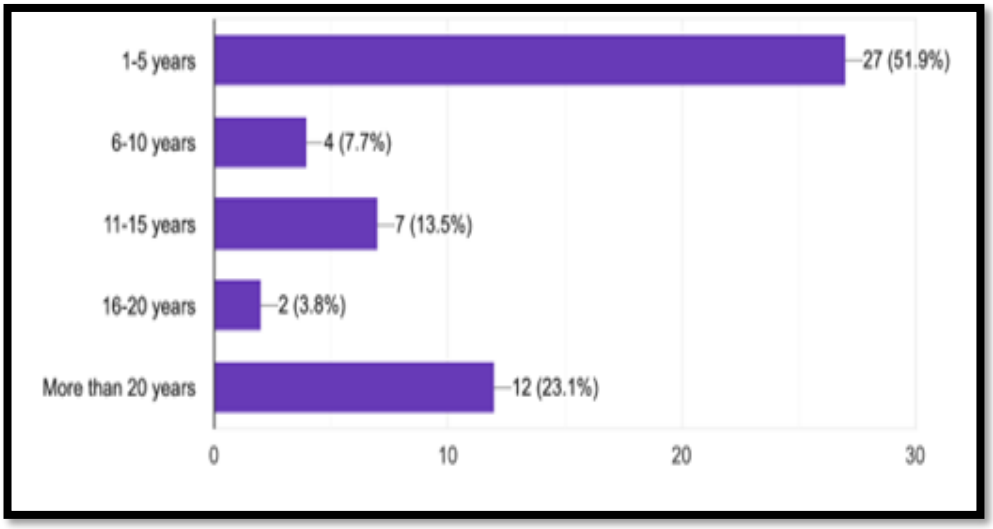

Figure 1 years of experience among the participants by years

The study included 52 participants who met the inclusion criteria. Of the 52 participants, 27 (51.9%) had 1–5 years of experience, 4 participants had 6–10 (7.7%) years of experience, 7 participants (13. 5%) had 11–15 years of experience, 2 (3.8%) had 16–20 years of experience, and 12 (23.1%) had more than 20 years of experience.

3.2 Qualitative Analysis:

Data coding:

Q1: What do you think about the use of electronic health records for promoting public health in Saudi Arabia?

Table 1

Coding	repetitions
Helpful	**33**
Increasing	**12**
Unutilized	**7**

As shown in Table 1, the most frequent code in the answers was "helpful" (33), followed by "increasing" (12); "unutilized" was the least frequent code (7).

Q2: On the basis of your experience as a public health specialist in Saudi Arabia, how do you describe the current status of public health utilization of electronic health records? Please elaborate.

Table 2

Coding	repetitions
Limitations	**31**
Advantages	**14**
Progressing/transformational	**7**

The most frequent code in the answers was "limitations" (31 responses), encompassing more than half of the responses. This was followed by "advantages" (14 responses), and "progressing/transformational" was the least frequent code (7 responses).

Q3: What is the most relevant information to your work that is currently available in E.H.R.s (such as immunization, demographics, etc.)?

Table 3

Coding	Repetitions
Immunization	**18**
Demographics	**13**
Low knowledge	**11**
Family/medical history	**6**
Chronic disease	**4**

As shown in Table 3, six codes were identified: "immunization", "demographics", "family/medical history", "low knowledge", and "chronic disease". The most frequent code in the answers was "immunization" (18 responses); this was followed by "demographics" (13 responses), "low knowledge" (11 responses), and "family/medical history" (6 responses), and the least frequent code was "chronic diseases" (4 responses).

Q4: Based on your reading and views of the current status of E.H.R. usage and utilization in public health, can you recommend any functions that need to be added to electronic health records to improve the quality of public health in Saudi Arabia?

Table 4

Coding	Repetitions
Interoperability and coverage	**22**
Low knowledge	**17**
Telemedicine EHR utilization	**7**
Data Surveillance	**4**
Patient consent	**2**

As shown in Table 4, five codes were identified, namely "interoperability/coverage" (22 responses), followed by "low knowledge" (17 responses), "telemedicine E.H.R. utilization" (7 responses), "data surveillance" (4 responses), and "patient consent" (2 responses). The most frequent code in the answers was "interoperability" (22 responses), and "data surveillance" appeared as an outlier theme (2 responses).

Q5: Have you experienced or read about any useful functions of E.H.R.s in other countries that you would like to see in E.H.R.s in Saudi Arabia? Please mention these functions here.

Table 5

Coding	repetitions
Low knowledge (don't know or functions mentioned are not relevant)	**41**
Data extraction,	**6**
Patient involvement,	**3**

As shown in Table 5, three codes were identified: "low knowledge" (41 responses), "data extraction" (6 responses), "patient involvement" (3).

Theme analysis:

Our analysis yielded one principal theme: "E.H.R.s could be a game-changer for public health in the kingdom after minor improvements and proper user education," which branches into three subthemes. We will report the subthemes in detail in the following section

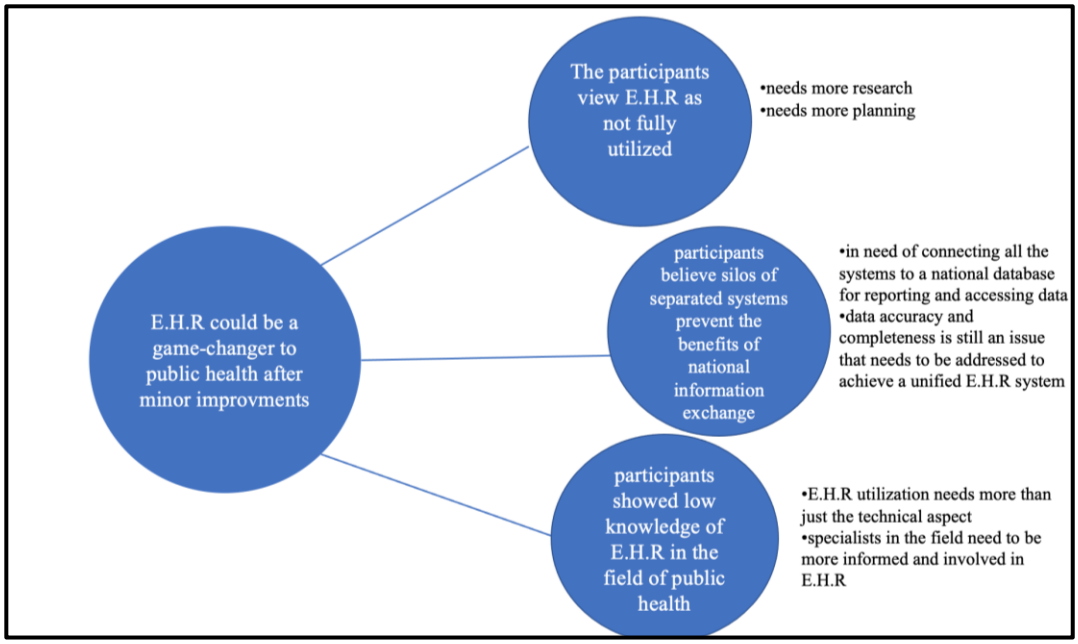

Figure 1: Main theme and branching subthemes.

Subtheme 1: Benefits are not fully realized

The current perception among public health practitioners is that E.H.R.s will improve public health performance by providing a better collection of detailed and accurate data. However, as one of the participants stated, "There is a lot of potential in using medical records for public health research and planning," indicating that many benefits are not yet fully realized because E.H.R.s require improvements to better serve public health needs, such as collecting and analyzing different health indicators.

Subtheme 2: current segregated silos of information systems prevent fully realizing the benefits of national information exchange and the application of advanced public health functions

The participants agreed that data accuracy and completeness are still issues that need to be addressed to achieve a unified E.H.R. system that can be used to generate valuable and timely public health reports. The "public health system is about rapid detection, response, and control of health threats; this cannot be done without uniform interoperable national electronic health records." and to have complete information and accurate and timely information, it is crucial to connect all the systems to a national database for reporting and accessing public health data; as one participant stated, "all the relevant information for all patients."

Subtheme 3: limited knowledge and awareness among public health specialists about E.H.R capabilities

Many participants responded "I don't know" or answered differently from what the questions asked. For instance, the majority did not know or could not differentiate between E.H.R.s and PHRs and

were not fully aware of the situation; some, for example, suggested adding meaningful use as a feature for E.H.R.s, for which it is considered a policy. These answers indicated a low level of knowledge within the public health community regarding E.H.R.s; however, this result is understandable and expected because E.H.R. utilization for public health purposes still has a lot of room to grow and improve.

4. Discussion

With the rapid advances in E.H.R.s and their crucial integration into public health, their use in the Kingdom has changed significantly from the past, according to public health professionals. In addition, evolving technology has allowed these professionals to store patients' medical records and use the data to promote public health. Therefore, it is valuable to continuously learn more about people's perspectives in the field of public health to acquire a clearer picture of the status quo and measure awareness of E.H.R.s and their utilization among public health professionals, who demonstrated very limited knowledge about them.

The participants viewed the current system as a work in progress, and their evaluation of its usefulness in the current stage ranged from "still primitive" and "poor" to "sufficient" or "very effective, especially during the pandemic." These responses are in agreement with a study conducted by Almalki et al., which reported that the adoption of e-health services is progressing slowly in M.O.H. organizations [7]. However, the participants' diverse responses are expected, considering that many hospitals are undergoing digital transformation. In contrast, others have not yet reached the same level and are still mainly using paper documents. E.H.R.s are currently not popularly utilized in public health because they are still in the early stages. Certain required functions and features are unavailable, and access to relevant data is still challenging. Our findings in the second and third subthemes are backed by research papers that stress the importance of connectivity of health information systems for ensuring completeness and accuracy of health information [8,9].

Most participants were unfamiliar with the latest public health applications and features that can support public health workers. However, some participants mentioned using interactive functions or chatbots, allowing patients to assess their health and self-educate about their health problems. We recommend activating the exchange of information between the data collection points and the national health information center. At the same time, Enhance the education and knowledge of public health professionals about E.H.R. functions and the benefits they can expect from them by encouraging awareness campaigns locally within health organizations and nationally through official channels. We also suggest this topic be revisited within the next five years to evaluate the changes because of the great wave of health digitization and remarkable development going underway in the Kingdom.

5. Limitations of the study

Because the study was conducted online, the internal validity of the exact research cannot be guaranteed, as it is difficult to assess how truthfully the participants responded. Nonetheless, because this research did not focus on sensitive questions but on factors related to the use of E.H.R.s for public health, the use of an online questionnaire to assess various factors could be considered a valid and reliable measurement.

6. Conclusion

This explored public health professionals in the Kingdom about how E.H.R.s can help improve the productivity and efficiency of the healthcare system and the expected great potential. E.H.R.s can improve public health outcomes, as they seem to serve as a major opportunity leading to many improvements in the management and promotion of public health in various settings in Saudi Arabia. Although some findings suggest that E.H.R.s are leading a transformation, other responses indicated that they are still in their early stage and require much support, as well as standardization, equality, and interoperability at the national level, to ensure maximum accessibility.

The results indicated very limited knowledge and awareness among public health professionals in terms of understanding E.H.R.s and their utilization and applications, as well as the differentiation between E.H.R.s and PHRs.

Based on these findings, it is recommended that E.H.R.s are given much support, as well as standardization, equality, and interoperability at the national level, to ensure maximum accessibility. Moreover, further research is needed to explore ways to promote the use of E.H.R.s by expanding the knowledge of public health specialists, as they must be fully aware of the capabilities of E.H.R.s to be able to utilize the technology for improved public health outcomes

7. Declarations

7.1 Abbreviations

E.H.R. = electronic health records.

HESN = an epidemiological surveillance program by the Saudi Ministry of health

MOH = ministry of health

COVID-19 = coronavirus SARS-CoV2 2019

7.2 Conflict of Interest Statement

The authors have no conflict of interests to declare.

7.3 Funding Disclosure

This research did not receive any specific grant from funding agencies in the public, commercial,

or not-for-profit sectors.

7.4 Ethical Considerations

The ethical approval has been taken from the institutional review board of King Abdullah International Medical Research Center.

7.5 Acknowledgements

My completion of this project could not have been accomplished without the support of my supportive manager, as well as My family. Also, I hold the deepest gratitude, for the Department of health informatics, college of public health and health informatics at King Saud Bin Abdulaziz University for health sciences, as well as King Abdullah International Medical Research Center, for their abundant opportunities to grow as a researcher.

7.6 Authors' contributions

Aseel A. Alshathri as main author, she has made substantial contributions to the conception and design, acquisition, and interpretation of data.

Dr. Thamer Aledreesi as co-author and supervisor, he has given the final approval for the version to be published.

8. References

[1]. Ahmed QA, Barbeschi M, Memish ZA. The quest for public health security at Hajj: The WHO guidelines on communicable disease alert and response during mass gatherings. Travel Med Infect Dis [Internet]. 2009;7(4):226–30. Available from: http://dx.doi.org/10.1016/j.tmaid.2009.01.005

[2]. Ministry Of Health. General Guide for Health of Hajj and Umrah Pilgrims. 2017; Available from: https://www.moh.gov.sa/Hajj/Documents/Languages/ENGLISH.pdf

[3]. Dornan L, Pinyopornpanish K, Jiraporncharoen W, Hashmi A, Dejkriengkraikul N, Angkurawaranon C. Utilisation of Electronic Health Records for Public Health in Asia: A Review of Success Factors and Potential Challenges. Biomed Res Int. 2019;2019.

[4]. Al-shehri AM. Can Informatics Transform Public Health Practice , Research and Learning in the Kingdom of Saudi Arabia (KSA)? 2014;8(2):1–8.

[5]. Aziz HA. A review of the role of public health informatics in healthcare. J Taibah Univ Med Sci [Internet]. 2017;12(1):78–81. Available from: http://dx.doi.org/10.1016/j.jtumed.2016.08.011

[6]. Alsulame, K., M. Khalifa and MSH. eHealth in Saudi Arabia: Current Trends, Challenges and Recommendations. Hasman,A Househ M, editor. 2015. 233–236 p.

[7]. Almalki M, Fitzgerald G, Clark M. Health care system in Saudi Arabia: an overview. East Mediterr Heal J. 2011;17(10).

[8]. Emerson H. Essential Local Public Health Services. Ann Am Acad Pol Soc Sci. 1951;273(1):19–24.

[9]. Hasanain RA, Cooper H. Solutions to Overcome Technical and Social Barriers to Electronic Health Records Implementation in Saudi Public and Private Hospitals. J Health Inform Dev Ctries. 2014;8(1):46–63.