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Synergistic Healthcare: The Role of Health Information, Medicine, Dentistry, and Respiratory Therapy in Improving Patient Health Outcomes

Youssef Mushabbab Alshehri[1], Mohammed Abdulfattah Altawayli[2], Saad Abdurahman Alalyani[2], Nasser Mohammed Alotaibi[3], Turki Ibrahim Alanazi[4], Haitham Mohammed Althobaiti[5], Mohamed Abdullah Alhawiti[5], Majed Jazaa Albarrazi[5], Norah Ali AlShahir[6], Elham Mohammed Najea Nasser[7], Thikra Mohammed Naji Nasser[8], Ghader Hamdan Alanazi[9]

1. General Physician, Referral center, Riyadh
2. Dentist, Referral center, Riyadh
3. Dentist, Ministry of Health, Riyadh
4. Dentist, Primary Health Care, Riyadh
5. Respiratory Therapist, Dureah Hospital, Riyadh
6. Dental Hygienist, Referral center, Riyadh
7. Dentist, Shaqra Hospital, Riyadh
8. Respiratory Therapy, King Faisal Specialist Complex, Altaef
9. Dental Public Health, Referral center, Riyadh

ABSTRACT

Health informatics is one of the most debated areas in the recent past among the researchers and the related stakeholders are providing and establishing their opinion about the enhancement of healthcare services and understanding of relative parameters in the same. this can be viewed as a systematic review and timely outcome of the review, which means that before the next enhancement in the process relevant information should be floated all over the stakeholders like, doctors, nurses, medical reviewers, and people engaged in the offering of health care services. This present study will try to give a different view to overall system of healthcare informatics by considering the views of patients i.e., they are taken as final sample units from the top hospitals of Saudi Arabia. Researcher has used factor analysis to evaluate the collected data.

KEYWORDS: Healthcare Informatics, Saudi Arabia, Hospital patients.

1. Introduction

In a country like Saudi Arabia where the access to healthcare services has increased from 70% to 85% in 2020 and is still increasing CUREUS (2023), but only for the urban population only, there is a dire need of healthcare services for the rural section of the society. Development is required to be done from the bottom of the pyramid to the patients who are coming to the hospitals for chronic diseases, related to ENT, especially dentistry and respiratory. In the present times health care has not remained

the part of core healthcare services like doctors, nurses, etc. but they have moved further to the wellbeing of the patients to a substantial level i.e., at present and in the future as well. This scenario can be considered good for the patients but then again, the whole process is time consuming and costly; also, this is going to increase the cost of healthcare services in the country, especially in the corporate sector including the urban system of health care. In the present scenario this will take time to reach the bottom of the pyramid, but the MOH (Ministry of Health) in Saudi Arabia is taking all the necessary steps to improve the scenario and synergistic healthcare is one of them. At the given point of exchange many of the health care services are available online but then again this is available for a particular section of the society only, still the deprived people are not the active part of the system. Hamade (2019) The variation in the processing of Saudi health care system is because of lose flow of information i.e., at times there are variation in the program flow and at times there can be lose end in the distribution of the benefits related to health care. Hence it can be stated that the informatics relate to health care can completely change the scenario in which healthcare practitioners are managing the services offered and the respective data analytics breakthrough.

There is a great debate in the process of research related to comprehensive analysis of data as far as, health informatics is concerned i.e., the researchers and the related practioners are providing and establishing their opinion about the enhancement of healthcare services and understanding of relative parameters in the same. this can be viewed as a systematic review and timely outcome of the review, which means that before the next enhancement in the process relevant information should be floated all over the stakeholders like, doctors, nurses, medical reviewers, and people engaged in the offering of health care services. Rahimi (2018) as stated above, health care services in the country are improving and trying to take the take the services to next level, but still there is time to meet the international standards; but then again people are committed enough the engaged in the promotion of tailormade healthcare system, making use of various telehealth platforms, devising updated health monitoring devices and even keeping the online records of the patients are who are coming to seek the health care services.

Since the final years of last decade, the respective stakeholders have given importance to the increase of coordination among the service providers and the respective beneficiaries, then it was also advised by many of the researchers that there is a need to increase the communication between all the said stakeholders and for increasing the communication advantage of ever-rising information technology can be taken and because in the present time AI (Artificial Intelligence) can change the face of healthcare system forever, as a mater of fact the information technology is used for the sharing of medical information of patients, keeping a keen eye on the plans followed for treatment of patients, floating and exchanging information as and when required by related people, use of secure messaging platforms for sharing patient information, maintain and share the electronic health record of the patients. This system can be collectively called as healthcare informatics and certainly have the capacity to minimize the margin of error in health care services, give better results related to patient's health and improve the overall system for better good of the society. Shukla; Veinot (2020)

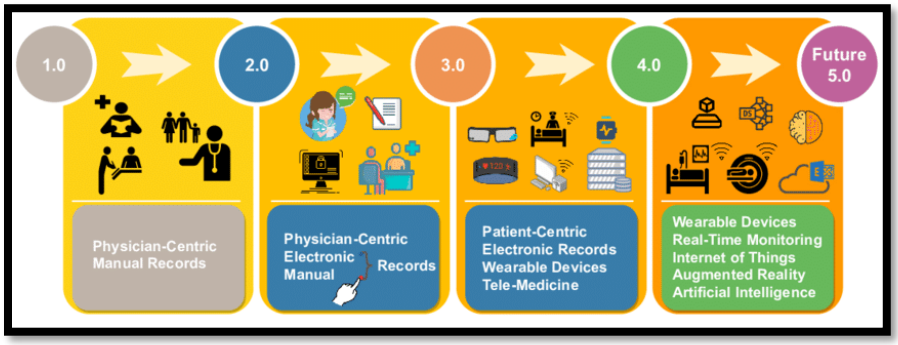

Figure1: Evolution of Healthcare informatics in Saudi Arabia

In addition to the above stated facts the drive of health informatics can be considered very important for the promotion of evidence-based practices in the system of healthcare. Many of the researchers have commented on the advancement of predictive analysis (based on a certain data base), detection of pre-defined results in certain cases, prevailing trends in the field of health care, more precision in decision making related to clinical typologies and improvement in the quality parameters of health care. Singh et al (2021). In most of the cases, data driven approaches enable the agencies of healthcare to track the performance, keep a close eye on the recovery of patient, look forward to respective areas of improvement and derive ways and means that are less on cost and high on quality.

According to Luna (2014) if the people are able to keep the track of information related to the track of their health, able to keep an eye on the progress of their recovery in case of any ailment and track the recent developments in the area of health care then it can be easier for them to know about the prevailing system of health care and the associate benefits. There are certain other benefits of the same like the patients get more informed and empowered, respective health outcomes are improved, satisfaction of patients is improved and the approach of health care people become more patient centric.

It can be stated that health care informatics have the capability to bring about the positive changes in the respective healthcare provisions and bringing about major changes in the improvement of quality.

In the present study the researcher will focus on the role of healthcare informatics in the field of medicine, dentistry, and respiratory therapy in Improving Patient Health Outcomes; the major focus will be on the current state of research in the above said fields and comparison of the same with existing body of knowledge in the present times. Then this present study will also focus on the impact of healthcare informatics on the quality of health care, future potential of the system and on increasing effectiveness of the patient care.

2. Literature Review

Singh et al (2022) Health information technology uses technology to increase the efficiency, accuracy, and accessibility of patient information that is essential for improving health. Many previous studies have examined the impact of medical information on various aspects of treatment, hospital decision-making, and patient outcomes. Researchers have shown that the use of electronic medical records can better manage care, reduce medication errors, and improve communication between physicians.

In a study by Feldman (2021) emphasized the importance of health information in improving the accuracy and comprehensiveness of medical information, which is important for highly evidence-based and well-designed decision-making. A study examined the relationship between EHRs and quality of care. Studies have shown that healthcare organizations with advanced EHR systems have better scores and better patient outcomes than those with documented records. Research shows the importance of health education in improving communication and collaboration among healthcare providers, reducing medical errors, and increasing treatment efficiency.

Then Weigel (2022) showed that computerized physician order access can reduce medication errors and increase patient safety. In his research on the impact of health information on patient safety, also Sadoughi (2023) concluded that the use of medical information can improve medication safety and reduce adverse events. Informatics that promotes patient engagement and support. Researchers emphasize the potential of online patient portals, mobile health applications, and wearable devices to facilitate patient communication, disease self-management, and adherence to medical conditions.

Hamade (2022) the findings of the study highlighted the significant impact of medical information on patient outcomes and overall care. The authors emphasize the importance of using technology to expand healthcare services, especially in underserved communities or during public health emergencies. This study shows that telemedicine platforms used by healthcare providers can facilitate patient access to care and improve clinical outcomes.

Objective

The main objective of the study is to find the role of healthcare informatics in the field of medicine, dentistry, and respiratory therapy in Improving Patient Health Outcomes; the major focus will be on the current state of research in the above said fields and comparison of the same with existing body of knowledge in the present times.

Hypothesis

H_0: There is a significant positive impact of healthcare informatics on medicine, dentistry, and respiratory therapy in improving Patient health outcomes.

H_1: There is no significant impact of healthcare informatics on medicine, dentistry, and respiratory therapy in improving Patient health outcomes.

3. Research Methodology

Data Collection

Present study is based on descriptive statistics and based on the finding the impact of healthcare informatics on medicine, dentistry, and respiratory therapy in improving patient health outcomes and the prevailing trends in future. The researcher has tried to include all the market trends for the preparation of research objectives and hypothesis.

Then on the other secondary data is being used to evaluate the previous studies in the respective research areas, some of which are stated in the above given matter in the form of literature review. Then some of the previous studies were also used to find the development in the area of study. Manish et al (2012); Sharma et al (2022); Dwivedi et al (2010) many of the studies in the past have presented a clear view on the IT and informatics related trends in the area of health care, especially in the field of medicines, dentistry and respiratory therapy but in the present study the researcher will try take the view of patients and present the findings accordingly.

Looking at the basic nature of the study the researcher has considered Saudi Arabia as a place of study. Here the researcher has considered some of the top hospitals and contacted the patients who are being getting cured in the departments mentioned above.

Sources of Secondary data

- Research papers from the journals of national and international repute,
- Newspaper articles
- Various web resources
- Some business Magazines
- Previous studies in the same area

Sample Selection

Total sample of the study is 200 respondents, although the patients are taken from different department but then again all of them are considered similar sample units. The researcher has considered the footfall of patients in a week's time in any given slab of 5 days and chosen those patients only who are visiting above given departments. The total footfall was around 2000 patients for all the selected hospitals and 10% of the same has been considered as sample.

Tools of Data Collection

Researcher has prepared a detailed questionnaire to contact the patients and the mode of contact was face to face. In order to save the time and get precise responses, most of the questions were based on 5-point likert scale.

Statistical Measure

- Factor Analysis.

Tools of Data Processing

- SPSS Ver. 22.0

Data Analysis and Interpretation

KMO Bartlett's Test Results

Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) are used to judge the adequacy of sampling procedure and assist in finding the factorability of the data. As a thumb rule P-value of Bartlett's test of sphericity needed to be < 0.05 for suitability of factor analysis. KMO index should lie between 0 to 1, and if higher than 0.6, it is considered good for a factor analysis Pallant (2005).

Table 4.56: KMO Bartlett's test of patients

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.908
Bartlett's Test of Sphericity	Approx. Chi- Square	3.641 .047
	df	197
	Sig.	.000

In the case of patients, KMO value is 0.908 (which is above 0.6), we have p-value 0.000 (which is <0.5), therefore factor analysis is appropriate.

Exploratory Factor Analysis

Total variance test of Patients

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.318	40.512	40.512	9.318	40.512	40.512	4.048	17.598	17.598
2	2.302	10.010	50.522	2.302	10.010	50.522	2.980	12.954	30.552
3	1.504	6.538	57.060	1.504	6.538	57.060	2.880	12.522	43.075
4	1.199	5.213	62.273	1.199	5.213	62.273	2.832	12.313	55.388
5	1.035	4.501	66.774	1.035	4.501	66.774	2.619	11.386	66.774
6	.839	3.648	70.422						
7	.789	3.432	73.854						
8	.668	2.906	76.760						
9	.622	2.703	79.463						
10	.566	2.460	81.922						
11	.492	2.138	84.061						
12	.482	2.096	86.157						
13	.454	1.975	88.132						
14	.393	1.709	89.841						
15	.377	1.638	91.479						
16	.353	1.536	93.015						
17	.299	1.302	94.316						
18	.272	1.180	95.497						
19	.254	1.103	96.600						
20	.222	.967	97.567						
21	.220	.958	98.525						
22	.195	.850	99.375						
23	.144	.625	100.000						

Percentage of variance as shown in the above table shows total variance attributed to each factor. Principal components analysis revealed the presence of five components with eigenvalues exceeding 1, explaining 17.60 per cent, 12.96 per cent, 12.51 per cent, 12.31 and 11.39 per cent of the variance respectively.

Table 4.58: Rotated component matrix of consumers Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
Data Trustworthiness (v1)	.829	.174	.084	.107	.236
Perceived Security Level (v2)	.857	.083	.096	.156	.191
Transparency (v3)	.798	.117	.101	.172	.175
Conflicts (v4)	.441	.415	.390	.261	-.178
Third Party Intervention (v5)	.605	.124	.188	.349	.122
Privacy Risk (v6)	.382	.002	.164	.776	.124
Perceived Risk (v7)	.292	.018	.231	.597	.063
Uncertainty (v8)	.349	.410	.096	.647	.075
Frequency of visit (v9)	.285	.270	.095	.724	.114
Technology Related Factors (v10)	.201	.202	.161	.718	.275
System Flaws (v11)	-.045	.618	.326	.390	.171
Perceived Safety (v12)	.424	.679	.076	.200	.151
Data Suitability (v13)	.019	.847	.209	.128	.191
Triability (v14)	.142	.740	.245	.130	.238
Factors of Illness (v15)	.293	.185	.571	.237	.177
Frequency of Visit (v16)	.250	.149	.713	.260	.109
Typology of Healthcare System(v17)	-.023	.195	.701	-.027	.274
Absorptive Characteristics of healthcare system (v18)	.070	.154	.763	.134	.196
Structural Assurance (v19)	.226	.348	.408	.112	.462
Integrity (v20)	.220	.263	.099	-.106	.707
Environmental Risks (v21)	.164	.121	.211	.153	.749
Familiarity risks (v22)	.209	.068	.153	.295	.675
Information Search and Usage (v23)	.114	.154	.362	.336	.551

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Interpretation

From the above table, it is found that v1, v2, v3, v4 and v5 show more loadings under the first component and thus it can be named as factors related to provider of healthcare. These are the variables that have utility on use of healthcare system, the patient is entering into. Similarly, v11, v12, v13 & v14 have more loadings under the second component and thus it can be counted under factors again related to healthcare service provider. Likewise, v15, v16, v17 & v18 have more loadings under the third component and thus it can be named as security and safety offered under respective healthcare system. It was further found that v6, v7, v8, v9 & v10 have more loadings under the fourth component and thus it can be named as Usage related Factors and finally v19, v20, v21, v22 & v23 show more loadings under the fifth component and thus it can be named as General Factors related to Medicines, respiratory and dentistry.

Reliability analysis

Cronbach's alpha was used to check the reliability of all the factors taken in the questionnaire and to check the internal consistency within each factor. The factors with Cronbach's value equal to or greater than 0.7, are considered as reliable and shall be considered for further analysis. The Cronbach's alpha value of the items of each factor is mentioned below.

Cronbach's alpha value of patients

Trust and Security related Factor	Description	Cronbach's Alpha value
Provider of Healthcare services	Data Trustworthiness (v1)	0.844
	Perceived Security Level (v2)	
	Transparency (v3)	
	Conflicts (v4)	
	Third Party Intervention (v5)	
Usage of healthcare services	Privacy Risk (v6)	0.834
	Perceived Risk (v7)	
	Uncertainty (v8)	
	Frequency of visit (v9)	
	Technology Related Factors (v10)	
Safety Related factors	System Flaws (v11)	0.844
	Perceived Safety (v12)	
	Data Suitability (v13)	
	Triability (v14)	
General Factors related to Medicines, respiratory and dentistry	Factors of Transaction and perceived risks (v21)	0.781
	Scale of Usage (v22)	
	Typology of Payment System (v13)	
	Absorptive Characteristics (v15)	
General Security Factors	Structural Assurance (v1)	0.813
	Integrity (v10)	
Data Safety related factors	Environmental Risks (v21)	
	Familiarity risks (v22)	
	Information Search and Usage (v23)	

4. Result

The data analysis and interpretation stated that there is a strong positive relationship between trust on data security & usage and the development in the areas of healthcare informatics. Hence the null hypothesis 'There is a significant positive impact of healthcare informatics on medicine, dentistry, and respiratory therapy in improving Patient health outcomes.' can be accepted and the alternate hypothesis can be rejected.

5. Conclusion

In summary, this qualitative review highlights the important role of healthcare in improving quality care. Health information provides healthcare providers with valuable information and analysis that can improve clinical decision making and overall health outcomes. By using healthcare reporting tools and technology, healthcare organizations can better collaborate, communicate, and coordinate care, ultimately improving patient safety and satisfaction. Healthcare providers can use

health information to improve processes, reduce errors, and improve overall care. As technology continues to advance, the role of health education in achieving positive health outcomes will become even more important. More research and investment in health literacy is essential to address changes and opportunities in the healthcare sector.

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