Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

READINESS OF HEALTHCARE PROVIDERS TO ADOPT E-HOSPITALS TECHNOLOGIES IN SUDIA Arabia.

AHLAM MAJRASHI (Corresponding author)
Healthcare Administration student, Saudi Electronic University
E-mail: ahlamcc19@gmail.com

Abstract

E-hospitals have the potential to transform healthcare delivery and make healthcare access more attainable due to the extensive usage of smartphones and other mobile devices in Saudi Arabia. Overall, the implementation of e-hospitals in Saudi Arabia is a positive initiative towards achieving the goals of the National Transformation Program and the Vision 2030 plan. This is because e-hospitals will boost healthcare access and quality and also enhance cost- effective patient care. E-hospitals will also make the access of healthcare more convenient and efficient. This study is Quantitative, cross-sectional descriptive study using validated questionnaire was employed from March 2023- May 2023 in Saudi Arabia and 301 medical professionals were included in this study. This study included a questionnaire that was used to assess participants' sociodemographic characteristics, online medical practices, willingness to use e-hospitals and perceived facilitators/barriers to work at e-hospitals. Multivariate regression analysis was performed in order to evaluate the independent factors associated with e- hospital work. As result, Overall, 81.7% had a positive response to wards working at e-hospitals. Age ($p<0.05$), familiarity with e-hospitals ($p>0.01$) and prior work practices in online healthcare settings ($p>0.01$) were associated with participants' readiness to work at e-hospitals. Gender,education level, professional level, the tier of their affiliated hospital and workload were not statistically associated. Healthcare providers who had positive attitudes towards e- hospitals considered improved efficiency, patient satisfaction, communication among physicians, increased reputation and income, and alleviated workload to be advantages of

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

adoption. The participants who were unwilling to work at e-hospitals perceived lack of time, insufficient authenticity/ reliability and underdeveloped policies as potential barriers. To conclude, Improving operative prociency in electronic devices, accommodating to work schedules, increasing familiarity with e-hospitals and regulating practices will improve the readiness of healthcare providers to work at e-hospitals.

Keywords: Electronic-hospitals, Primary healthcare centers, healthcare providers.

1. Introduction

The Saudi Arabian government has announced several initiatives in addition to the Vision 2030 plan to encourage innovation and entrepreneurship in the healthcare industry. Several efforts under the 2016-launched National Transformation Program are geared toward improving healthcare, including creating a national health information exchange and promoting telemedicine and e-health services (Alharbi et al., 2021). These programs lay the groundwork for the country's healthcare providers to implement e-hospitals in order to facilitate the success of a primary healthcare center-based integrated delivery model (Alharbiet al., 2021).

The most efficient method of providing healthcare is to emphasize primary care while coordinating efforts across secondary and tertiary facilities. Patients should begin their treatment in primary healthcare centers (PHCs), which is primarily concerned with illness management, population-based disease prevention, and management of individual cases. Moreover, people should only go to secondary hospitals if the primary healthcare provider cannot cure or manage their health concerns. According to Anichini et al. (2020), tertiary hospitals should concentrate their efforts largely on treating complicated cases and should only treat the patients if the other institutions cannot treat their condition. Individuals could access a convenient care from nearby healthcare providers under the integrated primary care delivery model. Therefore, it would assist the Saudi health care system in addressing new health demands and increasing patient expectation, which is operated by the rapidly growth inthe prevalence of non-communicable diseases and the aging population (Anichini et al., 2020).

E-hospitals, or extended care hospitals, are online hospitals that may take the shape of a mobile application or website and provide outpatient services via an immediate messaging podium (Li et al., 2022). Data can be transmitted concurrently in real-time in both directions through video conferencing, image sharing, or a messaging platform. Therefore, patients have the option of remaining in the comfort of their own homes or going to a medical facility in the vicinity of their homes in order to meet with a physician who works in a top-tier hospital via an e-hospital. E-hospitals can increase access to higher-quality health care and successfully eliminate professional seclusion and improve clinicians' performance in settings where resources are limited (Li et al., 2022). E-hospitals make it possible to provide high-quality services to patients despite physical, temporal, social, cultural, or political limitations (Li et al., 2022). E-hospitals make this possible by offering chances for online health training and health care, follow-ups, and illness management. In addition, they have the potential to compete with conventional brick-and-mortar hospitals in several respects. Conversely, e- hospitals have the ability to serve as a complement to conventional hospitals, as well as to incorporate themselves into the continuing process of healthcare reform, which will make universal healthcare coverage more realizable (Li et al., 2022).

E-hospitals have the potential to significantly improve healthcare access, particularly in rural areas where healthcare facilities are scarce. E-hospitals allow patients to access healthcare services from their own homes, using smartphones or other digital devices. These platforms enable patients to book appointments, consult with doctors, and receive medical advice. This can help alleviate the strain on healthcare facilities, especially in urban areas where overcrowding is common. Furthermore, this technology empowers healthcare administrators to find solutions to issues related to the shortage of qualified doctors, especially in rural regions (Almazroi et al., 2022). It improves access to healthcare professionals, reducing referrals and minimizing travel costs for patients.

Another sign that Saudi Arabia is ready to adopt e-hospitals is the country's widespread use of smartphones and other mobile devices. With 99% of internet users and 79.3% of social media users in 2023, it is clear that Saudi Arabia has made the digital transition for various reasons, including communication, entertainment, and work. This high rate of mobile phone ownership lays the groundwork for adopting e-hospitals, which can be accessed via mobile devices and offer patients remote access to healthcare services (Al-Anezi,2021). Healthcare provider readiness is key to successful e-hospitals implementation. Therefore, this study aims to identify the current readiness of healthcare providers to adopt e- hospital technologies, determine the factors in influencing this adoption and describe the perceived facilitators and barriers about working at e-hospitals.

2. Materials and Methods:

Study Design:

Quantitative, cross-sectional descriptive study using validated questionnaire was employed. The study was conducted from March2023- May 2023 on health care professionals at kingdom of Saudi Arabia.

Setting:

The study information was collected from healthcare providers who are working on tertiary hospital, secondary hospital, PHCs, and private hospital in Saudi Arabia.

Sample Size and Technique:

This study invited a convenient random sample of 301 from health care professionals at kingdom of Saudi Arabia. Once approval was obtained, The online version of the questionnaire was developed in Google Form and the link of the survey was distributed for health care professionals working in public and private hospitals on different social networks (WhatsApp, Telegram, and twitter). In addition, contacts of healthcare providers were obtained from the public domain. Prior to participation, the purpose of the survey was introduced, the concept of e-hospitals was explained via a short text and the consent of participants was obtained. In addition, to the research team contact information for further clarification. Questionnaires were individually completed by the healthcare providers only once.

Inclusion Criteria:

- Saudi and non-Saudi. healthcare professionals.
- 18 years or above.
- Healthcare professionals including doctors, pharmacist, nurses, and health applied.
- Must work at private or public hospitals in KSA.

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Exclusion criteria

- Not a healthcare professional.
- Not working in KSA.
- Less than 18 years.

Data Collection Tools:

The Instrument was adapted from previous study (Li et al., 2022), (Copyrights or permission to use, or open access for academic and research purpose). Questionnaire used to assess participants' sociodemographic characteristics, online medical practices, willingness to use e-hospitals and perceived facilitators/barriers to work at e-hospitals.

Pilot Study:

A pilot survey was then performed with 30 healthcare providers to evaluate the questionnaire, which mainly improved the interpretability of the questionnaire. These participants were then excluded from the final analysis. Finally, a revised version of the questionnaire was produced for use in this research.

Validity and Reliability:

In order to assess the validity and reliability of the questions a test-retest reliability analysis, which was obtained by administering the same test twice over a period of time to a group of individuals, was conducted. The findings indicated that these questions demonstrated high reliability, as evidenced by correlation coefficients of 0.975 and 0.949 these results indicate that the questionnaire is valid for using to achieve the study objectives.

Data Analysis:

The study conducted descriptive statistics on all survey items, evaluating percentages and frequencies for categorical variables. For univariate analyses, a $\chi 2$ test was used for categorical variables, and a Kruskal-Wallis test for ordinal variables. Multiple significance tests were performed to determine differences among hospital tiers. The study also used a $\chi 2$ test to examine the association between willingness to use e-hospitals and other variables. The descriptive analysis variables were included in the multivariate regression model. The degree of knowledge about e-hospitals was treated as a continuous variable

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

because it did not significantly differ from when it was categorized as ordinal. Furthermore, percentages and frequencies were used to analyze hospital-related variations in perceived facilitators and barriers. The analysis was performed using IBM SPSS version 25, and a two-tailed p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

IRB was obtained from SEU. Data was kept as anonymized and only theresearchers have access to the data. Research data will be kept for two years after publication then it will be destroyed. All participants were fully informed that their participation is voluntary via a written electronic information sheet. Participants were informed of the nature and purpose of the research. The participants' names were not included in the questionnaire. Itwas made explicit that they may voluntarily withdraw at any time prior to the completion of the survey, and by submitting the online survey, Participants consent to the use of the collected information for research purposes. All participants were remained anonymous throughout the research process.

3. Results

Sociodemographic data of the healthcare providers:

Frequencies and percentages were used in order to describe the participants` demographic data. Moreover, chi-square and Kruskal-Wallis tests are used to find the association among the demographic data and level of hospitals. Results can be seen in Table (1).

Table 5-1 Sociodemographic data of the healthcare providers included in the study

Characteristics	**Totaln (%)**	**Level of Hospital**				**P-value**
		Tertiary public hospitaln	**Primary healthcare center n (%)**	**Secondarypublic hospitaln (%)**	**Private hospital n**	

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

		(%)			**(%)**	
Sample Size, n	**301**	**83 (27.6)**	**31 (10.3)**	**132(43.9)**	**55(18.3)**	
Age, n (%)						<0.05*
20-30	194 (64.5)	53 (17.6)	12(4)	90(2.9)	39(13)	
31-40	74(24.6)	14(4.7)	14(4.7)	39(13)	7(2.3)	
41-50	23(7.6)	15(5.0)	2(0.7)	3(1.0)	3(1.0)	
51-60	10(3.3)	1(0.3)	3(1.0)	0(0.00)	6(2.0)	
Gender, n (%)						>0.01*
Male	124 (41.2)	35(11.6)	9(3.0)	59(19.6)	21(7.0)	
Female	177(58.8)	48(15.9)	22(7.3)	73(24.3)	34(11.3)	
Education level, n (%)						
Bachelor's degree	206 (68.4)	58(19.3)	19(6.3)	93(30.9)	36(12)	>0.01+
Postgraduate degree (MSc)	49(16.3)	16(5.3)	7(2.3)	18(6.0)	8(2.7)	
Diploma	24(8.0)	1(0.3)	4(1.3)	15(5.0)	4(1.3)	
Postgraduate degree (PhD)	22(7.3)	8(2.7)	1(0.3)	6(2.0)	7(2.3)	
Nationality, n (%)						

Saudi	275(91.4)	74(24.6)	24(8.0)	131(43.5)	46(15.3)	
Non-Saudi	26(8.6)	9(3.0)	7(2.3)	1(0.3)	9(3.0)	
Clinical Department, n(%)						<0.01*
Applied	135(44.9)	46(15.3)	9(3.0)	53(17.6)	27(9.0)	
Nursing care	57(18.9)	16(5.3)	9(3.0)	27(9.0)	5(1.7)	
Doctor	46(15.3)	8(2.7)	5(1.7)	30(10)	3(1.0)	
Pharmacy	22(7.3)	6(2.0)	0(0.00)	7(2.3)	9(3.0)	
Others	41(13.6)	7(2.3)	8(2.7)	15(5.0)	11(3.7)	

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Work experience, n (%)						<0.05+
1-5 years	187(62.1)	13(4.3)	90(29.9)	38(12.6)	46(15.3)	
6-10 years	51(16.9)	8(2.7)	21(7.0)	7(2.3)	15(5.0)	
11-15 years	30(10)	6(2.0)	15(5.0)	1(0.3)	8(2.7)	
16-20 years	23(7.6)	2(0.7)	6(2.0)	5(1.7)	10(3.3)	
More than 20 years	10(3.3)	2(0.7)	0(0.0)	4(1.3)	4(1.3)	
Professional level, n (%)						>0.01+
Junior	87(28.9)	19 (6.3)	8(2.7)	39(13.0)	21(7.0)	
Intermediate	123(40.9)	33(11)	14(4.7)	56(18.6)	20(6.6)	
Senior	91(30.2)	31(10.3)	9(3.0)	37(12.3)	14(4.7)	
Average working hoursper day, n (%)						
8 h	198 (65.8)	40(13.3)	26(8.6)	82(27.2)	50(16.6)	<0.01*
12 h	103(34.2)	43(14.3)	5(1.7)	50(16.6)	5(1.7)	
Average working hoursper week, n (%)						<0.01+

Multi-Knowledge Electronic Comprehensive Journal For
Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Less than 40	48 (15.9)	9(3.0)	4(1.3)	25(8.3)	10(3.3)	
40 to 48 hours	212(70.4)	50(16.6)	24(8.0)	99(32.9)	39(13.0)	
More than 48 hours	41(13.6)	24(8.0)	3(1.0)	8(2.7)	6(2.0)	

* The association was done using Chi square test X^2 .

+ The association was done using Kruskal-Wallis test.

Table (1) presents the characteristics of the study participants at different levels of hospitals, including primary healthcare centers, secondary public hospitals, tertiary public hospitals, and private hospitals. The table shows the distribution of participants based on several demographic and work-related factors, including age, gender, education level, nationality, clinical department, work experience, professional level, average working hours per day, and average working hours per week. The table also includes the sample size (n) for each hospital level and the percentages of participants in each category. The P-value is also provided for each variable to indicate the statistical significance of the differences observed among the hospital levels.

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

For example, the table shows that the majority of participants (64.5%) were aged between20-30 years, and this was statistically significant ($p<0.05$) across all levels of hospitals. In terms of gender, the table shows that female participants (58.8%) were slightly more prevalent than male participants (41.2%), but this difference was not statistically significant ($p>0.01$). Similarly, the nationality of participants was predominantly Saudi (91.4%), and this was statistically significant ($p<0.01$) across all hospital levels.

Satisfaction of online medical practices among healthcare providers:

Satisfaction of online medical practices among healthcare providers were investigated using frequencies and percentages. The association among the satisfaction levels and the healthcare levels was investigated using Kruskal-Wallis test. The outcomes are presented in Table 2.

Table 5-2 Satisfaction of online medical practices among healthcare providers

Characteristics	Total n (%)	Level of Hospital				P-value
		Tertiary public hospital n (%)	Primary healthcare center n (%)	Secondary public hospital n (%)	Private hospital n (%)	
Sample Size, n	**301**	**83 (27.6)**	**31 (10.3)**	**132(43.9)**	**55(18.3)**	
Online medical services						>0.01*
Interpreting test reports	101(33.6)	30(10)	6(2.0)	52(17.3)	13(4.3)	
Online consultation	72(23.9)	15(5)	11(3.7)	29(9.7)	17(5.7)	
E-prescription	76(25.2)	21(7)	11(3.7)	29(9.7)	15(5)	
Tracking and managing chronic diseases online	15(5)	6(2)	1(3)	6(2.0)	2(7)	

Providing online follow-up and rehabilitation guidance for post-operative care	16(5.3)	6(2)	0(0.0)	5(1.7)	5(1.7)	
Remote round/teaching/surgery/first Aid	17(5.6)	5(1.7)	2(7)	9(3.0)	1(3)	
None	3(1.0)	0(0.0)	0(0.0)	2(7)	1(3)	
Satisfaction						>0.01[+]

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Extremely satisfied	66(21.9)	5(1.7)	13(4.3)	30(10.0)	18(6.0)	
Satisfied	128(42.5)	14(4.7)	26(8.6)	53(17.6)	35(11.6)	
Neutral	78(25.9)	7(2.3)	13(4.3)	38(12.6)	20(6.6)	
Dissatisfied	28(9.3)	4(1.3)	3(1.0)	11(3.7)	10(3.3)	
Extremely Dissatisfied	1(0.3)	1(0.3)	0(0.0)	3(0.0)	0(0.0)	
Have you ever heard of e-hospitals?						>0.01*
Yes, I am familiar	78(25.9)	25(8.3)	7(2.3)	33(11)	13(4.3)	
I have seen documents	55(18.3)	13(4.3)	3(1.0)	29(9..6)	10(3.3)	
I only have minimal information.	75(24.9)	20(6.6)	9(3.0)	28(9.3)	18(6.0)	
I do not know what they are.	32(10.6)	9(3.0)	6(2.0)	12(4.0)	5(1.7)	
No, I have never heard	61(20.3)	16(5.3)	6(2.0)	30(10)	9(3.0)	

+ The association was done using Kruskal-Wallis test.

*Chi-square test was applied.

Table (2) presents data on the level of healthcare providers and the respondents` satisfaction levels. The sample size included 301 participants, with the majority attending a secondary public hospital (43.9%), followed by a tertiary public hospital (27.6%), a private hospital (18.3%), and a primary healthcare center (10.3%).

In terms of online medical services utilization, interpreting test reports was the most frequently used service (33.6%), followed by e-prescription (25.2%), online consultation (23.9%), providing online follow-up and rehabilitation guidance for post-operative care (5.3%), remote round/teaching/surgery/first aid (5.6%), and tracking and managing chronic diseases online (5%). When examining the level of hospital and its relationship to online medical services utilization, there was no statistically significant difference in the utilization of online medical services among the different types of hospitals. Also, Table (2) indicates that the majority of the participants worked in tertiary public hospitals (43.9%), followed by private hospitals (18.3%), primary healthcare centers (27.6%), and secondary public hospitals (10.3%).

Regarding the level of satisfaction, the majority of the participants were satisfied with online medical practices (42.5%), followed by those who were neutral (25.9%), extremely satisfied (21.9%), dissatisfied (9.3%), and extremely dissatisfied (0.3%). However, there is no

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

statistically significant difference in satisfaction levels based on the level of the hospital, as indicated by the P-value (>0.01).

Table (2) shows that there is no a statistically significant difference in familiarity with e-hospitals across different levels of hospitals. Among the respondents, 25.9% were familiar with e-hospitals and paid close attention to their development, while 18.3% had seen documents about e-hospitals. Additionally, 24.9% of the respondents had only minimal information about e-hospitals but were willing to learn more in the future, and 10.6% had heard of e-hospitals but did not know what they were. Finally, 20.3% of the respondents had never heard of e-hospitals. The data does not provide information on the satisfaction of healthcare providers with online medical practices.

Table (2) presents data on the level of healthcare providers and the respondents` satisfaction levels. The sample size of the study was 301. The majority of the participants worked in secondary public hospitals (43.9%), followed by private hospitals (18.3%), tertiary public hospitals (27.6%), and primary healthcare centers (10.3%). Regarding the level of satisfaction, the majority of the participants were satisfied with online medical practices (42.5%), followed by those who were neutral (25.9%), extremely satisfied (21.9%), dissatisfied (9.3%), and extremely dissatisfied (0.3%). However, there is no statistically significant difference in satisfaction levels based on the level of the hospital, as indicated by the P-value (>0.01).

The association between Sociodemographic data of the respondents and willingness to work at e-hospitals:

Chi-square and Kruskal-Wallis tests are used to find the association between Sociodemographic data of the respondents and willingness to work at e-hospitals. Results can be seen in Table (3).

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Table 5-3 Willingness to work at e-hospitals

Characteristics	Total n(%)	Willing to work at an e-hospital to manage yourpatients		P-value
		No n(%)	Yes n(%)	
Sample Size, n	**301**	**55 (18.3)**	**246 (81.7)**	
Age, n (%)				>0.01+
20-30	194 (64.5)	38(12.6)	156(51.8)	
31-40	74(24.6)	8(2.7)	66(21.9)	
41-50	23(7.6)	7(2.3)	16(5.3)	
51-60	10(3.3)	2(0.7)	8(2.7)	
Gender, n (%)				>0.01*
Male	124 (41.2)	23(8)	101(34)	
Female	177(58.8)	32(11)	145(48)	
Education level, n (%)				>0.01+
Bachelor's degree	206 (68.4)	41(13.6)	165(54.8)	
Postgraduate degree	49(16.3)	4(1.3)	45(15)	

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

(MSc)				
Diploma	24(8.0)	5(1.7)	19(6.3)	
Postgraduate degree (PhD)	22(7.3)	5(1.7)	17(5.6)	
Nationality, n (%)				
Saudi	275(91.4)	48(15.9)	227(75.4)	>0.01*
Non-Saudi	26(8.6)	7(2.3)	19(6.3)	
Clinical Department, n (%)				>0.01*
Applied	135(44.9)	18 (6.0)	117(38.9)	
Nursing care	57(18.9)	15(2.0)	42(14.0)	
Doctor	46(15.3)	6(2.0)	40(13.3)	
Pharmacy	22(7.3)	9(3.0)	32(10.6)	
Others	41(13.6)	7(2.3)	15(5.0)	
Work experience, n(%)				>0.01+
1-5 years	187(62.1)	36(12)	151(50.2)	

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

6-10 years	51(16.9)	8(2.7)	43(14.3)	
11-15 years	30(10)	3(1.0)	27(9.0)	
16-20 years	23(7.6)	5(1.7)	18(6.0)	
More than 20 years	10(3.3)	3(1.0)	7(2.3)	
Professional level, n (%)				>0.01+
Junior	87(28.9)	22(7.3)	65(21.6)	
Intermediate	123(40.9)	20(6.6)	103(34.2)	
Senior	91(30.2)	13(4.3)	78(25.9)	

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Average workinghours per day, n (%)				
8 h	198 (65.8)	40(13.3)	158(52.5)	>0.01*
12 h	103(34.2)	15(5.0)	88(29.2)	
Average working hours per week, n (%)				>0.01+
Less than 40	48 (15.9)	9(3.0)	39(13.0)	
40 to 48 hours	212(70.4)	38(12.6)	174(57.8)	
More than 48 hours	41(13.6)	8(2.7)	33(11)	

* The association was done using Chi square test X^2 .

+ The association was done using Kruskal-Wallis test.

Table (3) presents characteristics of a sample group of healthcare professionals and their willingness to work at an e-hospital to manage patients. The sample size was 301, with 55 (18.3%) respondents stating they were not willing to work at an e-hospital and 246 (81.7%) indicating their willingness. The table presents the distribution of respondents' characteristics, including age, gender, education level, nationality, clinical department, work experience, professional level, and average working hours per day and week. The P-value column shows the statistical significance of the differences between the groups' willingness to work at an e-hospital. One interesting observation is that the majority of the respondents were aged 20-30 years (64.5%) and had a bachelor’s degree as their education level (68.4%). Moreover, most

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

respondents were Saudi nationals (91.4%) working in the applied clinical department (44.9%) and had 1-5 years of work experience (62.1%). Another notable finding is that the P-values for all of the variables are above the significance level of 0.05, indicating that there is no significant difference between the groups' willingness to work at an e-hospital based on their characteristics.

Prediction of willingness to work at e-hospitals according to the participants` demographic data:

To predict the willingness to work at e-hospitals according to the participants` demographic data, logistic regression technique was used. The outcomes of the regression analysis are presented in Table 4.

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Table 5-4 Multivariate logistic regression of the willingness to work at e-hospitals

Independent variables	Coefficient	OR (95% CI)	SE	df	P-value
Level of working hospital				3	0.189
Primary healthcare center	-0.111	0.895(0.397-2.015)	0.414	1	0.788
Secondary public hospital	-0.059	0.942(0.331-2.684)	0.534	1	0.911
Tertiary public hospital	-0.739	0.477(0.214-1.067)	0.410	1	0.072
Private hospital	Ref	Ref			
Age				3	0.147
20-30	-0.026	0.974(1.99-4.776)	0.811	1	0.974
31-40	-0.724	0.485(0.087-2.693)	0.875	1	0.408
41-50	0.560	1.749(0.293-10.44)	0.911	1	0.539
51-60	Ref	Ref			
Gender					
Male	0.031	1.032(0.570-1.867)	0.303	1	0.917
Female	Ref	Ref			

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

Education level				3	0.188
Diploma	-0.169	0.845(0.294-2.424)	0.538	1	0.754
Bachelor's degree	-1.197	0.302(0.072-1.261)	0.729	1	0.101
(Postgraduate degree (MSc)	-0.111	0.895(0.220-3.634)	0.715	1	0.876
(Postgraduate degree (PhD)	Ref	Ref			
Clinical Department				4	0.084
Applied	-1.110	0.329(0.118-0.919)	0.523	1	0.034
Nursing care	-0.267	0.765(0.262-2.239)	0.548	1	0.625
Doctor	-1.135	0.321(0.093-1.112)	0.633	1	0.073
Pharmacy	-0.506	0.603(0.188-1.928)	0.593	1	0.393
Others	Ref	Ref			
Professional level				2	0.135
Junior	0.708	2.031(0.949-4.345)	0.388	1	0.068
Intermediate	0.153	1.165(0.546-2.485)	0.387	1	0.693
Senior	Ref	Ref			

Average working hoursper day					

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

8 h	0.396	1.485(0.777-2.84)	0.331	1	0.232
12 h	Ref	Ref			
Average working hoursper week				2	0.968
Less than 40	-0.049	0.952(0.330-2.745)	0.540	1	0.927
40 to 48 hours	-0.104	0.900(0.386-2.104)	0.433	1	0.809
More than 48 hours	Ref	Ref			

Table 4 presents the results of multivariate analysis, showing that the level of affiliated hospitals, age, gender, education, professional level and working hours/week were not statistically associated with the willingness to work at e-hospitals after adjusting for other covariates in the model.

Perceived facilitators for users of E-hospitals

In order to investigate the perceived facilitators for non-users of E-hospitals, frequencies were calculated. The results are portrayed in Figure (1).

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

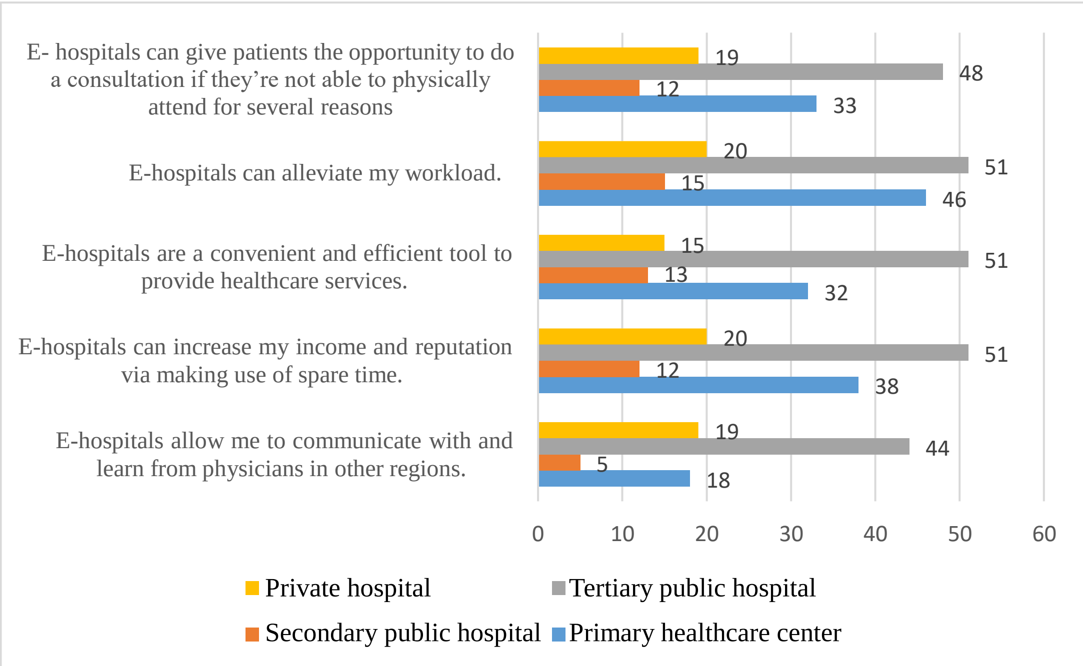

Figure 1. Perceived facilitators for users of E-hospitals

Based on Figure (1), it appears to be a survey or assessment of healthcare providers' perceptions about the benefits of e-hospitals in different types of healthcare institutions,

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

including primary healthcare centers, secondary public hospitals, tertiary public hospitals, and private hospitals. Around 51 users of E-hospitals stated that E-hospitals can increase my income and reputation via making use of spare time, E-hospitals are a convenient and efficient tool to provide healthcare services and E-hospitals can alleviate my workload. However, 48 users mentioned that E- hospitals can give patients the opportunity to do a consultation if they're not able to physically attend for several reasons. While, 44 users stated that E-hospitals allow me to communicate with and learn from physicians in other regions.

Perceived barriers for non-users:

In order to inspect the perceived barriers for non-users of E-hospitals, frequencies were calculated. The outcomes are depicted in Figure (2).

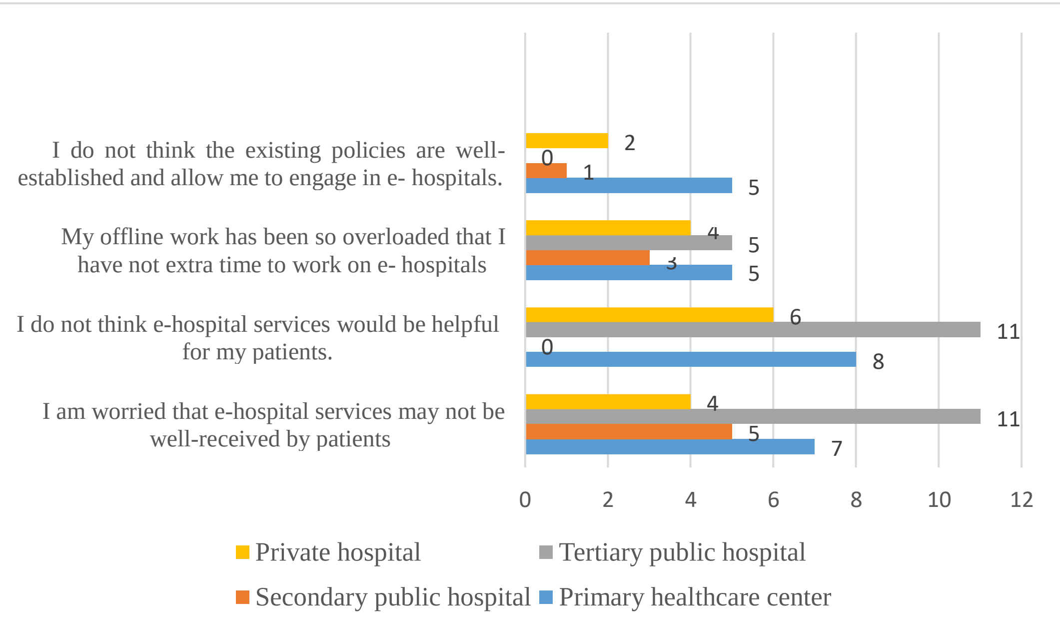

Figure 2. Perceived barriers for non-users of e-hospitals

According to Figure (2), it appears to be a survey or assessment of healthcare providers' perceptions about the barriers of e-hospitals in different types of healthcare institutions, including primary healthcare centers, secondary public hospitals, tertiary public hospitals, and

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

private hospitals. Around 11 non-users of E-hospitals are worried that services may not be well-received by patients and they do not think services would be helpful for my patients.

4. Discussion

Many contend that eHealth technologies hold promises for healthcare system enhancement, the attitudes of healthcare professionals in the Kingdom of Saudi Arabia (KSA) have not been studied. There is also an inadequacy of information about the barriers and facilitators that may affect eHealth implementation in KSA (Aldebasi et al., 2020). Therefore, this study aims to determine the professional attitudes, barriers, and facilitators that will affect the technology's usage in KSA.

Proficiency is one factor that impacts the professionals' willingness to use eHealth and their attitudes about the technologies involved. People who are competent in IT were more accepting of the technology usage in KSA (Aldebasi et al., 2020). eHealth employs computer technologies to interact with patients, store records and perform other roles. The functions depend on knowing computer skills. Therefore, proficient people accept the technologies because they find them easier to use. For instance, proficiency helps professionals use electronic records easily. Healthcare providers are more likely to resist because of their technological incompetence (Aldebasi et al., 2020). Providers must consider the employee's skill level concerning e-health to recruit employees who fit in the e-hospital environments.

Our study explored serval demographic factor that effect the professionals' willingness to use eHealth and their attitudes about the technologies involved. The finding reveal that the younger participants are more willing to work in e- hospitals. Therefore, Age is considered an important factor for e-hospitals readiness. In accordance to Algumzi (2022) study people's ages in KSA are connected to their technology competency. The younger healthcare providers are more competent with technology compared to older healthcare providers. Also, the new technologies are more information-oriented than in the past. Younger healthcare providers understand how to utilize electronic records and other technologies needed to enable e-Hospital operation (Algumzi et al., 2022). Also, younger providers get training on using the new electronic systems. Hence, they are proficient and ready to embrace e-hospitals and other related technologies by the time they get employed. It is important to incorporate e-hospital- related skills in post-graduate accreditation courses to ensure people are prepared to embrace the technologies (Aldebasi et al., 2020).

Our results show that in terms of satisfaction and efficiency that the majority of the participants were satisfied with online medical practices (42.5%), followed by those who were neutral (25.9%), extremely satisfied (21.9%). In accordance to Atinga et al., (2020) e-health systems influence health workers job satisfaction and motivation. There finding suggests that health workers who used digital systems to communicate, register and consult patients experienced satisfaction with their job. Also, respondents who felt e-health enhances healthcare delivery were more likely to show job satisfaction (Atinga et al., 2020).

In our results, it was found that familiarity with e-hospitals was one of the prerequisites for readiness to adopt e-hospitals. When examining the level of hospital and its relationship to online medical services utilization that the majority of the participants worked in tertiary public hospitals (43.9%). In accordance to Ross et al., (2016) study the familiarity with the technologies is another factor that impacts acceptability. Providers who have used e-hospitals technologies before are more likely to have positive attitudes towards the technologies than those who have not. Experience helps people build skills and understandthe technologies' importance. Therefore, it is important to add material on the e-hospital operation and e-health in the advanced training of healthcare providers. Training should include simulations and interactions with the technologies people anticipate using in their work in e-hospitals (Ross et al., 2016). Undergrad students should also be exposed to e-hospital resources. In KSA, current, the lack of the inadequate e-health-related material in the work environment contributes to the poor attitudes of professionals (AlBar & Hoque, 2019).

The study survey includes assessment of healthcare providers' perceptions about the benefits of e-hospitals in different types of healthcare institutions, around 132 users of E-hospitals stated that E-hospitals can alleviate my workload. Moreover, e-hospitals help to increase efficiency in work processes and decrease the workload especially in primary healthcare setting. Therefore, the administrators of physical hospitals and e-hospitals should make sure that healthcare professionals continue to work within realistic time constraints while balancing their workloads offline and online. Furthermore, in order to accurately identify and incorporate clinical demands into user-friendly e-hospital systems, interviews with healthcare providers and IT designers are required (Li et al., 2022).

The privacy concerns are growing with the implementation of e-hospitals. Physicians in KSA and elsewhere concern that health information systems may present weaknesses and gabs for information confidentiality and privacy that may make patients and professionals data suspected to internal or external violation (AlBar & Hoque, 2019). Also, issues like employee and patient technology proficiency affect their data security. However, the government has an e-health policy that seeks to guide its implementation. Having strong policies is among the key drivers that the government aims to use to increase the acceptability of e-health. Therefore, implementing the policies will guide how security issues and confidentiality will be handled in the kingdom (AlBar & Hoque, 2019).

The attitudes concerning e-health and e-hospitals in KSA are mixed. Several factors cause mixed reactions. The facilitators include proficiency and young age. Younger professionals are more accepting of the changes. Older professionals prefer the status quo. Also, proficiency is another factor (Algumzi et al., 2022). Proficiency is related to age and experience. People with experience using electronic technologies in school or work also have better attitudes than those without adequate experience and proficiency (Aldebasi et al., 2020). The KSA government is implementing an e-Health policy to improve the acceptance of the technologies to improve care. More research is needed to improve privacy and prepare employees for the issues that come with e-Health and e-Hospitals (AlBar & Hoque, 2019).

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

5. Conclusion

E-hospitals can help an integrated delivery model centered in primary healthcare centers succeed. As a result, patients can get medical treatment from their homes using digital devices such smartphones and other digital devices (Aldhahir et al., 2022). Patients may easily reach healthcare providers, which reduces the need for referrals and lowers patient travel expenses. According to Gu et al. (2021), e-hospitals relieve some of the pressure on healthcare institutions. Moreover, they can give healthcare systems the power to address the issue of the lack of trained medical professionals in rural areas (Al Saffer et al., 2021). However, for the successful adoption of e-hospitals, healthcare providers must be prepared to use e-hospital technologies. The healthcare providers should commit themselves to offering convenient care to boost healthcare access in Saudi Arabia. Several factors may also influence the adoption of e-hospital technologies (Aldhahir et al., 2022). Therefore, it is important to identify and deal with the perceived facilitators and impediments to working in e-hospitals such as, improving operative prociency in electronic devices, accommodating to work schedules, increasing familiarity with e-hospitals and regulating practices will improve the readiness of healthcare providers to work at e-hospitals

References

- Ahmed, N. J., Almalki, Z. S., Alsawadi, A. H., Alturki, A. A., Bakarman, A. H., Almuaddi, A. M., ... & Alamer, A. A. (2023, April). Knowledge, Perceptions, and Readiness of Telepharmacy among Hospital Pharmacists in Saudi Arabia. In Healthcare (Vol. 11, No. 8, p. 1087). MDPI. https://pubmed.ncbi.nlm.nih.gov/37107921/
- Alanezi, F. (2020). Factors affecting the adoption of e-health system in the Kingdom of Saudi Arabia. Research Gate. http://dx.doi.org/10.1093/inthealth/ihaa091
- Al-Anezi, F. M. (2021). Evaluating the readiness of mobile technology with respect to e-Heath for medication in Saudi Arabia: an integrative perspective. Journal of Multidisciplinary Healthcare, 59-66. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7802891/
- AlBar, A. M., & Hoque, M. R. (2019). Patient acceptance of e-health services in Saudi Arabia: an integrative perspective. Telemedicine and e-Health, 25(9), 847-852. https://pubmed.ncbi.nlm.nih.gov/30452333/
- Albarrak, A. I., Mohammed, R., Almarshoud, N., Almujalli, L., Aljaeed, R., Altuwaijiri, S., & Albohairy, T. (2021). Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia. Journal of Infection and public health, 14(1), 97-102. https://pubmed.ncbi.nlm.nih.gov/31060975/
- AlBasri, M., Ustun, A. & Georgiev, P. (2022). Ten Ways to Accelerate the Benefits of Digital Health in Saudi Arabia. McKinsey & Company. https://www.mckinsey.com/industries/healthcare-systems-and-services/our-

insights/ten-ways-to-accelerate-the-benefits-of-digital-health-in-saudi-arabia

- Aldebasi, B., Alhassan, A. I., Al-Nasser, S., & Abolfotouh, M. A. (2020). Level of awareness of Saudi medical students of the internet-based health-related information seeking and developing to support health services. BMC Medical Informatics and Decision Making, 20, 1-8. https://doi.org/10.1186/s12911-020-01233-8

- Aldhahir, A. M., Alqahtani, J. S., Althobiani, M. A., Alghamdi, S. M., Alanazi, A. F., Alnaim, N., ... & Alwafi, H. (2022). Current Knowledge, Satisfaction, and Use of E-Health Mobile Application (Seha) Among the General Population of Saudi Arabia: A Cross- Sectional Study. Journal of Multidisciplinary Healthcare, 667-678. https://www.tandfonline.com/doi/abs/10.2147/JMDH.S355093
- Aldosari, B. (2014). Rates, levels, and determinants of electronic health record system adoption: A study of hospitals in Riyadh, Saudi Arabia. International journal of medical informatics, 83(5), 330-342. https://www.semanticscholar.org/paper/Rates%2C-levels%2C-and-determinants-of-electronic-A-of-Aldosari/929339d8e325d80d09631731a8b8da0450d25380
- Algumzi, A. (2022). Evolving factors influencing consumers’ attitudes towards the use of eHealth applications: implications on the future of Neom. International Health, 14(2), 152-160. DOI: 10.1093/inthealth/ihab020
- Alharbi, A., Alzuwaed, J., & Qasem, H. (2021). Evaluation of e-health (Seha) application: a cross-sectional study in Saudi Arabia. BMC medical informatics and decision making, 21(1), 103. https://doi.org/10.1186/s12911-021-01437-6

- Alharbi, R. A. (2022). Adoption of Electronic Health Records in Saudi Arabia Hospitals: Knowledge and Usage. Journal of King Saud University – Science. https://doi.org/10.1016/j.jksus.2022.102470

- Aljohani, N., & Chandran, D. (2019). Adoption of M-Health Applications: The Saudi Arabian Healthcare Perspectives. https://acis2019.io/pdfs/ACIS2019_PaperFIN_045.pdf

- Almazroi, A. A., Mohammed, F., Al-Kumaim, N. H. & Hoque, R. (2022). An Empirical Study of Factors Influencing E-Health Services Adoption Among Public in Saudi Arabia. Health Informatics Journal. https://doi.org/10.1177/14604582221102316
- Almuayqil, S., Atkins, A. S. & Sharp, B. (2016). Ranking of E-Health Barriers Faced by Saudi Arabian Citizens, Healthcare Professionals, and IT Specialists in Saudi Arabia. Research Gate. http://dx.doi.org/10.4236/health.2016.810104
- Al Saffer, Q., Al-Ghaith, T., Alshehri, A., Al-Mohammed, R., Al Homidi, S., Hamza, M. M.,

  ... & Alazemi, N. (2021). The capacity of primary health care facilities in Saudi Arabia: infrastructure, services, drug availability, and human resources. BMC health services research, 21(1), 1-15. https://doi.org/10.1186/s12913-021-06355-x
- Al-Samarraie, H., Ghazal, S., Alzahrani, A. I., & Moody, L. (2020). Telemedicine in Middle Eastern countries: Progress, barriers, and policy recommendations. International journal of medical informatics, 141, 104232. https://pubmed.ncbi.nlm.nih.gov/32707430/
- Alshahrani, A., Stewart, D. & Maclure, K. (2019). A Systematic Review of The Adoption and Acceptance Of E-health In Saudi Arabia: Views of Multiple Stakeholders.

  International Journal of Medical Informatics [online], 128, pages 7–17. Available from: https://doi.org/10.1016/j.ijmedinf.2019.05.007
- Alshammari, M. H. (2021). Electronic health in Saudi Arabia: A Review. International Journal of advanced and Applied sciences, 8(6), pages 1-10 http://science-

Multi-Knowledge Electronic Comprehensive Journal For Education And Science Publications(MECSJ)
Issues 68 (2023)
ISSN: 2616-9185

gate.com/IJAAS/Articles/2021/2021-8-6/1021833ijaas202106001.pdf.

- Anichini, R., Brocco, E., Caravaggi, C. M., Da Ros, R., Giurato, L., Izzo, V., ... & Stoico, V. (2020). Physician experts in diabetes are natural team leaders for managing diabetic patients with foot complications. A position statement from the Italian diabetic foot study group. Nutrition, Metabolism and Cardiovascular Diseases, 30(2), 167-178.

- Atinga, R. A., Abor, P. A., Suleman, S. J., Anaba, E. A., & Kipo, B. (2020). e-health usage and health workers' motivation and job satisfaction in Ghana. PloS one, 15(9), e0239454. https://doi.org/10.1371/journal.pone.0239454

- Bhatti, M. A., Al Doghan, M. A., Alshiha, A. A., & Juhari, A. S. (2022). Adoption of Smart Systems and The Health Workers' Sustainable Job Performance: The Role of Attitude towards Smart Systems, Technology Readiness, Perceived Usefulness and Practicality of Medical Applications. INTERNATIONAL JOURNAL OF CONSTRUCTION SUPPLY CHAIN MANAGEMENT, 12(1).

  https://www.researchgate.net/publication/364284587_Adoption_of_Smart_Systems_and_The_Health_Workers'_Sustainable_Job_Performance_The_Role_of_Attitude_towards_Smart_Systems_Technology_Readiness_Perceived_Usefulness_and_Practicality_of_Medical_Application

- Elkhalifa, A. M., Ahmed, B. H., & ELMobarak, W. M. (2022). Factors That Influence E-Health Applications from Patients' Perspective in the Kingdom of Saudi Arabia: An Exploratory Study. IEEE Access, 10, 109029-109042.

  https://ieeexplore.ieee.org/abstract/document/9917505/

- Ghaleb, E. A., Dominic, P. D. D., Fati, S. M., Muneer, A., & Ali, R. F. (2021).

The assessment of big data adoption readiness with a technology–organization–environment framework: a perspective towards healthcare employees. Sustainability, 13(15), 8379. https://www.mdpi.com/2071-1050/13/15/8379

- Gu, D., Khan, S., Khan, I. U., Khan, S. U., Xie, Y., Li, X., & Zhang, G. (2021). Assessing the adoption of e-health technology in a developing country: an extension of the UTAUT model. Sage Open, 11(3), 21582440211027565. https://doi.org/10.1177/21582440211027565
- HASANAIN, R. A., Vallmuur, K., & Clark, M. (2015). Electronic medical record systems in Saudi Arabia: knowledge and preferences of healthcare professionals. Journal of Health Informatics in Developing Countries, 9(1). https://www.jhidc.org/index.php/jhidc/article/download/135/186/526
- Humayun, M., Jhanjhi, N. Z., Almotilag, A., & Almufareh, M. F. (2022). Agent-based medical health monitoring system. Sensors, 22(8), 2820. https://doi.org/10.3390/s22082820

Lahariya, C. (2020). Health & wellness centers to strengthen primary health care in India: Concept, progress and ways forward. The Indian Journal of Pediatrics, 87(11), 916-929.

- Li, P., Luo, Y., Yu, X., Mason, E., Zeng, Z., Wen, J., ... & Jalali, M. S. (2022). Readiness of healthcare providers for e-hospitals: a cross-sectional analysis in China before the COVID-19 period. BMJ open, 12(2), e054169.

- Noor, A. (2019). The utilization of E-health in the Kingdom of Saudi Arabia. International Research Journal of Engineering and Technology. https://www.irjet.net/archives/V6/i9/IRJET-V6I9187.pdf
- Oo, H. M., Htun, Y. M., Win, T. T., Han, Z. M., Zaw, T., & Tun, K. M. (2021). Information and communication technology literacy, knowledge and readiness for electronic medical record system adoption among health professionals in a tertiary hospital, Myanmar: A cross-sectional study. Plos one, 16(7), e0253691. https://pubmed.ncbi.nlm.nih.gov/34197506/
- Ross, J., Stevenson, F., Lau, R., & Murray, E. (2016). Factors that influence the implementation of e-health: a systematic review of systematic reviews (an update). Implementation science : IS, 11(1), 146. https://doi.org/10.1186/s13012-016-0510