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Improving Smart Decision Systems in Process of Controlling and Recovering Iron Deficiency Anemia

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Abstract— The applicable of ICT is not only a competitive advantage for manufacturers and service providers, but it also as a requirement for any organization was reflected. This is a matter of health services, not only to improve service quality to reduced service time which will be impressive, But also affect the patient's health fair distribution of services by mobile equipment's are remarkable as well. For all new technologies, the advantages of mobile equipment that is successfully reaches its peak when the health have been made implementation, maintenance and development. In this article, we discuss the optimal role of intelligent decision support systems to improve and control iron deficiency anemia in identifying and reducing medical errors And oblivion covered by the patient in a timely manner, such as appointments system which is plays a role, that can help to quality health services and in many cases lead to better and more effective communication between doctors and patients, Reduce error rates, saving time, reducing the cost of treatment and reduce the length of treatment.

Index Terms— Mobile Healths, Mobile Technology and Equipment, Intelligent Decision Support Systems and Specialized Medical Attachments

I. INTRODUCTION

EVERY day, the growing communications industry, telecommunications and informatics, the world is faced with new revolutionary. Information and communication technology revolution in all sectors of economic, social, political and security has been left remarkable effects. With development of the present technology in the medical sector, followed by a shift in the health care system and it's one of the largest fields of information technology, health and treatment. IT numerous methods can help in this area. Storage patient information systems, drug information systems, and surgical treatment systems which is follow-up by treatment systems,

telemedicine systems, nurse steering systems, surgical robots , systems admission and many others behind the scenes designed that those have a common goal that exist work to facilitate the treatment. With the present system the patient receives the best service in the shortest time, doctor all the time from anywhere in the world who wants to have access to their patients and patient information with fully available everywhere. Universal access to medical information in context of electronic networks was not a dream, it clearly could be health agencies that these systems are seen near with introduction of smart mobile decision support systems can be early detection of diseases such as cancer, diabetes, MS and other chronic diseases had prevented. However, application of these tools needs to provide standards and infrastructure appropriate security, technical, etc [1].

Providing intelligent decision support systems by attaching medical specialty in various fields, conditions provided until the doctor start to track and pursue recovery. You may have been done in the field of short messages. The timely reminder the patient in the clinic, as well as timely reminders taking medication to patients that had have a significant impact in reducing dementia patient [2]. Proof the possibility of the virtual world, in despite of the problems and disadvantages that would play a positive role in an improving and accelerating the disease process and more according to the guidelines that has provided to be observed the possibility of eliminating and avoiding the use of virtual worlds isn't possible in an everyday life and it's something that undeniable Because of today with advent of new technologies take advantage of the environment to accelerate demand people that increased side and has led to tasks and increasing the recovery process can be accelerated without the physical presence of the patient and doctor, which leads to closer communication, reduce the error rate, time and also makes during the course of further follow up, less and provides online communication wouldn't longer the admission of the patient. According to the present studies in most important China's experience in outbreaks and epidemics of dangerous disease pneumonia (SARS) Experience and lessons of this country to overcome to disease, using SMS technology. In the other hand, research shows that SMS messages is to remind patients forget their appointments with hospitals and doctors with 30 to 50 percent. SMS is a very great help to control of doing chronic diseases [3]. Health service via SMS is the

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fastest, easiest and cheapest kind of communication with patients has brought in medical and health industry [4]. In line of findings which is related to other areas of Medical, a comprehensive survey in London showed that texting in two or three turns five and seven days before the visit, the reduced presence of psychiatric disease for visiting [5]. In another study impact of sending text messages using the drug daily for three months, in the regular drug use, was studied in patients with schizophrenia. Results showed that the group receiving regular drug use SMS more than the control group. SMS application in the field of psychiatry seems logical [6].

As a stated in the field of research was communicating via SMS and specialized research has been done in the field of smart messaging and the same sex as the subject of the current paper that is different. In this paper, using of decision support systems, intelligent messaging system as a paid expert in mobile health which describes the medical intervention with the help of computer systems, mobile phones and SMS systems and generally any removable device in the pursuit of health care sick. The use of portable mobile devices that are constantly connected to sources of information and the ability to have real-time updates can be useful for physicians to access updated information and provide decision support at point of care.

It is worth noting that intelligent decision support systems messaging to accelerate and improve the process of designing and implementing has not been integrated disease but if there is Smart Messaging System, it led in an only one direction in this case, the patient and doctor if they will rule such as taking medication to control doses by the physician, direct contact with doctor, information on how to prevent and control the disease, patient reminders to appointments for doctor if you need to review, the need to install multiple systems is that no intelligent decision regarding the type of disease in this research that couldn't meet the demands of such patients. In the present study intends due to the upcoming and the use of decision support systems, intelligent messaging, improve and accelerate the process to review and analyze the control of iron deficiency anemia and interact with doctor in case of medication in patient's body to analyze the results.

II. MEDICAL INTELLIGENT DECISION SUPPORT SYSTEMS

Decision support systems or smart decision support systems designed as any computer programming which is defined to assist health care professionals in making clinical decisions. Computer software is designed to help clinical diagnosis. The system uses the information and medical knowledge to diagnose a variety of conditions and procedures prescribed medical advice to any patients. The main goal of each system is actually for helping doctors and patients about self-care, it means that a doctor can interact with system and patient data analysis, and other clinical activities of the system would recognize the patient that can also be used to control the progress of the disease to be associated with each system.

III. THE REASONS FOR THE USE OF MEDICAL DECISION

1. Doctors are sometimes take mistakes.
2. Doctors always couldn't adapt to the latest findings of medical information.
3. In conventional use of automated decision making would have an effective.
4. Health care organizations are willing to increase the quality and decrease costs [7].

IV. FIELDS USED INTELLIGENT MEDICAL DECISION SUPPORT SYSTEMS

- Production alert and reminder for doctor and patient
- Help the patients and doctors
- Planning for treatment
- Recognizing and interpreting appointments

V. INTRODUCTION TO THE MOBILE HEALTH CARE

Mobile and social health care network tries in the field of health and medicine which is very useful admitted to Iranian society with the lowest cost to provide health promotion. In other words, mobile health locally reliable for the Iranian people to care, information, counseling, health assessment, collection and were guided online medical information. Mobile health system is very useful in the field of health and medicine sector, which strives inpatient to improve public health cause the lowest cost. Mobile health platform as a health services, relying on self-care model to members of the society is to provide a healthier lifestyle. The system is based on self-service delivery model. It means that all services provided to users is based on data has entered the system. In present system, the goal of treatment, depend on information available about its current state of health and family history [8]. Few examples for intelligent health systems will be included below:

- Software cancer prevention
- Software to improve the process of quitting smoking
- Software various tests with various tests which is related to health care as a care
- Mobile app to help assist in self-care and coping with drug addicts in order to prevent with drug addiction screening test
- heart healthy Software for people at risk in heart disease
- Software march fortieth of hygiene and first aid in order to serve the pilgrims march advice for heart patients, care of vulnerable people)
- Software leave obesity on physical health and achieve ideal body weight

Mobile health as one of the key components of the national system known in an electronic health care. Accordingly, these components on the roadmap implementation is a national system in an electronic health care in developed and developing countries. Because of the widespread use of this

technology in the field of health and the reduction of health costs in developed countries to create coverage and greater access to community health services could vary for developing or less developed countries [9].

VI. DESIGN AND IMPLEMENTATION OF INTELLIGENT MEDICAL DECISION SUPPORT SYSTEM

Providing a comprehensive health care, appropriate and quality of patients is required to collect, analyze and provide clinical data which is very complex to the patient for using electronic medical records. In this case the medical records paper doesn't necessary performance and need for space, equipment and personnel were abundant. This sort of thinking makes use of advanced technologies such as clinical decision support systems for better utilization of health care data for patients and thus to create computer records for patients. Clinical decision support systems are considered as one of the key components to help doctors and other therapists in way that to healing process, designed and presented. Smartphone users around the world today is not only messaging services to communicate with your friends, but also to interact with brands that they are buying and selling goods and even entertainment. A service that once was limited to simple text messages, now has become a precious ecosystem. The most important of these characteristics can be used to ubiquity and high levels of them and also pointed out the geographic location of its users. They use Health officials for information on scientific data, clinical solving problem, treatment, education and research of several tools such as decision support systems and smart phones.

Due to the advantages of digital assistants and smart phones to improve the quality of medical services, using of officials health care tools are increasing. Smart phones have no effect on access to updated information and resources, especially people who are serving in remote areas, the condition public health effects and improves quality of health services provided. With a spread of certain diseases and chronic , especially cancer following the undertaken investigation in this area, with flood a large number of people that are suffering from iron deficiency anemia and the lack of medical information, during visit a course of doctor and prescribed foreign drugs is incompatible with the patient's immune system and patients that continue their medication in order to the lack of permanent access for doctor was refused and leave all their patients , due to environmental pollution and how to feed the myriad which we see today about chronic diseases, it came seeks to examine the intelligent decision support systems can be an optimal impact on patient recovery process or not. Certainly ahead with technology, the relationship could be established.

In the present study, according to implemented the intelligent decision support system with aimed at analyzing to what extent such systems recovery enables the administrator for Disease Control and iron deficiency anemia due to disease and the sensitive nature of using medications by patients will have effective rule in an improving disease in case of non-compliance, increased duration of treatment and desired

results that aren't achieved. in this study, intelligent decision support system designed to used, with analysis of medical and health information that patients are use required to comply in a timely manner and let ill, according to some reason or drug side effects that wants to use refuses medication and undergoing therapy to stop, the point where it's no longer disease progresses, may treatment easy and convenient for the patient's that aren't possible. Other features of this system is that in case of any side effects for patients without having to see a doctor, or stop your medication with little cost by sending an SMS by doctor that communicate and notify by him of their treatment. Even the possibility that the patient make an appointment with doctor after undergoing treatment with true remind that isn't take a necessary longer hours before his turn to medical centers refer patients to obtain a doctor's turn, but this is the case that the exact date and time system attendance to patient has been based appointment to patients reminders, the patient has prevents amnesia and does not allow the patient, physical presence and his place prevented after the end of treatment.

Table 1: Patients without Medical Intelligent Decision Support System

Patients	Age	Start of treatment	Join the end of treatment	Appointments	Contact your doctor	Result
Patient Number1	32	23/05/1395	13/06/1395	27/06/1395	Do not	Failure recovery
Patient Number2	64	23/05/1395	13/06/1395	27/06/1395	Do not	Failure recovery
Patient Number3	39	23/05/1395	13/06/1395	<u>20/06/1395</u>	Do not	Failure recovery
Patient Number4	36	23/05/1395	13/06/1395	<u>27/06/1395</u>	Do not	Recovery
Patient Number5	8	25/05/1395	15/06/1395	<u>24/06/1395</u>	Do not	Failure recovery
Patient Number6	45	25/05/1395	15/06/1395	29/06/1395	Do not	Failure recovery
Patient Number7	80	27/05/1395	17/06/1395	31/06/1395	Do not	Failure recovery
Patient Number8	72	27/05/1395	17/06/1395	31/06/1395	Do not	Failure recovery
Patient Number9	84	27/05/1395	17/06/1395	31/06/1395	Do not	Failure recovery
Patient Number10	71	27/05/1395	17/06/1395	<u>24/06/1395</u>	Do not	Failure recovery
Patient Number11	71	27/05/1395	17/06/1395	<u>24/06/1395</u>	Do not	Failure recovery
Patient Number12	33	27/05/1395	17/06/1395	31/06/1395	Do not	Failure recovery
Patient Number13	87	28/05/1395	18/06/1395	<u>25/06/1395</u>	Do not	Failure recovery
Patient Number14	48	28/05/1395	18/06/1395	<u>25/06/1395</u>	Do not	Failure recovery
Patient Number15	50	30/05/1395	20/06/1395	<u>27/06/1395</u>	Do not	Failure recovery
Patient Number16	60	30/05/1395	20/06/1395	03/07/1395	Do not	Failure recovery
Patient Number17	84	31/05/1395	21/06/1395	04/07/1395	Do not	Failure recovery
Patient Number18	84	31/05/1395	21/06/1395	04/07/1395	Do not	Failure recovery
Patient Number19	32	31/05/1395	21/06/1395	04/07/1395	Do not	Failure recovery
Patient Number20	38	01/06/1395	24/06/1395	<u>31/06/1395</u>	Do not	Failure recovery

In this respect medical intelligent system was designed for a significant contribution both followed by the patient and doctor. To implement the present system, by visiting the Health Center of Oncology and coordination with physicians

40 patients included in this study had determined conditions for population. The first group of intelligent decision support system has been studied and the second group without intelligent decision support system follows you to treats normally. For the first group of intelligent decision support system they use to the need of patient or the nearest person who is in touch with her a smartphone have smartphone messenger can be installed on it. The results obtained from comparing to examine by two methods. The following tables show details of the patients in both groups, which is understandable patients who have used the intelligent decision support system that compared with patients who didn't use to what is the extent date and time to see a doctor and have achieved remission. According to table above which have been identified 20 cases since the beginning of therapy that lost time due to using of drug and drug side effects that may have occurred to the patient and lack of access have not been able to see their doctor will rule on date and follow their treatment process while the table below, all 20 of these patients due to use of intelligent medical decision support system based drug use the rule settings, the results indicate the optimal role of this system was in recovery process.

Table 2: Patients Treated with Intelligent Medical Decision Support System

Patients	Age	Start of treatment	Join the end of treatment	Appointments	Contact your doctor	Result
Patient Number1	48	23/05/1395	13/06/1395	20/06/1395	24/05/1395	Recovery
Patient Number2	27	23/05/1395	13/06/1395	20/06/1395	-	Recovery
Patient Number3	31	23/05/1395	13/06/1395	20/06/1395	24/05/1395 25/05/1395 26/05/1395	Recovery
Patient Number4	30	23/05/1395	13/06/1395	20/06/1395	-	Recovery
Patient Number5	53	25/05/1395	15/06/1395	24/06/1395	-	Recovery
Patient Number6	23	25/05/1395	15/06/1395	24/06/1395	-	Recovery
Patient Number7	69	27/05/1395	17/06/1395	24/06/1395	-	Recovery
Patient Number8	42	27/05/1395	17/06/1395	24/06/1395	29/05/1395 31/05/1395	Recovery
Patient Number9	48	27/05/1395	17/06/1395	24/06/1395	29/05/1395	Recovery
Patient Number10	46	27/05/1395	17/06/1395	24/06/1395	-	Recovery
Patient Number11	76	27/05/1395	17/06/1395	24/06/1395	31/05/1395	Recovery
Patient Number12	42	27/05/1395	17/06/1395	24/06/1395	31/05/1395	Recovery
Patient Number13	22	28/05/1395	18/06/1395	25/06/1395	03/06/1395	Recovery
Patient Number14	18	28/05/1395	18/06/1395	25/06/1395	-	Recovery
Patient Number15	93	30/05/1395	20/06/1395	27/06/1395	-	Failure recovery
Patient Number16	53	30/05/1395	20/06/1395	27/06/1395	-	Recovery
Patient Number17	18	31/05/1395	21/06/1395	28/06/1395	03/06/1395 05/06/1395 05/06/1395	Recovery
Patient Number18	9	31/05/1395	21/06/1395	28/06/1395	04/06/1395	Recovery
Patient Number19	27	31/05/1395	21/06/1395	28/06/1395	-	Recovery
Patient Number20	84	01/06/1395	24/06/1395	31/06/1395	-	Failure recovery

The positive results from this study could be cited lack of amnesia patient during drug which it's very effective and efficient in turn during the course of treatment. People also visit doctor to specify the date and time without wanting to accept and queue for hours to wait in queues. Another effective and dramatic results that can be non-verbal communication with doctors, which prevents discontinuation of therapy due to side effects or for each other reason.

For rural areas and other geographic areas in terms of distance medical centers for their physical presence is not possible for any reason or even for doctors. All of these features reduce the cost and time savings associated with an event that a mobile health patient should only handle the problem by having a smart mobile phone, in any case without any concern, even though without an Internet connection device, your health care and their assist patients, which leads to the consent of the patient and the doctor.

VII. THE MEDICAL BENEFITS OF INTELLIGENT SYSTEMS CAN BE MENTIONED THE FOLLOWING

1. Improve efficiency and control iron deficiency anemia using compared with treatment conventional methods
2. Savings in health care costs
3. Non-verbal communication between doctor and patient
4. Efficient use of time
5. Reduce the length of treatment
6. Prepare a report on time to use and nonuse of drugs by patients
7. Set appointments within a time specified by doctor

VIII. THE RESULTS OF TESTING AND IMPLEMENTATION OF INTELLIGENT MEDICAL DECISION

In present study According to identified the population, we mention that in general , 40 patients have been evaluated and in this way about 20 patients was discussed about the course of treatment with intelligent system design and 20 cases without intelligent decision support system. In this paper we have surveyed the impact of decision support systems is to increase quality of care for 18 patients for improving the quality of patient care and treatment of disease, respectively. About two study, the impact of decision support systems due to lack of medicine will rule due to decreases aging have not been affected to the level of diagnostic and therapeutic measures.

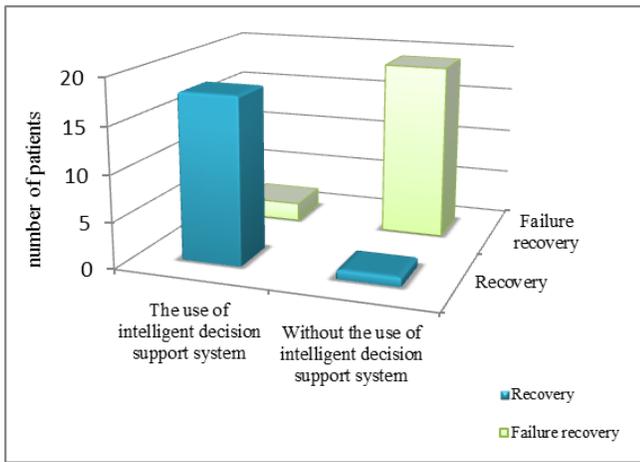


Fig. 1: Comparison chart recovery process of patients in both study groups

According to survey from 20 studies, about 19 case didn't use decision support system, according to Table 1. The effect of this system in reducing waste of time appointments studied of which is from 20 studies are using medical intelligent systems on time and without wasting time. By referring to medical centers and 12 medical study without intelligent congestion system due to medical centers the presence of timely have not been successful and from 8 studies in order to side effects, stop their medication and didn't visit doctor, chart below (Fig. 2) shows the results of analysis.

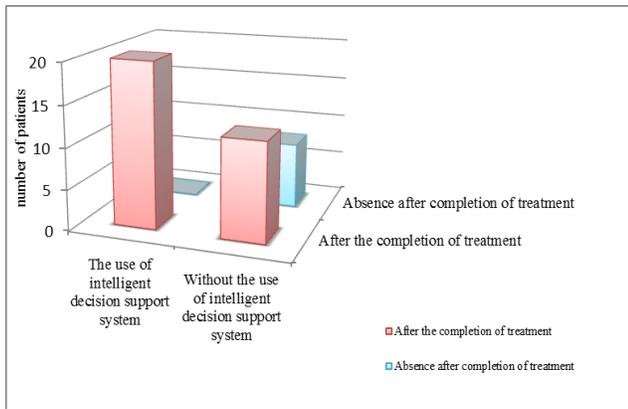


Fig. 2: Chart appointment of two groups

IX. CONCLUSION

The application of intelligent decision support systems in clinical practice increased the quality of care, reduce unnecessary diagnostic and therapeutic procedures, reducing health care costs, improve and accelerate disease control and even reduce medical errors and save time and lead time.

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