Designing minimum data sets of health smart card system

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A B S T R A C T

Introduction: Nowadays different countries benefit from health system based on health cards and projects related to smart cards. Lack of facilities which cover this technology is obvious in our society. This paper aims to design Minimum Data Sets of Health Smart Card System for Iran.

Method: This research was an applied descriptive study. At first, we reviewed the same projects and guidelines of selected countries and the proposed model was designed in accordance to the country's needs, taking people's attitude about it by Delphi technique. A data analysis in study stage of MDS(Minimum Data Sets) of Health Smart Card in the selective countries was done by comparative tables and determination of similarities and differences of the MDS. In the stage of gaining credit for model, it was accomplished with descriptive statistics to the extent of absolute and relative frequency through SPSS (version 16).

Results: MDS of Health Smart Card for Iran is presented in the patient's card and health provider's card on basisof studiesin America, Australia, Turkey and Belgium and needs of our country and after doing Delphi technique with 94 percent agreement confirmed.

Conclusion: Minimum Data Sets of Health Smart Card provides continuous care for patients and communication among providers. So, it causes a decrease in the complications of threatening diseases. Collection of MDS of diseases increases the quality of care assessment.

Keywords: Smart card, Minimum Data Set, Health

Introduction

For the first time, Kunitaka Arimoray who was Japanese in 1970 issued the smart card exclusively after that Ronald Monory who is a Frenchman who introduced patent IC card in 1974; later, it changed to smart card in 1977. Three commercial companies including Bull CP 8, SGs Thomson and Schlumbergen began to produce IC card then. Subsequently, Motorolla Company in 1979 produced the first micro-controller chips safe in order to be used in the French banking system. In 1986, 14000 Bull Cp 8 cards were released and distributed among clients of Virginia and Maryland banks and 50000 cards between Palm Beach and Mall banks. The first broad project of smart card was implemented by the United States department of agriculture in 1987 and the first national project of prepaid cards was performed in Denmark in 1992. In 1994 Euro pay, master card, visa jointly drafted a standard for bank's cards. In 1998, Microsoft smart card operating system was introduced (1). JCB card, besides the Hypercom terminal which provides more security, was presented in 2002. Subsequently in 2006 smart card was released for the United States department of foreign

and defense affairs (2).

There are few countries that benefit from E-health system and the users of this card in these countries include a wide range of small therapy centers, states, and even a country. Also, capabilities of this card in terms of single purpose by limited user against versatility are different, including medical card, disease records, treatment records, insurance records, ability to pay charges and premium, etc. (3).

Mainly, health smart card was implemented in Europe, Southern America, Japan and Australia in mid-1980s. Data of this card were divided into 2 groups of management data and medical data. The most primary designs covered especial groups of patients with especial disease, for instance, HEMA Card for hematology in Belgium, Dialybre card in France for dialysis patients, and diabetes card for diabetic patients in Germany (4). In Germany, 80 million health insurance card designs were implemented in 1996 (5). In Taiwan, 150000 national health insurance cards were implemented in 2002. In Austria, 24000 cards, such as E-card, were implemented (6). In Australia, Medical Smart Cards was issued for 40000 patients in 2006 (7). Also, in Mexico 3.7 million cards called Seguro

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Popular Health Insurance Card were released in 2006 (8). Moreover, this card with the name of CANS covered 7 million people in Algeria in 2007 (9). Moreover, more than 200000 cards called CarteDUO were presented in 2007 in France (10). In addition to the mentioned countries, health smart card programs are implemented in other countries such as China, Finland, Jordan, Poland, and Turkey (11). Health cards are divided into patient's card and health provider's card.

A.   Patient's Card

Patient data card which is kept by the patient is complete, accurate, and updated. Medical information of the individuals will be available, especially in emergency situations; moreover, in non-emergency situations, existence of the patient's information, medical records, patient health , causes of better treatment in this card prevents repetition of medical examination and reduces the risks resulting from improper prescription and drug interactions. This card usually includes information about the person, insurance, emergency patients, and drug prescription. Patient personal code and secrete cards help to establish a relation between card and access card machine.

B.   Health Provider's Card

Usually health provider's cards are issued for health care professionals and practically allow the people to access patient information and provide health care (12). Health card includes management information including patient profile, insurance information, and information such as treatment cost and patient payments. Each of these management functions need different sets of information which should be saved in the patient card. Emergency information includes details of emergency cases, chronic disease and patient care programs which finally enable faster and better treatment in emergency cases. Medical information refers to all information about people's health. Treatment records and results of previous examinations are similar to this information (13).

Methods

This research was an applied descriptive study. The study of necessary data in different parts of this project included evaluation of diagnostic and therapeutic issues such as symptoms, different diagnoses, treatments, and all necessary data about patient from the time of visit to the health center performing diagnostic and therapeutic procedures and finally patient discharge. It is better that this data be included in smart cards and always be with the patient. In order to determine all cases mentioned above and in addition to the patient, we reviewed the same projects and guidelines of selected countries (America, Australia, Turkey and Belgium) and the proposed model was designed in accordance to our country's needs.

In credit evaluation stage, the investigator's suggested pattern and opinions of ten experts who had an PhD degree in "Health Information Management" and 15 medical specialists were considered through Delphi technique. For experts and specialists selection, random sampling method was used. Validity of the related tools was modified through the content validity method (Correlation coefficient=0.88). According to the study of Minimum Data Sets of Health Smart Card's common and difference points in the selected countries (America, Australia, Turkey and Belgium), and considering the country's need and requirements, Minimum Data Sets of Health Smart Card were presented in a frame with 2 patterns including Minimum Data Set of patient's card and health provider's card. Two-round Delphi technique was performed just because of its adjustment proportional to the situation of the country. In this stage, a questionnaire that included all of the above mentioned patterns, 46 questions and comparison of the opinions of experts, was distributed among them.

Results

Patient's card was issued for quick access to the important data related to the health of patients. In fact, this card refers to electronic health record which is always kept by the patient in order to be used in emergency cases. Generally, minimum data related to the patient smart card of patients were categorized in thefollowing form and displayed in Table 1.

Discussion

Now, health smart card is used for saving health information. Medical professionals can access the patient's health data very quickly by using the health smart card. Variables and data included in this card are like Kardas(2006)(14), Gamlo (2011)(15), and Lavoie (1995) (16); demographic data and public and patient health data card are considered as a main part of minimum health data card. This part consists of data on patient identity, and medical and health data. In this study, there was an attempt to include all variables needed. Capacities of health smart card are limited but it is very important to consider the maximum capacity for saving data.

For designing a minimum Data Set of health smart card, the item related to insurance was introduced as a step towards establishing the optimal operation of health insurance. In the studies of Trček et.al (2001), using health smart cards is recommended in order to improve insurance processes(17).

Another feature which is considered in designing minimum Data Sets of Health Smart Card is related to the patient's card and provider's card. In Lavoie's studies (1995), we need both patient's and provider's cards (16).

The problem of data security in clinical issues is very important, Gamlo (2011) defines 2 security sectors for security of the data card (15). In the studies by Blobel (2001(18)), Bing (2003) (19) and Negawad (2008) (20), private and public agents, pin code, and digital signature for security of their network are used.

Table 1. Minimum data set of patient's card

TYPE OF INFORMATION	DATA
PERSONAL INFORMATION	IDENTIFICATION NUMBER, NAME, LAST NAME, SEX, AGE, ID, NATIONAL CODE, DATE OF BIRTH, BIRTH PLACE, MARITAL STATUS, EDUCATIONS, RELIGION, NATIONALITY, HOME ADDRESS, PHONE NUMBER, JOB ADDRESS, MOBILE NUMBER, CHARACTERISTICS OF WHO IS WITH PATIENT, BLOOD TYPE
INSURANCE INFORMATION	NAME OF INSURANCE COMPANY, TYPE OF INSURANCE, INSURANCE'S NUMBER, DATE OF ISSUE , CREDIT, PAGE NUMBER OF INSURANCE, THE RELATION BETWEEN THE PERSONS WHO WERE INSURED.
HEALTH INFORMATION	THE MAIN REASON FOR VISIT, PI(PRESENT ILLNESS), MODE AND ONSET OF SYMPTOMS, PROGRESS OF SIGNS, CHANGING IN BEHAVIOR, HABITS, SLEEP, APPETITE, CHANGE IN FUNCTION,RESULTS OF REVIEW OF SYSTEMS, DRUG HISTORY, SUBSTANCES USE(HISTORY OF PREVIOUS AND CURRENT USE , DURATION AND AMOUNT), DRUG ABUSE, PAST HISTORY, PERSONAL HISTORY, FAMILY HISTORY, ,CHRONIC DISEASE ,DIAGNOSIS, MEDICATIONS USED FOR TEMPORARY AND PERMANENT, DRUG ALLERGIES, PROCEDURES, TREATMENTS.
DATA OF LAST VISIT	SYMPTOMS OF DISEASE, RESULTS OF EXAMINATION, RESULT OF VISITS, DIAGNOSIS, PRESCRIBED DRUGS, PROCEDURES
FINANCIAL CREDIT	AMOUNT OF CREDIT, DETAILS OF CREDIT, BILLS.
SECURITY DATA	PIN CODE, FINGERPRINT, COMMON CODE BETWEEN ACCESS CARD MACHINE, PASSWORD.

Table 2. Minimum data set of provider's card

Type of Information	Data
Personal	Name, last name, id card, national code, birth date, birthplace, home address and phone number, job address and phone number, mobile number.
Personnel	Personnel code, position, educations, expertise, relate to organization and number of medical council.
Security	Pin code: in order to authentication, emergency license: in order to access patient data in emergency situation, common code between machine.

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