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Main Elements of National Model of Electronic Prescription System from Physicians' Point of View: A Case Study in a Developing Country

Mahnaz Samadbeik[a], Maryam Ahmadi[b*], Farahnaz Sadoughi[c] and Ali Garavand[d]

[a]*Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.* [b]*Department of Health Information Management, School of Management and Medical Information Sciences, Iran University of Medical Sciences, Tehran, Iran.* [c]*Health Management and Economics Research Center, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran.* [d] *Department of Health Information Management and Technology, School of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran.*

Email: m_ahmadi24@yahoo.com

Running title: Main Elements of National Model of Electronic Prescription System

Abstract

Identifying the factors and components of an electronic prescription system is of utmost importance in effective designing and implementation of this system. In this regard, the current study was conducted to determine the main factors affecting the national model of electronic prescription from the physicians' point of view. This is a cross-sectional, descriptive-analytical research carried out in 2015. Based on the census sampling method, 104 members of the board of directors of the Iranian general practitioners' associations, general practitioners' alumni association of Iran, and physicians owner of a website or weblog were selected as samples for this study. Data were collected using a valid and reliable questionnaire. After analyzing the data with SPSS software (v.16), a model was proposed using a regression algorithm. The findings indicated that accessing the current medication data and medication history of patients during prescription, and also creating the electronic patient medication record (ePMR) are the most important selective components for physicians with frequency percent of 92.1%. Moreover, from the physicians' viewpoint, the method of "transmission of prescriptions to the central national database and

retrieving prescriptions information from the selected pharmacy of the patient" had the highest priority (weight coefficient) in the model of the national electronic prescription system. Therefore, the Iranian prescription system is required to be developed based on the centralized architecture and national electronic prescription database.

Keywords: Electronic prescribing; Main elements; National model; Physician; Model.

Introduction

The medication prescription is a vital process in every country and a priority for health policies of governments and calls for continuous improvement (1, 2). Use of information technology in the healthcare field leads to improved quality of services provided, increased employee productivity, and reduced costs (3). Accordingly, the electronic prescription system, as a featured technology in recent decades, is highly taken into consideration. Electronic prescription, which is defined as an electronic system to facilitate and improve communication in the field of pharmaceutical prescription, helps selecting, using, and supplying medication by providing support in decision-making and access to required knowledge in the point of care as well as precise auditing of the whole process of medication use (4). Therefore, implementation of the electronic prescription system can overcome several problems of the paper prescription process (5-7) and result in numerous advantages such as more effective prescription, improved healthcare quality, less prescription processing time, reduced costs, and enhanced patient safety (8-11). The electronic prescription system is an example of an interdisciplinary socio-technical information system with the wide scope, different users, different subsystems, and specific implementation process for each country (10, 12-14). Electronic prescription system, for which several standards have been developed each year for its enhancement, should be designed and implemented according to national requirements (6, 15-18).

Nowadays, many national policymakers have accepted and used electronic prescriptions to enhance patient safety and healthcare quality and many European countries are benefiting from this sophisticated communication technology (11, 19, 20). Although Iran is at the first level in electronic prescription reference of graduated levels of the electronic prescribing model, paper prescription is still being used widely in this country (21). In designing and implementing

electronic prescriptions, the requirements of all stakeholder groups (such as pharmacists, physicians, directors, vendors and patients) must be carefully considered (1). In case of responding to user needs, the electronic prescription can improve the medication prescription process since users prefer the electronic prescription system that meets their professional needs (1, 15). Physicians are the main users of the electronic prescription system and considering their clinical needs and priorities is essential for developing the National Electronic Prescription System (8, 22 and 23). Most of the studies conducted in this area have focused on the technology acceptance model and physicians' attitude, suggestions and experience regarding the electronic prescription system after implementation of the system (8-11, 19, 22 and 24-30). The study of general practitioners' (GP) attitudes towards electronic prescription in two primary healthcare organizations of Finland reported that e-prescription had positively influenced the physician's work and management of patients' medication. The perceived usefulness of e-prescription by GPs could result in more widespread adoption of the technology and give a fillip to the efficiency of the GP's work (10). Based on Austrian and Swedish physicians' attitudes**,** the benefits of implementing the e-prescription were time-saving, improved safety, and better service (11). Also, from the results of the research by Grossman *et al.*, it was found that physicians were generally satisfied with the e-prescription as it reduced manual prescriptions. However, they reported some challenges about the re-renewals and mail-order pharmacy connectivity (28).

Meanwhile, despite the important role of physicians in the successful implementation of the electronic prescription system, few studies have pointed out to their needs and expectations prior to large-scale implementation of the system (31-33). The perception of the main stakeholder groups regarding the new system is a key factor for successful implementation and user acceptance of the new information systems. Accordingly, the system's developer should be aware of the requirements and expectations of the future users about the proposed system and resolve issues and concerns before implementing the information system (31, 33). The study of Porteous *et al.* reported that the Scottish general practitioners will accept the electronic prescription transfer system, but they are concerned about patient confidentiality and an extended role of pharmacists in this system (33). In this regard, the preliminary consensus of the stakeholders on the use of standards will lead to the success of the e-prescription (32).

Until now, very little was known about the model of the electronic prescription system in Iran. General practitioners are the most important sources for obtaining information about the factors and components of this system. Therefore, the current research was conducted to determine the main factors affecting the national model of electronic prescription from the physicians' point of view by using the mathematics model. In this way, the present paper demonstrates the application of the regression model to propose an appropriate model for the electronic prescription system. The results of this study will prepare the ground for accepting this technology by physicians and their voluntary participation in the electronic prescription program.

Experimental

This is a cross-sectional, descriptive-analytical research carried out in 2015 in order to determine the significant factors affecting the national model of the electronic system from the physicians' point of view.

According to national investigations, in most countries, the electronic prescription program has been started with general practitioners from outpatient centers and great similarities between medication prescriptions of general practitioners with their counterparts have led to further support for the computerization of this process. On the other hand, the hospitals' medication management processes and specialist physicians' prescription are often more complicated. This made the process of standardization and computerization even more complicated (32). Thus, members of the board of directors of the Iranian general practitioners associations, general practitioners' alumni association of Iran (n = 28) and physicians who have a website or weblog (n = 76), have purposefully been selected as the study sample (total sample number = 104). A simple search of keywords like "physicians' website", "physicians' weblog", "physician's email", "physician's email address", "online physician", and "online medical consultant" in the most popular search engines (Google and Yahoo) are regarded as the inclusion criteria for physicians with website or weblog. At last, after applying the exclusion criteria (duplicate or wrong email address), 76 physicians with a weblog and website were selected.

The data were collected using a valid and reliable questionnaire. The questionnaires used in this study were prepared based on previous researches, the current state of Iran's prescription system, features of electronic prescription systems referred to, and results of the comparative study of

researchers regarding the electronic prescription system in developed countries (20, 21, 31, 33, and 34). The questionnaire composed of 63 questions and had eight sections: current computer use, funding electronic prescription, pharmacist's access to patient information, electronic communication with insurance organizations, access to data required at the time of prescription, electronic transmission of prescription data, repeating electronic dispensing, and model of the electronic prescription system.

To determine the validity of questions translated from English sources, the forward-backward translation method was used. Also, the content validity of the questionnaires was measured by an expert panel review that included 10 experts associated with the prescription system so as to make necessary modifications. Reliability of the questionnaire in this study was confirmed by Cronbach's alpha. Cronbach's alpha coefficient of funding electronic prescription, pharmacists' access to patient information, electronic communication with insurance organizations, repeating electronic dispensing, and general Cronbach's alpha coefficient were 0.81, 0.79, 0.82, 0.84, and 0.81, respectively. Also, questionnaire's external reliability was approved by conducting the test-retest method on 15 physicians with 85% coefficient of agreement.

The questionnaires were completed by a self-administered method or via email. Data analysis was performed with the SPSS software (v.16). Inferential statistic was used to rank components and calculate their scores. In all cases where the aim was to prioritize options, non-parametric analysis of variance (Friedman test) was done to evaluate the level of effectiveness, to rank method of options from the subjects' point of view, and to provide answers based on the Likert scale.

After analyzing data, a model was proposed using a regression algorithm. In order to devise the electronic prescription system according to physicians' views, the following steps were taken:

Kolmogorov-Smirnov non-parametric statistical test ensured that the Likert-based criteria of the electronic prescription system resulted in normal nominal data because the level of significance was greater than 0.05.

Kaiser-Meyer-Olkin test (KMO > 0.5) confirmed satisfactory results of the factor analysis and Bartlett's test of sphericity confirmed that the correlation coefficients' scores of models of the electronic prescription system were high (significance level > 0.05).

Components obtained using data envelopment analysis (DEA) have a greater role in determining the model and for this purpose, the main component factor analysis was used as well. Therefore,

factors (=3) with eigen values >1 are regarded as significant ones and factors with eigenvalues <1 are excluded from the analysis.

To identify the three main components, the Varimax factor rotation method was used to extract the main factors.

Factors of the main components were entered into the regression analysis to obtain the model. Using these three extracted components and the regression model, a model was proposed for the electronic prescription system.

ANOVA table showed that the model was statistically acceptable (significance level < 0.05).

Results and Discussion

Out of the 104 questionnaires distributed among the physicians, 68 were completed (65.4%) and returned. A survey of current use of the computer showed that only 17.7% of physicians who answered the questions were using the electronic medical records system in their clinic. Also, only 33.3% of the computer systems allowed issuing electronic prescriptions; however, only 16.7% of the physicians used it for printing new prescriptions and none of the computer systems used in their clinics allowed printing repeated prescriptions. Information stored in electronic medical records in physicians' clinic included summary sheet (33.3%), patients' medication records (16.7%), and appointments (16.7%). Summary sheet information with 33.3% frequency was regarded as the most important information stored in the electronic medical records available in the clinic of physicians' who participated in the study.

More physicians (47.1%) preferred joint investment of physicians and the government on new software or hardware of electronic prescription. Also, very small percentage of physicians (5.9%) agreed that physicians' will finance the software or hardware of the electronic prescription (Table 1).

Table 1. Frequency percent of physicians' view on funding option for the electronic prescription system.

Funding axes	Funding options			
	Government funded (%)	**Physician funded (%)**	**Shared funded (%) (Physician + Government)**	**Unanswered (%)**
New hardware /software	44.1	5.9	47.1	2.9
Training cost	58.8	8.8	26.5	5.9
Implementation cost	58.8	17.6	17.6	5.9
Maintenance cost	41.2	17.6	35.3	5.9

More than half of the physicians (55.9%) agreed that pharmacists had access to patient information through the electronic prescription system and regarded it as a way for better clinical care of patients. In addition, 91.2% of physicians believed that patients' diagnostic information stored in the system can be useful for pharmacists while only 23.5% of the physicians believed in the usefulness of pharmacists' access to medication's Adverse Drug Reaction (ADR).

Ranking factors related to analysis of electronic communication of physicians with insurance organizations in the electronic prescription system according to Friedman test showed that, from the physicians' point of view, "providing the possibility of submitting e-claim and electronic submission of reimbursement endorsement between insurance organizations and physicians' clinics" and "electronic endorsement of physician claims by insurance organization" are the highest and lowest priorities, respectively. As indicated in Table 2, from the physicians' point of view, "possibility of access to current medications data and medication history of patients during prescription" and "creating ePMR with 92.1% frequency are the most important physician-related selective components regarding prescription and electronic transmission of prescriptions. However, "writing a reason for overriding of alerts in the electronic prescription system while prescribing" and "the possibility of changing or discontinuing the patient medications and changing medication use" are issues with the lowest percentage of agreement among physicians (47.1%).

Table 2. Frequency percent of physicians' view regarding prescription features and electronic transmission of prescriptions in the electronic prescription system.

Prescription features and electronic transmission of prescriptions	**No (%)**	**Yes (%)**
The possibility of access to current medications data and medication history of patient of patients during prescription	8.8	91.2
The possibility of access to identification and demographic data of patients during prescription	38.2	61.8
clinical information of patients during prescription The possibility of access to	17.6	82.4
Creating ePMR	8.8	91.2
Providing the possibility of access to drug pharmacopeia of insurance organizations and formulary during prescription	14.7	85.3
Displaying a list of recommended drug choices based on diagnosis or the patient's condition during prescription	20.6	79.4
The possibility of displaying drug generic name while choosing drug trade name and displaying a list of selected drug form and strength	29.4	70.6
Facilitating dose calculation, appropriate drug forms selection, and prescribed medication use instruction registration based on patients information	17.6	82.4
Providing appropriate alerts during prescription	14.7	85.3
Reminding physicians to do required tests and check on patients during the course of prescribed medication use	23.5	76.5
Writing in a reason for overriding of alerts in the electronic prescription system during prescription	52.9	47.1
Creating ePMR and the possibility of printing the prescriptions when needed	20.6	79.4
Providing the possibility of authorizing electronic prescription by prescriber's electronic signature	26.5	73.5
Providing the possibility of electronic endorsement of refills and renewals request from the pharmacy	35.3	64.7
Notifying the prescriber about the prescription fill status	26.5	73.5
The possibility of physicians' access to non-dispensed prescribed items	38.2	61.8
Facilitating access to data for government purposes and objectives	44.1	55.9
The possibility of canceling or deleting a prescription by prescriber if dispensing process is not yet completed at the pharmacy	23.5	76.5
The possibility of changing or discontinuing patient medications and changing medication use	52.9	47.1
Eliminating paper prescriptions for patients, physicians, and pharmacies	32.4	67.6
Reducing phone calls between pharmacists and physicians by providing the possibility of electrical communication between them	44.1	55.9
Providing the possibility of better control and evaluation of patient medication	17.6	82.4
The possibility of controlling prescribed medication at patient-selected pharmacy stock during prescription	23.5	76.5

The possibility of displaying and printing a detailed list of current patient's medications, use instruction, and a reason for prescribing the medications for the patient	23.5	76.5

Analysis of the results obtained from investigating physicians' point of view regarding the components of repeated prescribing showed that more than 60% of physicians totally agree that "implementation of the repeated prescribing system reduces workload of physicians and medical clinic's staff." It also revealed that, according to all physicians who participated in the study, "repeated prescribing" is an important feature of the electronic prescription system and it should be considered in designing the final model. Table 3 shows that "prescription submission to central national database by physicians and the possibility of retrieving information from any pharmacy using health smart card and patient unique identifier" is the highest priority of physicians (32.5%) in models of the electronic prescription system. Also, 71.5% of physicians selected the Health Insurance Organization of Iran as a qualified trustee to establish and protect the national electronic prescription database.

Table 3. Frequency percent of physicians' view in prioritizing models of electronic prescription system.

Items	**Models of Electronic Prescription System**	**Priority**							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**Unanswered**
1	Direct submission of prescription to pharmacy selected by patient via email	5.9	2.9	5.9	0.0	5.9	15.5	17.7	49.1
2	Prescription submission to central national database by physicians and retrieving its information from system of patient-selected pharmacy by scanning the paper prescription number bar code or manually entering it in to the pharmacy system	0.0	5.9	11.8	5.9	20.6	5.8	0.0	50.0

3	Prescription submission to central national database by physicians and retrieving its information from the system of pharmacy selected by patient using health smart card and patient unique identifier (ID)	14.8	8.8	14.7	8.8	2.9	0.0	0.0	50.0
4	Prescription submission to central national database by physicians and retrieving its information from system of patient selected pharmacy by automatic downloading of prescriptions at specified intervals	0.0	2.9	20.6	17.6	5.9	5.9	2.9	44.2
5	Prescription submission to central national database by physicians and retrieving its information from any pharmacy by scanning paper prescription number bar code or manually entering it to the pharmacy system	5.9	23.5	8.8	5.9	5.9	0.0	8.8	41.2
6	Prescription submission to central national database by physicians and retrieving its information from any pharmacy using health smart card and patient unique identifier	32.5	5.9	8.8	2.9	2.9	0.0	2.9	44.1
7	Using electronic medical record system and databases for downloading prescription data at the pharmacy (decentralized databases)	5.9	8.8	5.9	5.9	2.9	5.9	11.8	52.9

In order to measure priorities of the model of the electronic prescription system from physicians' point of view, seven options are presented in the questionnaire. Results of envelopment analysis, conducted to extract the main components showed that in determining the model of the electronic prescription system, there are three significant factors with eigenvalues greater than 1. The scree

plot of Figure 1 confirms the choice of three components. These three factors are determined using Varimax factor rotation method (Table 4).

Figure 1. Scree plot for principal component.

Table 4. Varimax-rotated factor loadings to extract main components in determining the model of the electronic prescription system.

Rotated Component Matrix[a]			
ITEM	**Component**		
	Factor 1	**Factor 2**	**Factor 3**
Q2	.907		
Q3	.708		
Q4	-.678		
Q5		.863	
Q6		-.806	
Q7			.867
Q1			-.645

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

[a]Rotation converged in 6 iterations.

The values in this panel of Table 4 represent the distribution of the variance after the varimax rotation. Varimax rotation tries to maximize the variance of each of the factors, so the total amount of variance accounted for is redistributed over the three extracted factors.

Finally, a model is presented for the electronic prescription system using these three components and regression model. ANOVA regression analysis indicates that the model is statistically acceptable ($p = 0.003$) (Table 5).

Table 5. Coefficients of determined factors in the model of the electronic prescription system.

Model	Standardized coefficients	Non-standardized coefficients		Sig.	T
	Beta	B	Std. Error		
Constant	11.520	0.0	3.056	0.003	3.770
Factor 1	1.899	1.056	0.390	0.001	4.865
Factor 2	1.764	0.788	0.523	0.006	3.375
Factor 3	0.381	0.195	0.377	0.334	1.010

Based on coefficients obtained for each factor (Table 5), the model of the electronic prescription system is:

$$\text{Model of the electronic prescription system} = 11.520 + 1.899 \times \text{Factor 1} + 1.764 \times \text{Factor 2} + 0.381 \times \text{Factor 3}$$

According to this model, weight coefficient of Factor 1 (prescription submission to the central national database and retrieving information from the system of the patient's selected pharmacy by scanning paper prescription number barcode, manually entering it to the pharmacy system, using health smart card and patient unique identifier (ID) or automatic downloading of prescriptions at specified intervals) is more than other coefficients in the model of the electronic prescription system. The constant value presented in this paper reveals a linear relationship among variables.

Discussion

In general, from the physicians' point of view, National Electronic Prescription System should be based on centralized architecture and the Central National Electronic Prescription Database. In addition, from the physicians' point of view, "prescription submission to the central national database and retrieving its information from the system of pharmacy selected by patient" had the

highest priority (weight coefficient) in the model of the electronic prescription. Results of researchers' review of the electronic prescription in developing countries indicate that the four European countries (Denmark, Finland, Sweden, and the UK) studied the use of the central national electronic prescription database in the system architecture (20).

In Iran, the rate of using computers and electronic medical records in the clinics of the physicians studied was very low and in few cases, it was used for printing prescriptions. Based on the studies carried out in Ontario of Canada and Scotland, prior to implementation of the electronic prescription system, most of the physicians studied were using computers for printing prescriptions in their clinics and about half of them were using it for printing prescriptions repeatedly (31, 33). This difference may be due to the fact that insurance organizations do not accept electronic prescriptions which are out of the patient's insurance. In this study, the majority of the physicians agreed with the government's investment in education, implementation, and maintenance of the electronic prescription system. Most of the Scottish doctors and pharmacists also believed that the Scottish government should pay for education, maintenance, and implementation of the electronic prescription system (33). But, the majority of family physicians in Ontario were of the opinion that government and business owners must pay the cost of maintenance and implement the electronic prescription. Ontario pharmacists, on the other hand, believed that pharmacy owners are responsible for the maintenance costs of the electronic prescription (31). In this particular case, the healthcare model could be the cause of differences and similarities among views of the physicians. In Ontario, the healthcare model is based on the public service system and its capital is mostly funded by the state. However, Scotland's healthcare model is based on the public and private sectors and Iran's national health system, like many other developing countries, is a public cooperation, where all elements of the country are somehow involved in providing healthcare services and there are a wide variety of service providers and payer organizations. Thus, the government should provide incentives by investing in education and paying for the cost of hardware and software for the electronic prescription system to encourage physicians to use the system. More than half the physicians who participated in this study agreed to give pharmacists access to patient information through the electronic prescription system and regarded it as a way for better clinical care of patients. Physicians who disagreed with pharmacists' access to patient information sought a passive role for pharmacists in treatment of patients. Canadian physicians opposed this access saying that patient information would be of no use to pharmacists. They also

wanted patient information to be kept confidential (31). In other studies, security and confidentiality concerns were also listed as the major obstacles for implementation of the electronic prescription system, from the physicians' point of view (28). Yet, pharmacists' convenient access to patients' information provides an opportunity to improve patient medication compliance, to control ADR, and to reduce drug costs by preventing unnecessary prescriptions. It also improves the quality of healthcare (35, 36). In the model of electronic prescription central database, pharmacists' instant access to patient information was made possible and there was no need to talk face to face. So, they should be provided with sufficient information to deliver effective clinical services since information redundancy can make the user deal with a large amount of unnecessary information about the patient or issues related to confidentiality of patient data (33). Also, it is necessary to use the formulary and benefits, and follow the medication history information standards to achieve the desired effects of e-prescription (8, 22).

The majority of physicians (67.6%) who responded to the questionnaire considered the electronic transfer of prescription a good idea. In studies in this field, similar results were obtained and physicians supported the idea of processing and transmitting electronic prescriptions to improve the quality of patient care and they had a positive view about it (11, 22, 27, 29, 31, 33 and 37).

Prior to completing the questionnaire, only 29.4% of the physicians in this study already had some information about the electronic prescription system. Also, to learn about the views of family physicians and general pharmacists towards drug information system, similar results were obtained in Ontario on prior knowledge of the physicians (31). Lack of prior knowledge of key stakeholders about the electronic prescription system can be a major obstacle towards electronic health and electronic prescription acceptance (37, 38). As numerous studies referred to physicians' reluctance to electronic prescribing and computerizing medical clinics, measures need to be taken to familiarize physicians with the electronic prescription system and with how to use it. They must be provided with incentives to adopt this system and use it in their daily activities (25, 39).

In the current research, most of the physicians agreed that implementation of the repeated prescribing system reduces the workload of physicians and medical clinic's staff. In the Ontario study, more than 40% of physicians felt that electronic prescription reduced physician's and medical staff's workload. Also, other similar studies showed that electronic transmission of new and repeated prescriptions can facilitate physicians' and pharmacists' workflow (40, 41).

Most of the physicians who participated in this study agreed to eliminate paper prescriptions for patients, physicians, and pharmacies. They also agreed to submit paper prescriptions to insurance organizations, and eliminate paper prescriptions in case of implementation of the electronic prescription system. Ontario pharmacists also supported eliminating paper prescriptions authorizing patients to opt for the electronic prescription system which is indicative of their desire to go through the paperless system (31). However, Scottish pharmacists advocated their current system of authorizing paper prescription during drug prescribing (33). After implementation of the electronic prescription system, a few Ontario pharmacists still believed in the usefulness of the paper prescription because not all pharmacies have all drugs written in the patient's prescription. So, the physicians should be able to print the paper prescription (31). Of course, a central prescription database eliminates the need to print the electronic prescription because it is possible to access patients' prescription at any pharmacy by giving the registration number. After the implementation of the electronic prescription system in different countries, the difference in the views of physicians and pharmacists on whether to eliminate the paper prescription may be due to the difference in the current workflow patterns of prescribing.

About 64.7% of the physicians who participated in this study agreed to provide the electronic endorsement of refills and renewals request using the electronic prescription system. More than 80% of the pharmacists and insurance experts agreed to provide the facilities of prescription refills and renewals by direct patient reference to the pharmacy and considered it necessary to take into account preventive measures to avoid prescription refills and renewals before the specified time period. What is more, majority of the pharmacists in Scotland and Ontario agreed to the implementation of electronic repeat dispensing (31, 33). By providing the possibility of repeating electronic dispensing, one no longer needs to personally refer to physicians in very short time interval for prescription refills and renewals. It will result in more prescriptions being accepted from the patients, reduced workload of the clinical staff, and involvement of more pharmacists in the process of repeated prescribing (29, 33, 42, and 43). Furthermore, the model of the central electronic prescription database eliminates the need to refer to a specific pharmacy every time one repeats his or her prescriptions (20). However, in some countries, the endorsement process of prescription refill (receiving the request, reviewing the request, and endorsement of the prescription refill request) depends upon the physicians. Owing to the possible increase in their workload, there may not be a positive view about it (28).

Conclusion

Since the central electronic prescription database was the most important part of the physicians' preferred model for the national electronic prescription system, it is necessary to establish the country's prescription system based on the centralized architecture and the national electronic prescription database. Also, the method of retrieving prescription information from any pharmacy using a health card is the key information obtained from the National Electronic Prescription System, from the physicians' point of view. Therefore, the researchers suggested speeding up the replacement process of insurance cards with health insurance smart cards. Also, it is necessary to integrate the health smart card and smart card for health insurance organization with the smart national card so that they can be in the electronic health records as well. Providing access to information about drug pharmacopeia of insurance organizations and formulary is one of the main components of the prescription and prescribing process from the physicians' point of view. But formulary in Iran combines official Iranian formulary with pharmacopeia of the insurance organizations because pharmacological information (primary data) is stored in the official Iranian formulary and information on prices of medicines and insurance underwriting conditions (supplementary information) are stored in the pharmacopeia of insurance organizations. Thus, the researchers suggest establishing a national formulary unit based on the insurance coverage and an integrated payment system which uses the electronic prescription system to promptly notify via online any changes in drug price coverage and pharmaceutical insurance coverage based on the physician's specialty.

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