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Mobile Base Program for Drug-Drug Interactions (MBPDDIs)

Abstract: *A mobile application program was used in performing a drug-drug interactions (DDIs) for drugs used in Iraq, depending on the drug-drug interactions chart (DDIsC) originated by Ninava Drug Industry (NDI). Two programs were used for designing this work; the first is Microsoft office access which is used to design the form which included the list of drugs and ten registers under it contain different drugs names (Access of drug was available through browsing therapeutic groups or searching for a brand name). If the drug in combo list interacts with more than ten drugs, the combo contains the same name of drug but with number 2, 3 and so on. The design which includes in mobile contains android system.*
In the second design of the drugs interaction a visual basic program is used. Two lists of drugs were used in this program. When a drug from the first list is selected with another drug from the second list, the symbol offer at text box.

Keywords*: Mobile apps, Drug-Drug Interactions (DDIs), Android system, Visual basic, Microsoft access, Drug-drug interactions chart (DDIsC).*

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1.Introduction

A mobile application or "mobile app" is defined as a software application that can be executed (run) on a mobile platform (a handheld commercial off-the shelf computing platform, with or without wireless connectivity), or a web-based software application that is tailored to a mobile platform but is executed on a server [1,2].
Mobile apps were applied and developed by computer scientists in addition to doctors and pharmacists whom they used these applications in addition to ordinary peoples or patients[3-7]
At 2011, the potential of mobile health (m-health) technologies for improving management of Diabetes patients in southern Iraq was evaluated and established a collaboration framework with UK academic and diabetic specialists [5-8]. Two years after this study, a program of improving diabetes management with mobile health technology was published in South Carolina[8,9].
Recently, the problem of the effect of the aneurysm and stenosis on the human blood stream has been solved numerically under conditions in Iraq[10,11].
Because mobile is becoming the preferred consumer channel for communication, and for pharmacists, mobile applications are a way to better use of medications, thereby improving healthcare results and owering costs, this research (Drug-Drug Interactions Mobile Program (DDIsMP) allows to put many drugs and its interactions in pharmacists' hands[12].

2. Motivation

Drug-drug interaction (DDIs) could help doctors and pharmacists whom they used these applications in addition to ordinary peoples or patients[13]. This work showed pharmaceutical educational sessions through phone

3.Drug-Drug Interactions Mobile Program (DDIsMP)

DDIs can be defined as a pharmacological or clinical response to the administration of a drug combination, different from that of anticipated one from the known effects of the two agents when given alone. The clinical result of a DDI may be manifested as antagonism, synergism or idiosyncratic[14,15].

4.Case Study

Data containing the (DDIs) chart originated by Ninavah Drug Industries(NDI) was shown in Figure 1.

Figure1: Ninavah Drug-Drug Interaction Chart

5.Programming

A mobile app program was intended for use in performing a drug-drug interactions(DDIs) for drugs used in Iraq, depending on the (DDIs) chart originated by Ninava Drug Industry(NDI).

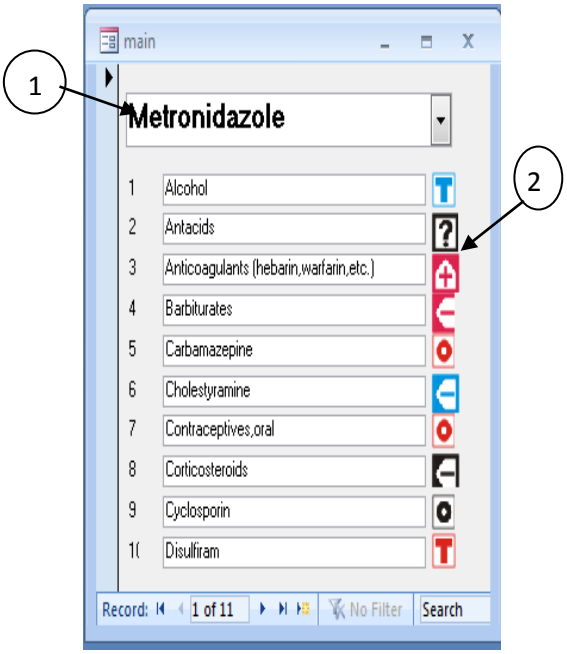


Figure2: Access form of DDIs

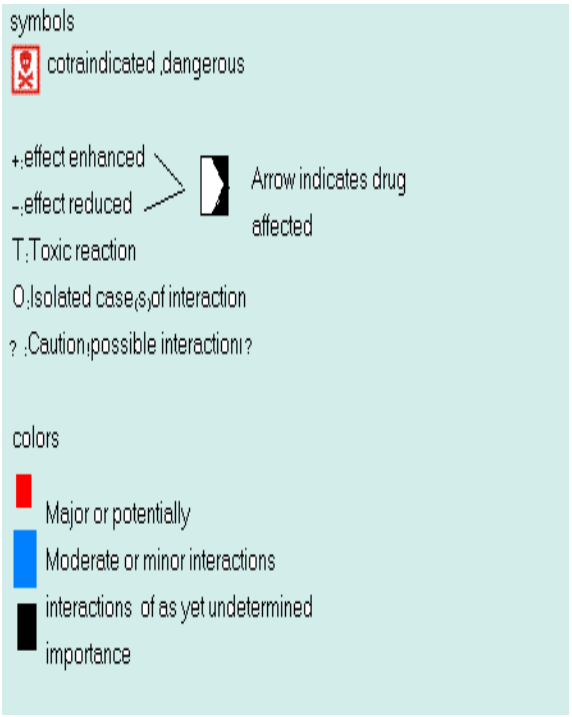
1: Represent the list of drugs called combo list(list of values from which the user can select a single value)

2: Represent the symbols of interaction of each drug with other(s).

If the drug in combo list interacts with more than ten drugs, the combo contains the same name of drug but with number 2, 3 and so on. At access program there is selection called report. Reports allow you to view and present data from your database in a printed form. Access offers several styles and formats for repots, so you can create a customized document to suit your needs. So this form has button called help, this button when press it offers the report of the operation of the symbols which used for interaction between two different drugs as shown in Figure(3).

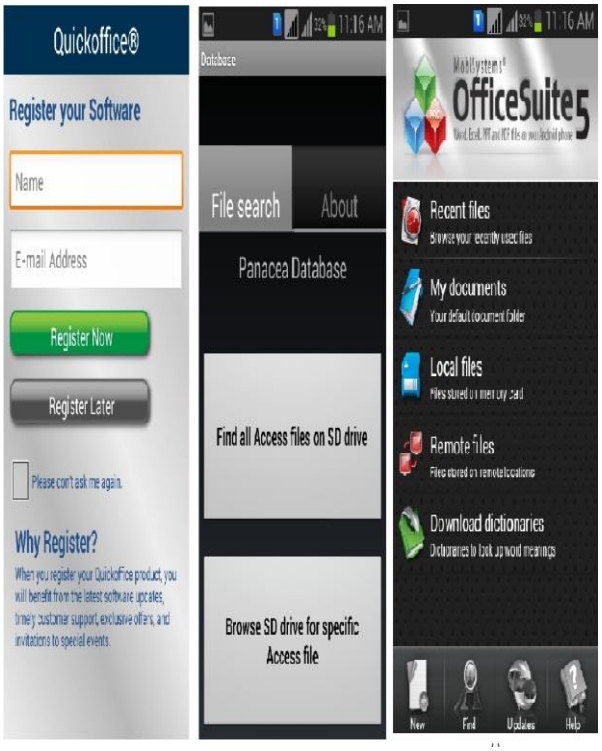
Figure 3: Report of drugs

The design which includes in mobile contains



android system, at beginning, three programs must setup into mobile.

While the OfficeSuite_Pro_v5.1.515.apk is the first, the Office quick q412.apk and Database_0.3.4.apk were the second and third respectively as shown in Figure 4 (a, b and c).



(a) Quick Office (b) Database (c) Office Suit

Figure 4:The Installed Program at Mobile

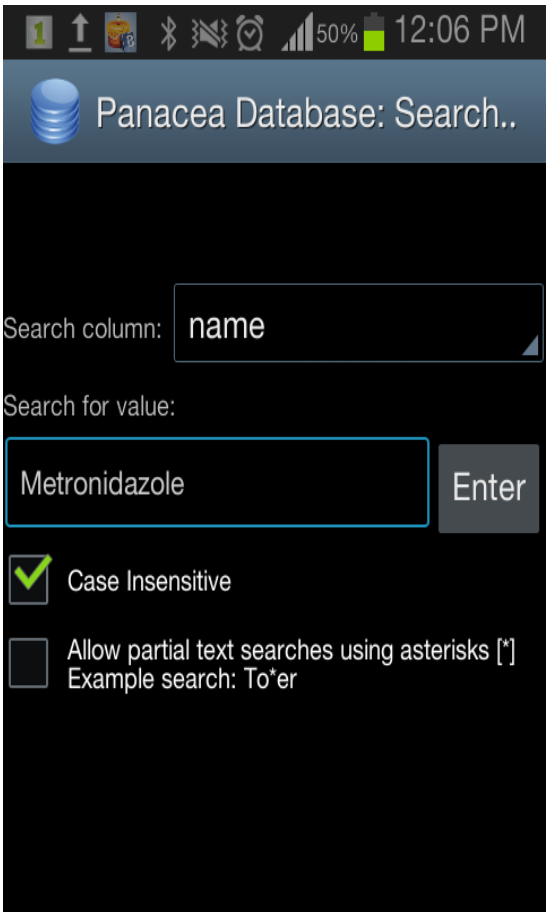


Figure.(5) : The form at mobile

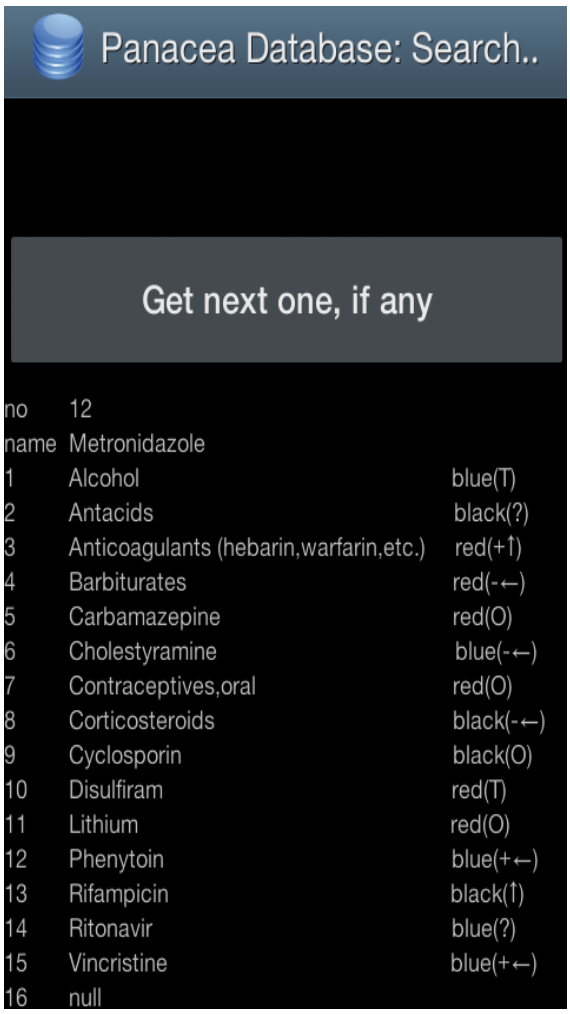


Figure.(6) : The form at mobile

Noting that the designing access programs were stored in mobile. The form of program in mobile is shown in Figures (5 and 6).At the list beside the search of column the name is selected , while at the list beside the search for value the name of drug is written, then the list of interaction drugs will be appear after press the enter icon as shown in Figure (5 and 6).At the row of name, the drug which need to know it's interactions with other drugs is written, then ok button is pressed, the list of drug appear at the down of the drug's name and the interactions symbol are at the right of the list with one of their colors (black, blue or red). At this figure we select the name of drug is Metronidazole, so the list of drugs which interact with it are Alcohol, Antacids, and Anticoagulants and so on. The symbol (+↑) mean the interaction effect enhanced at Metronidazole because the arrow is up directed, at the fourth row the refer to right with minus symbol which mean the effect enhanced reduced in Barbiturates and so on for other symbol which explain in Figure(2).The second design of drugs interaction by using two lists for drugs, when select one drug from the first list and another drug from the second list the

symbol offer at text box as shown in Figure(7). In this picture the first drug which selected is one of Anti-cholinergic and the second drug is Barbiturates, when pressed at DDI icon then NI appear at the square plane that is mean there is no interactions between the selected drugs.

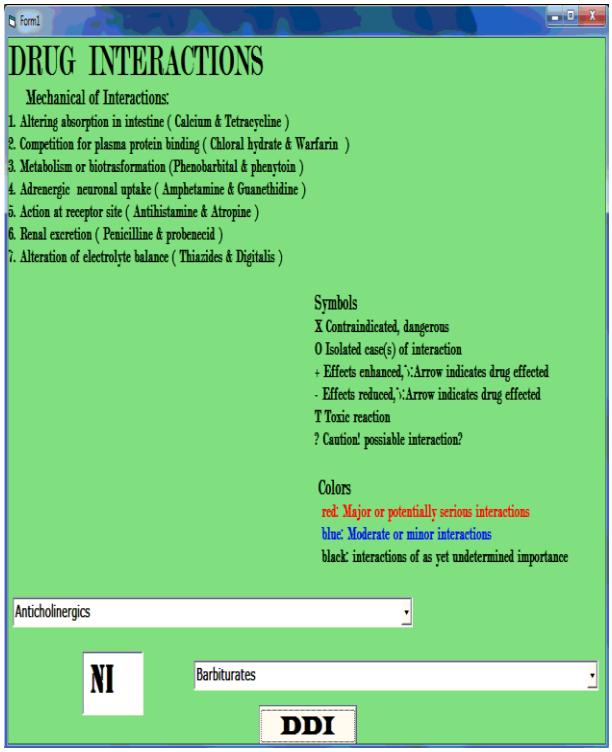


Figure.(7):Visual Basic Form

System Evaluation:

The program is considered to be m-health system and practical, so the users can achieve the interactions between the drugs easily. The usability is important in m-health system .

Conclusion:

Mobile medical apps are rapidly becoming one of the best significant apparatuses in clinical practice. They are an effective and appropriate means to provide real-time medical information at the physicians and pharmacies.This program helps and enables physicians, pharmacists and even a patients to know about the DDIs which decrease the risks of taken more than one type of drug. Advances will continue to improve patient in mobile technology Care and its knowledge's in the medicines that he used.improve patient in mobile technology Care and its knowledge's in the medicines that he used.

Abbreviations:

app: application
DDIs: Drug-Drug Interactions
NDI: Ninavah Drug Industries
DDIsC: Drug-Drug Interactions Chart
FDA: Food and Drug Administration;
PHR: Personal Health Record
HER: Health Electronic Record
M-health: mobile health.
DDIsMP: Drug-Drug Interactions Mobile Program
NI: No Interaction

References:

[1] Mobile Medical Applications; Guidance for Industry and Food and Drug Administration (2013), CDRH (Center for Devices and Radiological Health).
[2] Mobile Medical Applications Guidance for Industry and Food and Drug Administration (2015), CDRH (Center for Devices and Radiological Health).
[3] M.S. Hansen and J. Dorup, "Wireless access to a pharmaceutical database: A demonstrator for data driven Wireless Application Protocol applications in medical information processing", Journal of Med. Internet Research ;3(1):e4(2011)
[4] A. Choi.; A.W Lovete .; J. Kang, K.. Lee, and L. Choi., "Mobile applications to improve medication adherence : existing apps, quality of life and future directions" A Vance's in pharmacology and pharmacy, 3(3):64-74, (2015)
[5] B. Bunschoten, and B. Deming, "Hardware issues in the movement to computer-based patient records"; Health Data Manag. ;3(2):45–8, 50, 54(1995).
[6] O.H .Ahmed and A.J. Pulman, "Concussion Information on the Move: The Role of Mobile Technology in Concussion Management", Journal of Community Informatics, (2012).
[7] A. M.Khuttar, K. Al Jeboury and K. McDonald," Mobile phone technologies and diabetes: a project for self-management and education" In: M. Moore, H. Brunskell-Evans, ed. 2012. Reimagining Research for Reclaiming the Academy in Iraq: Identities and participation in post-conflict enquiry. London: Sense Publications Ltd, Ch.6.(2012)
[8] R. Istepanian,, "The Challenges and potential benefit of mobile diabetes management in the Middle East and MENA Regions. International Diabetes Federation". IDF 2011 World Diabetes Congress, Dubai, UAE(2011).
[9] J.C. Sieverdes, F. Treiber, C . Jenkins, and K. Hermayer, "improving diabetes management with mobile health technology", the American Journal of the Medical Sciences; volume 345; issue 4; page 289-295(2013).
[10] N.S. Sameer, and A.A. Al- allaq," Numerical Study of the Effects of Aneurysm and Stenosis in the Left Coronary Artery on the Human Blood Stream " Engineering and Technology Journal, Vol. 35, Part A, No. 1,(2017)
[11] A.S. Abdul Munem, and M.S. Croock," Health Monitoring System for Ambulance Emergency System using Wireless Sensor Network ",Engineering and Technology Journal, Vol. 34, Part A, No. 15,(2016).
[12] S. Kony, "Mobile technology & Medication adherence: Why pharmacy needs to go mobile today"; Inc. 7380 West Sand lake rd.
[13] C. Lee Ventola," Mobile Devices and Apps for Health Care Professionals: Uses and Benefits " P &T. ; 39(5): 356–364(2014).
[14] N. Naoyuki," Chemical Modifier Screenings as Methods for Identifying Pathway-Targeting Compounds and

for Predicting Drug-Drug Interactions" , Organic Chemistry: Current Research, 128(2014).
[15] D.S. Tatro, S. Louis MO, Drug Interaction Facts. Facts and Comparisons. (2001).

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