

BARRIERS IN IMPLEMENTATION OF ELECTRONIC MEDICAL RECORDS IN PAKISTAN

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ABSTRACT: *This paper examines that Financial barrier, Technical barrier; Time barrier, Psychological barrier, Social barrier, Legal barrier, organizational barrier and Change process have an impact on low implementation of Electronic Medical Records (EMRs) in Pakistan. With different other concepts, removing these barriers will definitely increase implementation rate of EMRs in Pakistan. Skilled and dedicated leadership can set good values. Government of Pakistan should come forward to remove these barriers and could establish good high standards in health. In this research, questionnaire was developed and distributed to different people working in Pakistan. Data analysis was done through SPSS. The results were astonishing and all the variables have positive impact on low implementation of EMRS in Pakistan.*

1 INTRODUCTION:

An Institute of Medicine report defines EMRs as “an electronic patient record that resides in a system specifically designed to support users through availability of complete and accurate data, reminders and alerts, clinical DSS, links to bodies of medical knowledge and other aids”[1]. Information technology is the most important consideration in order to be used as a tool for keeping patient health records for the safety and ease of patients [2].

The use of EMRs is the quality improvement program in the field of medical science in order to be replaceable with manual based records. This quality improvement technique is being practiced in many other countries instead of Pakistan.

EMRS provide data about patients (analysis of the patients by physicians). They are used when physician interacts with patient and wants to know history of patient and previous analysis. That history usually includes reasons of illness, symptoms, family background and social background. All the data is stored digitally in software systems. But today many of the records are stored manually, i.e. cannot provide easiness in routine coordination and also in reducing medical errors.

Paper based technique is a traditional kind of way which is going to be obsolete in this century. In developing countries, more efficient and innovative technique like EMRs is preferred for health keeping [3].

If medical records are stored electronically then better care can be provided to patients. But there are many barriers like less certification, little knowledge of systems, cost, lack of health information technology etc. It also contains many preferences over the manual system as there is almost no chance of data missing or misplacement. It can easily be accessed through many remote sites not only in village sides but also outside the country. Any user can access it as it involves less time of access and user does not frustrate. A backup mechanism of such a system makes it permanent and long term [4].

With the help EMRs, physicians in different hospitals can see medical records of billing, data handling, lab reports and

old prescriptions very easily. So the use of EMRs for getting accuracy in doctor’s work is much more valuable. It is also a basic part of health care. So healthcare systems will become more authentic and efficient due to EMRs[5].

1.1 Aims Of Study:

The aims of this paper are as follows.

- To find out the reasons, why there is less percentage of physicians who adopt EMRs in Pakistan.
- To identify the basic barriers in implementation of EMRs in Pakistan.
- Why physicians give more preference to paper based records than EMRs.

1.2 Research Questions:

- Is Financial barrier, the main cause of low implementation of EMRs in Pakistan?
- Is Technical barrier contributing towards low implementation of EMRs in Pakistan?
- Is time barrier, a cause of low execution of EMRs in Pakistan?
- Is Psychological barrier, the main reason of less implementation of EMRs in Pakistan?
- Is there any role of Government in promoting the implementation of EMRs?
- Are Social and Legal barriers hurting physicians in implementing EMRs in Pakistan?
- Are Organizational and Change barriers pushing physicians in non implementation of EMRs in Pakistan?

2 Literature Review:

EMRs systems have become essential to enhance the efficiency and amplify the betterment of health care of patients [6]. The main purpose of literature review is to provide the information of need and use of EMRs in medical industry and barriers which cause not to use them in Pakistan. Though different proprietary software packages for medical records are continue to be introduced but there are many free packages available online. IT usage in medical

industries provide more advantages over the other conventional use [7].

EMRs provide the efficient way to store records and it provides more accuracy of data. The main purpose is to achieve the standardized care where data is available in specific form and interoperable health records. EMRs systems are different due to its complexity from other techniques [8].

The use of EMRs in Pakistan is dependent upon Government support. Role of Government is always demanding and complex. Recently it is demonstrated that Government policies play a main role in adoption of IT and use in medical industries [9]. In spite of this, many doctors are still do not support the use of EMRs [10].

IT is used by many hospitals but usually at administrative level (to check the plans about health, risk adjustments and decisions of physicians) [11]. Studies have been made which suggest that physicians are the special professional groups. The main resistance factor when EMRs systems were initialized was systems itself and its features but after some time the resistance factor has become politicized. Another reason for not implementing EMRs is the complexity of system and requirements [12].

EMRs systems are beneficial to use to promote health services prevent diseases and help in treatments. With the help of these systems, care whether long term or short term which includes medicines, instruments or devices and procedures can be improved. Different tasks which can be done with the help of this technology includes computerization of medical records in hospitals and clinics, use of internet for document delivery, exchange of information and communication, developing e-cards to identify the patients, electronic scheduling to give appointments, for labs and examination for hospital admission and computerized methods to diagnose the diseases and giving treatment support. An EMRs also use for communication purposes and for support of clinical decisions.

In developing countries the EMRs systems have fewer resources so that they cannot meet the needs of increasing population. They lack the technological sophistication. Some barriers in using EMRs are as follows.

2.1 BARRIERS:

2.1.1 Financial Barriers:

These barriers involve issues related to budget in implementation of EMRs. The basic problem is understanding by physicians that if the cost of implementation and running would be affordable or not. Two main costs can be identified by the researchers; one is to buy the system and second is implementation cost. There are some sub categories of Financial barriers also. First is high starting cost which includes purchasing the hardware and software, settlement expenses and some contracts with vendors. According to research \$10,000 for one physician is needed to implement the EMRs [2,13]. It is also the major

barrier in Pakistan according to studies [2, 6, 8 13-20]. Other than starting cost, implementation, maintenance, up gradation and administrative costs are also high to keep working of EMRs.

Physicians also think that if they invest a big amount on implementation then it takes number of years over return. But according to sellers or vendors of EMRs systems, the benefits of using them overcome the costs, so physicians should not be worried [2,6,13,16-18,20]. So having less IT budgets or lacking financial resources is a barrier [19].

2.1.2 Technical Barriers:

Physicians and users of EMRs should have technical knowledge of systems. If they lack the technical skills to handle systems then it is a problem [15,17,19, 21-24]. Not having the technical skills by physicians like typing is another resistance in implementation of EMRs [25]. Many users complain that there is less training to use the system and help by developers to solve the problems [13]. EMRs systems also have some limitations and when it reaches up to limit it stops working and then problems are faced by many physicians [14]. Another technical reason is the less customizability of EMRS softwares, so sellers should made efforts to increase it. Reliability of EMRs software is also less because systems may crash [13, 17, 20]. Lack of hardware devices which are used in EMRS systems is also a Technical barrier.

2.1.3 Time Barriers:

Implementation of EMRs is also a time consuming activity because physicians will have to give time to learn the system and then entering the data into the system instead of giving full time to patients. This barrier will also decrease the speed of physicians. So if physicians spent time on selection, purchase, implementation and learning of system then it will reduce their speed of working. Due to the complexity of systems it also increases the work load for physicians. Entry of data is an issue for physician [16 17,20, 22, 23 ,26].

Some physicians think that it is more efficient to use paper in some situations [22]. According to study it is concluded that most of physicians perform documentation after the session time and it adds up the work [25].

2.1.4 Psychological Barriers:

Many of the physicians have the negative perception about the use of EMRs because there are less successive results of using EMRs, so they are afraid to use them due to lack of belief. However processes and procedures for adoption of EMRs should be under control. But many physicians described that they have threats to lose the information of patients.

2.1.5 Social Barriers:

Social impact also affects the implementation of EMRs. Since physicians work by communicating and coordinating

with different co-workers so the use of EMRS will affect the working relations of physicians and other parties, hence it is considered as a social barrier[27]. Social factor also involves vendor’s support and role in training the system[15]. Similarly insurance companies regarding the medical tasks do not properly co-operate and support the implementation of EMRs [18].

2.1.6 Legal Barriers:

Use of EMRs is also threatened by security issues. As keeping all the records safe and confidential to avoid any kind of legal issue is a major concern. According to some researchers, EMRs adaptation may be the factor which is making a patient’s data insecure [17, 21]. Physicians are unsure about the security and data authenticity of patient’s records and the data accessibility for all users. This factor of causing less confidentiality and unexpected disclosure of patient’s data leads to the legal issues also. Physicians show more concern about this matter as compared to patients because those consultants who practice EMRs are in the opinion that application of EMRs provide more risks as compared to manual or paper methods of record keeping [26]. So, the concern about the data security of patients leads to be a barrier towards the adaptation of EMRs.

2.1.7 Organizational Barriers:

Organizational barriers also affect the implementation of EMRs. Organizational size and organizational type are the two factors which affect the behavior of physicians towards EMRs implementation. If it is a big organization, implementation of EMRs is no issue but in case of small organization, financial barriers badly hurt the organization in implementing EMRS.

2.1.8 Change Process:

Physicians who follow their own style of work do not adopt the way of EMRs so easily. So the change in process becomes a challenge and also a barrier in the implementation of EMRs. During change process, many problems occur. One main problem is that the culture of the organization provides less support in implementation of EMRs. This change requires switching from manual system to EMRs adaptation but this does not happen, causing this process too much slow [13]. Physicians also need some personal incentives as a motivation towards this task, so, for the adaptation of EMRs, personal incentives are also required for efficient performance. In the implementation of EMRs, project management is also required which needs a team leader for support and to solve change management problems[24].

3 RESEARCH METHODOLOGIES:

3.1 Theoretical Framework:

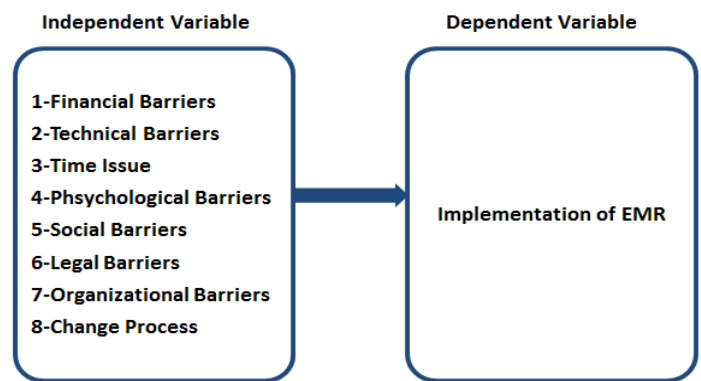


Figure 1

3.2 Hypothesis:

H1: Financial barrier is the main cause of low implementation of EMRs in Pakistan

H2: Technical barrier is contributing towards low implementation of EMRs in Pakistan?

H3: Time barrier is a cause of low execution of EMRs in Pakistan

H4: Psychological barrier is the main reason of less implementation of EMRs in Pakistan

H5: Social barrier is hurting physicians in implementing EMRs in Pakistan

H6: Legal barriers is hurting physicians in implementing EMRs in Pakistan

H7: Organizational and Change barriers are pushing physicians in low implementation of EMRs in Pakistan.

The research questions were examined from the physicians who provided information. Questionnaires were used as a secondary source of data collection. As with the help of questionnaires, it is very easy to gain data efficiently for research purpose. In this paper questionnaire were administered personally and distributed through web among the physicians who are working in different hospitals in Pakistan to collect data.

3.3 Sampling size:

It is a method of choosing elements from a big population. So that a learning of the sample and an understanding of its characteristics would make it probable for us to simplify such properties or characteristics to the population elements. The number of physicians surveyed is n=50.

3.4 Sampling procedure:

In our research, sample area is Pakistan where we administered our questionnaires to make our sample size more appropriate in understanding the low implementation of EMRs in Pakistan. Simple random sampling technique is used in this paper. Precision and confidence are important issue in sampling because when we use sample data to draw inferences about the population, we hope to be fairly “on target”, and have some idea of the extent of possible error. Because a point estimate provides no measure of possible error, we do interval estimation to ensure a relatively accurate estimation of the population parameter.

4 RESULTS AND CONCLUSION:

4.1 Checking the Reliability of measures: Cronbach’s Alpha:

The interim consistency reliability or the Cronbach’s Alpha reliability coefficients of the eight independent variables (**Financial barrier, Technical barrier, Time barrier, Psychological barrier, Social barrier, Legal barrier, Organizational barrier and Change barrier**) and one dependent variable (**Implementation of EMRs**) were obtained in table 1 as a whole. The results in table 1 indicate that the Cronbach’s Alpha for the 9-item measure is 0.838. The closer the reliability coefficient to α 1.0 the better the results are.

Table 2 shows individual results of Cronbach’s Alpha of Independent and dependent variables. Implementation of EMRs indicates 0.814 reliability and the remaining eight independent variables given below have the range from 0.781 to 0.840, which shows that the data collected through **questionnaire is reliable as all values are above 0.7.**

So the data collected through questionnaire is highly reliable.

Table 1 Cronbach’s Alpha (Combined)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.838	9

Table 2 Cronbach’s Alpha (Individual)

Variables	Cronbach's Alpha
Financial barrier	.811
Technical barriers	.812
Time barrier	.781
Psychological barrier	.807
Social barrier	.840
Organizational	.810
Legal barrier	.814
Change process	.796

4.2 Descriptive Statistics: Measuring Mean and Standard deviation

Descriptive Statistics such as means and standard deviations were investigated for the interval-scaled independent and dependent variables as mentioned in table 3. The results in table 3 (5-point scales) were tapped on the variables, the mean of Implementation of EMRs is 3.6765, Financial barrier shows 3.9583, Technical barrier shows 4.1520, Time barriers shows 4.0441, Psychological barrier shows 3.9444, Social barrier shows 3.7810, Legal barrier shows 3.7875, Organizational barrier shows 4.1122 and Change process shows 4.2214 So, this research shows that data is more reliable and consistent to (4th scale) i.e. **agreed** by respondents in an average. Standard deviation is near to 1.0

in all the cases. So it shows strong impact on low Implementation of EMRs in Pakistan.

Table 3 Descriptive Statistics

Item Statistics			
	Mean	Std. Deviation	N
Financial barrier	3.9583	.66942	50
Technical barriers	4.1520	.72025	50
Time barrier	4.0441	.71961	50
Psychological barrier	3.9444	.74916	50
Social barrier	3.7810	.67404	50
Legal barrier	3.7875	.69260	50
Organizational barrier	4.1122	.7415	50
Change Process	4.2214	.8715	50

4.3 Inferential Statistics: Pearson Correlation:

The Pearson Correlation Matrix is attained for the eight interval-scaled variables as revealed in table 4. From the results, we find that **low implementation of EMRs in Pakistan** is positively correlated with all the independent variables. The significance value is below than 0.05 in all the cases.

Table 4 Pearson Correlation

		Productivity Of Employees	Significance
Pearson Correlation	Implementation of EMRs	1.000	
	Financial barrier	.229	.000
	Technical barriers	.184	.000
	Time barrier	.108	.000
	Psychological barrier	.669	.000
	Social barrier	.209	.002
	Legal barrier	.186	.004
	Organizational barrier	.223	.004
	Change Process	.678	.001

4.4 Multiple Regression Analysis:

The table 5 lists the eight autonomous variables which are put into the Regression Model and R (.741) is the correlation of the eight independent variables with the dependent variable, after all the inter correlations amongst the eight independent variables are taken into account. In the Model Summary in table 5, the R Square (0.550), which is explained variance, is in fact the square of the multiple R (.741)².

In table 5 the value of R 0.741 (74.1%) shows that 74.1% of the dependent variable i.e.; low implementation of EMRs can be explained with its eight independent variables.

The value of R square is 0.550 or 55% which shows the significant contribution of eight independent variables towards dependent variables i.e.; low **implementation of EMRs.**

Table 5 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.741a	.550	.473	.57402

4.5 ANOVA:

From the ANOVA table we conclude that our model is goodness of fit because the significant value is .000. If the significant value is less than the level of significance (0.05) **its shows the model is goodness of fit. It also shows that at least one the coefficient is not zero.**

Table 6 ANOVA

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.491	7	2.356	7.150	.000a
	Residual	13.509	41	.329		
	Total	30.000	48			

4.6 Coefficients:

ANOVA table tells us about the goodness of fit but coefficient table tells us about individual contribution of every variable. From the Coefficients table, we conclude that every variable is contributing towards dependent variable i.e.; low implementation of EMRs in Pakistan. So it is proved that all the independent variables have an influence on low implementation of EMRs in Pakistan.

5: RESULTS:

From the correlation table, we conclude that our independent variables are all positively correlated with the dependent variable i.e.; low implementation of EMRs in Pakistan. So it means that independent variables are main cause of low implementation of EMRs in Pakistan. Our all hypotheses have been accepted as the significance value of independent variables is less than 0.05.

6 CONCLUSIONS:

The objective of writing this paper is to discuss about those factors which are considered main hurdles or barriers in implementing EMRs in Pakistan. A survey was conducted to see the different aspects, which are mainly responsible for low adoption of EMRs in Pakistan sample size of n=50. It has been seen that all the independent variables have

positive impact on low implementation of EMRs and they are positively correlated with the dependent variable.

7 RECOMMENDATIONS:

The Government of Pakistan should come forward to provide financial assistance to physicians in the implementation of EMRs. At the same time physicians should also change their processes and frame of mind.

Table 7 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	4.208	.611	
	Financial Barrier	.122	.071	-.224
	Technical Barrier	.203	.093	.298
	Time Issue	.096	.102	-.126
	Psychosocial Barrier	.539	.103	-.600
	Social Barrier	.008	.105	.011
	Legal Barrier	.152	.104	.204
	Organizational Barrier	.079	.101	.091

8 LIMITATIONS:

The limitations of this study are that we are only covering organizations in Pakistan. The sample size may be on the lower side, it is possible that if there is large sample size, results would be clearer and specified.

9 FUTUREWORK:

This research is confined to Pakistan only. In future we can expand our research internationally and can make assessment on how to increase the implementation of EMRs. At the same we can expand the base of independent variables to judge and to increase the implementation of EMRs.

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