UNITED STATES INTERNATIONAL UNIVERSITY -AFRICA

SCHOOL OF SCIENCE AND TECHNOLOGY

ONLINE DRUG MANAGEMENT INNOVATION APPLICATION CONCEPT

[1]LILLIAN KIAMBO, [2] COLLINS ODUOR ONDIEK, [3] PATRICK KANYI WAMUYU

[1] Lillian Kiambo, Student, School of Science and Technology, United States International University-Africa, Nairobi, Kenya

[2] Collins Oduor Ondiek, Assistant Professor, School of Science and Technology, United States International University-Africa, Nairobi, Kenya

[3] Patrick Kanyi Wamuyu, Associate Professor, School of Science and Technology, United States International University-Africa, Nairobi, Kenya

E-mail: kiambolillian@gmail.com, coduor@usiu.ac.ke, pwamuyu@usiu.ac.ke

Abstract

The main purpose of this website is to allow medical professionals gain information on the drugs they prescribe. This system is therefore intended for use by doctors, clinicians, clinical officers, pharmacists, nurses and any other medical professionals who are involved in the process of prescribing and administering medication to patients. This system aims to ensure the process of administering medication to patients is done in an easy and efficient manner by providing medical professionals with the information on the available drugs in the market, that is, the correct dosage, side effects, alternatives and interactions as well as a patient's drug history. These medical professionals shall be able to register with the system in order to gain access to the system's full features. The development of the system was, however, limited by the time and expected duration of completion as well as the vast nature of medicine which limited it to common tropical diseases such as malaria and typhoid.

The development of this system was instigated by the vast amount of knowledge on diseases and the medication necessary that medical professionals need to know in order to properly treat their patients. Studies have shown that a recent increase in complex drug interactions has made the process of prescribing and administering drugs more difficult and increased the risks of adverse drug reactions due to patient lifestyle choices and increase in the number of patients living with chronic diseases. A drug information management system would be highly beneficial.

The primary data collection method used in the research conducted while developing this system was questionnaires. The data collected from the various sources was analyzed with simple descriptive, statistical and analytical tools such as graphs and charts. The results on the challenges faced by medical professionals in accessing information on drugs included a lack of easily available facts and updated material on medication that is available in the East African market as well as a lack of readily available comprehensive patient drug history. The benefits cited include an easy way to view patient drug history as well as easy access to comprehensive information on medication available in the market. From the results of the research, it can be concluded that the system could be easily adopted for the benefits it would provide. However, due to the sensitive nature of medical information, it is my recommendation that privacy policies be established to earn the user's trust. Further development could go into the system in the future to integrate patient registration and access to the system.

1.0 Introduction

1.1 Background of the Study

This project is based on a drug information management system. This system is intended for use by medical professionals including, but not limited to, doctors, clinicians, clinical officers, nurses and pharmacists. The system aims to ensure that the process of administering medication to patients is done in an easy and efficient manner for the medical professionals by providing information on the available drugs in the market. This includes the process of providing the correct dosage, listing their side effects, alternatives as well as the interaction between different medication as well as medication and food or other substances such as alcohol.

In Kenya and most other African countries such as South Africa and Nigeria, medical professionals rely on books, journals and reports from their pharmaceutical boards to get information on medication. In the developed world, systems that provide this information are readily available. Epocrates online in the United States, Medicines Complete in the United Kingdom and DrugBank in Canada provide comprehensive information on approved medication and their formulations, dosages and interactions.

1.2 Problem statement

While there are a number of medical applications targeted towards patients, very few are targeted towards medical professionals. They are instead still reliant on books and journals for use as reference materials. This makes staying up to date on current news and affairs, especially on prescription of medication and reaction to medication, harder for them.

Furthermore, medical professionals may have difficult time accessing updated information on interaction of medication with other medication and foods. This leads to high rates of adverse drug reactions that endanger the patient.

Finally, many medical professionals do not have a single portal through which they can access patient's drug history. Instead, they rely on paper files which are not as efficient.

1.3 Objectives of the study

1.3.1 Overall goal

To design and develop a web-based drug management system

1.3.2 Specific Research Objectives

1.3.2.1 The system will have an interface for users to register and members to log in

1.3.2.2 The system will allow members to search for drugs by name

1.3.2.3 The system will allow members to view the dosing, formulation, manufacturer information and alternative options for the selected drug and their interactions with other drugs

1.3.2.4 Users will be allowed to view patient prescriptions and drug history

1.4 Research Questions

1.4.1 To find out the challenges faced by medical professionals in retaining and remaining updated on prescription information on drugs

1.4.2 To determine the benefits of using an online drug management system.

1.5 Scope of the study

This website will help in making it easier for medical professionals in prescribing and administering the relevant drugs to patients. The stakeholders of this project will be the medical professionals who include, but are not limited to, doctors, clinicians, clinical officers, nurses and pharmacists. The website will be used to help medical professionals better manage cases of adverse drug reactions due to potentially harmful drug interactions.

1.6 Significance of the study

This paper is relevant to Sustainable Development Goal (SDG) 3, specifically, to "promote good health and well-being for all at all ages". This is achieved by utilizing technology to promote better health provision by medical professionals. Technology brings efficiency and effectiveness in the provision of health services.

This study contributes to achieving SDG 3 within the Kenyan context by attempting to improve the way in which medical professionals prescribe drugs for a particular disease.

This study also contributes to the big 4 agenda in Kenya that is set to guarantee affordable and universal health coverage for all citizens. Under Kenya Vision 2030, the Universal health Care (UHC) is defined as 'the ability for persons to receive health servbices they need without suffering financial hardship'. This means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they require, of sufficient quality to be effective, while also ensuring that the use of these services does not expose them to financial hardship.

2.0 Literature Review

2.1 Introduction

In chapter two, we look at the existing systems that are present and challenges faced by medical professionals who do not utilize an online drug information management system as an aide in the prescription and administration of medication to their patients.

2.2 Literraure revew on based on the specific research objectives

2.2.1 Benefits of using a web-based drug management system

1. Comprehensive information on approved drugs in the market
2. Easy search and viewing of drug interactions
3. Easy search and viewing of patient drug history
4. Easy to use and navigate
5. Readily available compared to mobile applications
6. Easy look up for administration and prescription of medication
7. Improved patient-doctor engagement
8. Easy access to facts on medication provided on a single platform

2.2.2 Challenges faced by medical professionals in staying up to date on the drug management afairs

1. Facts on medication are not available on a single platform
2. Updated books and reports are not available to all
3. Information on medication is only found in books and reports
4. Information on adverse drug reaction is not readily available
5. Available systems are not for East African market
6. Available systems are not free
7. Comprehensive patient drug history is not readily available
8. Poor patient-doctor engagement

2.3 Conclusion

From this chapter, we can conclude that web-based systems that provide medical professionals with information on the drugs they prescribe and the drugs that their patients are taking have great benefits to the efficiency of drug administration. Such systems have readily been taken up by

developed western countries and the medics using them are reaping the benefits. However, those in East Africa, Kenya in particular still have challenges in accessing information on the approved and disapproved medication in the market.

3.0 Research Design and Methodology

3.1 Locality of the project and Beneficiaries to the project

The system will be implemented in Nairobi, Kenya. The city of Nairobi has had a number of outbreaks of tropical diseases such as cholera and typhoid. Other major diseases such as malaria plague the residents of Nairobi. Medical practitioners therefore need a system such as this to manage the prescription and administration of medication for the residents to ensure treatment and after-care is provided in an efficient manner. This would be a huge step towards the achievement of agenda 3 of the SDG and also Kenya's universal health pillar. The beneficiaries of this project will be the medical professionals such as doctors, clinical officers, clinicians and nurses who diagnose, treat and prescribe medication for these patients.

3.2 Research approach

3.2 Population of the study(Target group) and Sampling method

My sample will include 40 medical professionals whom I will ask questions regarding tropical diseases and their treatment and find out what they think about a drug information management system that would help them easily manage the prescription and administration of medication. This would help gauge whether the system would be useful or not. The sample population will involve professionals working in both public and private institution in order to get a proper representation of the medical community.

The research will be carried using random sampling methods and statistical random sampling. Random sampling method will be used to make sure that the sample population is not biased and since it might have sampling errors, this is where stratified random sampling comes in handy. It reduces sampling errors by dividing the population into strata of different groups and coming up with the quality size of the desired results as predetermined.

3.3 Data collection methods and Primary Data collection methods

Data collection is a process of collecting information from all the relevant sources to find answers to the research problem, test the hypothesis and evaluate the outcomes. There are primary and secondary data collection methods. Secondary data collection methods collect data that is already published in books, articles or online portals while primary data collection methods include interviews, experiments, surveys and observation. The data collection methods involved in this project will be both primary and secondary methods.

3.3.1 Primary Data collection methods

Primary data collection methods involve data being collected for the first time. The primary method used will be questionnaires.

3.3.1.1 Questionnaires

Questionnaires were used as a primary data collection method due to their effectiveness. A few carefully selected questions were formulated and used in the questionnaire. All this was made possible using Google forms which was used to get responses. This helped to determine the issues in drug information management that has led to the lack of automation of the process.

3.4 Data analysis methods

Data analysis is the process of obtaining raw data and converting it into information that can be easily understood. Data collected from the various sources was analyzed with simple, descriptive, statistical and analytical tools such as frequencies, percentages, graphs and charts.

4.0 Research findings and analysis

4.1 Response rate

Response rate refers to the number of people who answered a questionnaire divided by the number in the study sample. I administered an online questionnaire through the use of Google forms of which 35 people successfully completed. This turn up rate gives a response rate of 87.5%.

4.2 Demographics results

4.2.1 Respondent Gender

This research had more male respondents than female and none that preferred not to disclose their gender. 60% of the respondents were male while 40% were female.

4.2.2 Respondent Age Group

A majority of the respondents were between 18 and 30 years accounting for 91.4% of the respondents. The remaining 8.6% of the respondents were between 30 and 50 years. There were no respondents above 50 years.

4.2.3 Respondent Area of Specialization

A majority of the respondents identified as medical doctors representing 62.9% of the respondents.

4.2.4 Respondents Years of Experience

A majority of the respondent had between 1 and 5 years of experience. This accounted for 91.4% of the respondents. This was in line with the respondent's age group responses. The remaining 8.6% of the respondents had between 6 and 10 years of experience. There were no respondents with over 10 years of experience.

4.3 Findings on challenges faced when accessing drug information

One of the objectives of the research questionnaire was to determine the main challenges faced by the medical professionals in accessing drug information. The main challenges considered included facts on medication not being easily available, lack of updated material on medication, lack of information on adverse drug reaction, online systems with drug information that was not geared towards the East African market and a lack of readily available comprehensive patient drug history. The respondents were also free to include other challenges they faced that they felt may have been important to the study but had not been included. The questionnaire presented these challenges in the form of checkboxes and the respondents could select as many as they felt were applicable to them. The most common challenge faced was a lack of online drug information systems that were geared to the East African market with 68.6% of the respondents citing this as a challenge that they

faced. This was closely followed by a lack of readily available comprehensive patient drug history which was cited by 62.9% of 60% of the respondents citing lack of updated material on drug information as a challenge. The figure below displays the respondents' responses in the form of a bar graph.

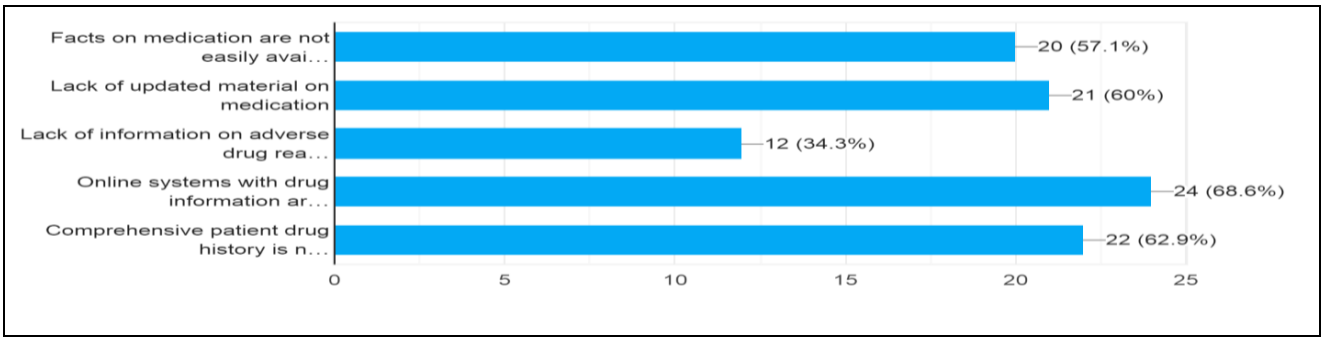


Figure 4.1: Challenges faced in accessing drug information

4.4 Findings on the benefits of an online drug information management system

The second objective of the research questionnaire was to determine the objectives of using an online drug information management system. The main benefits outlined in the questionnaire included easy access to comprehensive data on approved drugs, easy search for adverse drug reactions, an easy way to view a patient's drug history, easy access to information needed to prescribe medication and improved doctor-patient engagement. The respondents were also free to include other perceived benefits that may not have been highlighted by the questionnaire. The benefit that seemed to resonate most with the respondents was an easy way to view the patient drug history with 91.4% of the respondents citing this benefit. This was closely followed by easy access to comprehensive data on approved drugs that was cited by 80% of the respondents. The figure below displays the respondent's responses in the form of a bar graph.

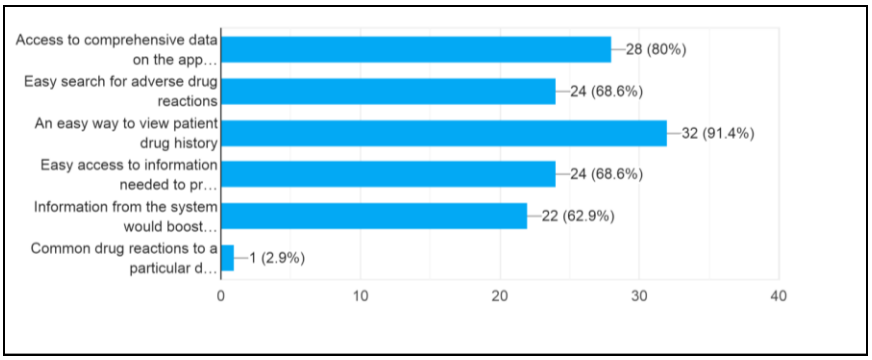


Figure 4.2: Benefits of using the system

5.1 Discussion

From the research, the most prevalent challenge cited was a lack of online systems that were geared towards the East African market cited by 24 out of the 35 respondents which accounted for 68.6% of the respondents. The least common challenge faced when accessing information on drugs was a lack of information on adverse drug reactions cited by only 12 out of the 35 respondents who accounted for 34.3% of the responses. This indicates that the respondents were willing to use a system to access information on medication they prescribe as long as it was geared toward the East African market.

Furthermore, the most popular benefit that the respondents identified was an easy way to view patient drug history cited by 32 out of the 35 respondents which accounted for 91.4% of the responses. This indicates that medical professionals would be quick to adopt this system as it would allow them easy access to a patient's comprehensive drug history. Second was easy access to comprehensive data on approved drugs in the East African market cited by 28 out of the 35 respondents which accounted for 80% of the responses. This indicates that the respondents were willing to adopt a system that would make it easier to access the data they require on the approved medication in the East African market. The least popular benefit cited by the respondents was the improved doctor-patient engagement which was cited by 22 out of 35 respondents which accounted for 62.9% of the responses.

5.2 Conlcusion

The research concluded that an online drug information management system would be beneficial to those in the medical profession in providing a single platform from which they can access information on approved drugs which is much better than the current system which has them relying on reports and journals. The respondents would be quick to adopt the use of an online drug information management system because it offers many benefits that would lead to effectiveness and efficiency of the medication prescription process.

5.3 Recommedations

Privacy policies need to be established and the system needs to be approved as a legitimate system in order for the patients to feel safe when their medical information is stored in it.

5.4 Furture work

The system can be expanded in order to also accommodate more patient information and the drug information accessed through it increased to cover the African continent.

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AUTHORS

Author	Lillian Kiambo School of Science and Technology United States International University-Africa, Nairobi, Kenya E-mail: kiambolillian@gmail.com Website: http://www.usiu.ac.ke
Co- Author	**DR.COLLINS ODUOR ONDIEK - Supervisor 1** Assistant Professor, School of Science and Technology, United States International University-Africa, Nairobi, Kenya E-mail: coduor@usiu.ac.ke Website: http://www.usiu.ac.ke
Co- Author	**PROF PATRICK KANYI WAMUYU -Supervisor 2** Associate Professor, School of Science and Technology, United States International University-Africa, Nairobi, Kenya Website: http://www.usiu.ac.ke