

# Designing Decision Support System to Detect Drug Interactions Type 2 Diabetes

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## ABSTRACT

**Background and Aim:** Type II Diabetes is the most common diseases of metabolic disorders and the treatment of oral anti-diabetic drug use takes place But The problem of using multi-drug and interactions at the same time is an issue that has always been a major challenge And diagnosis of drug interactions, particularly in Diabetic patients due to the problem with the disease is very important. The purpose of this studying is, to design a clinical assistant decided to use this approach to determine the type II diabetes drug interactions this makes it easy for those who are active in the field. **Materials and Methods:** Study is Developmental that to determine the content of the system a self-made checklist was used. Checklist Validity and reliability has been confirmed by four professors. The Research community to determine the content of the system was country endocrine that are 124 people. The sample size was calculated using Cochran that was 57 people. The Score of checklist was calculated in SPSS version 20 .finally, the checklist was approved by at least 70% points. The system by using Microsoft SQL server 2008 and visual Studio 2012 development environment was designed in C#.net. In the end, In order to evaluate the software to determine the level of satisfaction, usability and ease of use, designed systems sharing with all Medical Informatics students of Tehran University of Medical Sciences. For this purpose a self-made questionnaire was used. Questionnaire Validity has been confirmed by four professors and reliability was assessed by Cronbach method. **Results:** The results of the survey are showing that the majority of students found out and believed the software is useful and easy to use and generally expressed their satisfaction software. **Conclusions:** The methodology provides a suitable approach for analysis and modeling of data in the medical field and the performance is good.

**Key words:** Decision support system, Type 2 diabetes, Drug interactions.

## 1. INTRODUCTION

Diabetes is a chronic disease in which blood sugar levels are too high and insulin secreted by the pancreas, the body cannot properly use (1, 2). The number of people with diabetes worldwide in 2008 was 230 million and is expected to reach 300 million people by 2025, the number of people with diabetes (3, 4, 5).

In Iran, the head of non-communicable diseases is diabetes (5, 6). About 90% of all people with diabetes have type II diabetes. Type II diabetes occurs in people over 30 years and through diet and exercise properly treated. In addition, this type of diabetes treatment used oral anti-diabetic medicines (2, 7, 8). Drug therapy is one of the most common methods of treatment. Prescribing the correct and proper use of drugs is an important

factor in public health security provider (9). The simultaneous use of several drugs in the treatment of patients is increased (10). Medication errors are the most important medical error and Drug interactions in the prescription drug is considered as one of the main errors (11). Since the treatment of diabetic patients with oral anti-diabetic drugs played and People with diabetes are often people over 30 years. Therefore, their risk for comorbidities such as heart disease - cardiovascular, blood pressure, nerve damage, kidney disease and do not skimp. It also follows that the treatment of diabetes complications, they need to take medicine. So often patients with Type II diabetes for life must take several drugs simultaneously (12). Therefore, it is necessary to somehow prevent drug interactions between anti-diabetic drugs and other

The questions	strongly agree		agree		no comment		disagree		strongly disagree	
	Abundance	Frequency	Abundance	Frequency	Abundance	Frequency	Abundance	Frequency	Abundance	Frequency
It makes the things I want to accomplish easier to get done	3	15%	17	85%	-	-	-	-	-	-
It saves me time when I use it.	5	25%	15	75%	-	-	-	-	-	-
It does everything I would expect it to do.	-	-	4	20%	3	15%	13	65%	-	-
In terms of appearance (color combinations, font, icon)it is Appropriate	18	90%	2	10%	-	-	-	-	-	-
It requires the fewest steps possible to accomplish what I want to do with it.	17	85%	3	15%	-	-	-	-	-	-
I can use it without written instructions	19	95%	1	5%	-	-	-	-	-	-
There is no contradiction and incompatibility when using it	17	85%	3	15%	-	-	-	-	-	-
I can use it successfully every time	-	-	5	25%	1	5%	14	70%	-	-
I learned to use it quickly	18	90%	2	10%	-	-	-	-	-	-
I am satisfied with the speed of execution software and data entry	19	95%	1	5%	-	-	-	-	-	-
I would recommend it to a friend	17	85%	2	10%	1	5%	-	-	-	-
It works the way I want it to work.	2	10%	18	90%	-	-	-	-	-	-
I can recover from mistakes quickly and easily.	18	90%	2	10%	-	-	-	-	-	-

Table 1. The questionnaire designed to evaluate the usefulness, ease of use and satisfaction of software.

drugs seized.

Today, IT is entered in all social contexts, and all sciences and is growing rapidly. IT increasingly is used in modern medical practices, health care management and medical professional knowledge. One of the sections related to artificial intelligence is decision support systems that play a major role in this area. One of the areas that decision support systems is entered in is the healthcare field (13, 14, 15). Clinical decision support systems are interactive computer programs that are designed for helping doctors and other health professionals to deciding task (16, 17). All the evidence indicates that a decision support system to evaluate drug interactions diabetes is required. Help doctors in diagnosing drug interactions to reduce the side effects and cost of drug interactions in the field of diabetes and patients are affected less damage. Considering the results shorts Leaf and colleagues at providing decision support system for diagnostic and therapeutic applications called Mysyn and its success as well as the implementation of these systems worldwide (18) and according to the need that is felt in the field of drug interactions with type 2 diabetes, this research uses design techniques to design and implement clinical decision support system in this area.

## 2. METHODS

This study is development type that at first the necessary knowledge in the field of diabetes type II, type II diabetes treatments, drugs and their interactions through various such as consultation with experts in endocrine diseases fields, reference books, articles and valid databases are achieved. Then the knowledge base file Created and knowledge derived in the

previous steps in the encrypted and understandable form was stored for system. The user interface was designed by using C # .net language in Visual Studio 2012. The user interface is a set of equipment and software that acts as a communication channel between user and expert system. In fact, this allows the user to enter information related desired problem into the system on the other hand gives CONCLUSIONS system to user. Finally, the evaluation of the whole system was performed by questionnaire was built by the researcher.

The questionnaire was designed to evaluate the usefulness, ease of use and satisfaction of software (Table 1). That is consist of 13 questions. Scoring it based on the Likert scale ranged from 5 options strongly agree, agree, neutral, disagree and strongly disagree was set and to Responses from strongly disagree to strongly agree 1 to 5 grades were considered. Because of these systems are in the field of medical informatics students so for survey software, from Students of Tehran University of Medical Informatics requesting to cooperation and the results were inserted in SPSS software.

## 3. RESULTS

In this study, 20 questionnaires were distributed, after completed the data were entered into SPSS software version 21. The results of this questionnaire in the form of the table following below.

## 4. DISCUSSION

For designing Knowledge Base for Type 2 diabetes drug interaction detection system, Microsoft SQL Server R2 is used. This Database is formed of 4 tables to store and keep

name of antidiabetic drugs and conflicted drugs with them, identify drug interactions between the two drugs, the pharmaceutical groups and interactions between them. Designing this system is simple and quick. Because of the importance of this issue (Diagnosis of type 2 diabetes drug interactions) the implementation is based on rule-based model was performed. Often clinical decision support system based on fuzzy or neural network are designed and implemented in MATLAB environment. MATLAB development environment has a fundamental flaw and it is that interpretation language. As a result, the speed of execution of this is very slower than compiled languages such as C # .NET and tedious (19).

In this study without the use of complex models such as neural networks and fuzzy systems or Using MATLAB environment, a simple model based on rules and C # .NET programming language compiler was used. It can be stated with simple models and fast programming languages such as C # .NET can also design decision support systems that the application of high and good results have followed.

## 5. CONCLUSION

Although the interaction of drugs on each other in most cases have little importance and may even be useful. But many drug interactions may lead to undesirable and sometimes life-threatening reactions. Obviously aware of Pharmacology and understanding mechanisms underlying drug interactions Many drug interactions are predictable and can be prevented from occurring, many of them (20).

So that, decision support systems should be designed they can examine drug interactions of various diseases. These systems cause drug interactions Statistics reduced, resulting in injuries or deaths resulting from it reduced interference.

In the present study designed system with a capacity to evaluate drug interactions with other medications can reduce type 2 diabetes medication errors, reduce costs associated with adverse drug events, improve quality and improve the health.

CONFLICT OF INTEREST: NONE DECLARED.

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