

Facilitating the Interaction between medical reps and health professionals through a drug management system

LR Mohammed^{1#}, D Gunasekera¹ and N Wedasinghe¹

¹Department of Information Technology, Faculty of Computing, General Sir John Kotelawala Defence University, Sri Lanka

36-it-0024@kdu.ac.lk

Abstract: *One of the crucial components of healthcare that needs to be managed correctly and efficiently is medication. The drug management system, also known as the drug information system, is a system that stores data and enables functionality that organizes and maintains the medication use process within pharmacies. Some businesses sell medications despite not having pharmacies without a prescription, purchased. It may be found in a pharmacy's standalone building or elsewhere in the same complex. Additionally, there are other places like a pharmacy, a doctor's office, or hospital druggists are licensed. Registered pharmacists are those who have registered with the pharmaceutical council. But since this is a title that is only granted upon the successful completion of rigorously national, practical, and legal studies. this research paper is conducted a survey with the list of 5 questions send to professionals in medical sector to find out the impact of Drug Management Systems (S) in the healthcare industry. Researcher have identified that approximately 81.1% of the respondents of health professionals believe that DMS can provide more accurate, fast diagnosis and reduce the healthcare workers workload. Pharmacists must always be on the lookout for fake prescriptions that addicts who are attempting to obtain narcotics and other prohibited substances unlawfully order. Additionally, the pharmacy indicates that it is engaged in professional pharmacy practice. The appeal of pharmacy is strong. We now can swiftly and effectively acquire or collect huge volumes of information linked to patient care, evaluate it, transfer it, and store it thanks to the availability of computers and the development of information technology.*

Keywords: Drug Management, AI, Patientcare

1. Introduction

The management of the database and the pharmaceutical store's administration is the project's main goal. This project examines how a drug management system was created and put into use. By compiling a database of the medications sold in the store, this is accomplished. The drug management system's (DMS) main goal is to boost accuracy while also enhancing the store's security and effectiveness. The creation of software for efficient retail administration is the aim of this project. We have software

designed to offer efficient policing through the distribution of statistics in pharmacies. This research already constructed the database, and it will be connected to the program, the relationships, and visual basic.

And also, this research paper aims to study the hypothesis of replacing health professionals with AI in drug management. There are several qualitative and quantitative factors to argue and compare between AI in drug management. The research will be clarified on some important matters on AI technology in drug management such as, what is AI in drug management? what is the purpose of AI? what are the main benefit of AI in drug management? what types of AI involve in drug management? and what are the challenges need to overcome to bring the AI technology? In this paper, outline the state of AI technologies, the potential of such technologies for transforming healthcare, the advance technologies in AI to resolve the problems faced by the healthcare sector, drug management and different structures necessary for healthcare sector.

In this study, six questions will be conducted for health professionals in government and private medical centers.

Objectives:

- Identifying how is artificial intelligence being used in drug management?
- Identifying how drug management system will impact the future of healthcare?
- Identifying the advantages of AI in drug management

A database can be updated using a drug management system, allowing you to keep track of the medications you have on hand. Many pharmacy-related services provided to the drug are managed by this drug management system. A management system called drug management system was created with the goal of improving a pharmacy shop's accuracy, safety, and efficacy. With this program, you can use a database of drugstores for the purpose of conducting the study.

2. Literature Review

a. Potential of Drug Management in Healthcare:

According to "Bhavesh Sharma and Harsh Dubela" the main objective of the project is to manage the administration of the pharmaceutical store and the primary purpose of the pharmacy management system is to increase the accuracy and improve the safety and efficiency of the pharmacy store. The goal of this project is to develop software for the

effective management of the store database (Sharma, Dubela and Bohra, 2021).

According to “A. Jesudoss and M. Jacob Daniel” in existing system there is no proper maintenance for medicine, only LED indication is possible in existing system. There is no sensor in medicine monitoring in existing system. In health monitoring there is availability of sensor, so I took the concept and applied in medicine monitoring. We propose a new medicine monitoring, surveillance security and SMS alert for medicine management system in the internet of things environment which is used for checking the authenticity of pharmaceutical products and intruders (Jesudoss, Jacob Daniel and Jerom Richard, 2019). Email notification will be appeared for drug management system which is used to check the trusty of drug products and confirm the delivery in my system. The use of the current pharmaceutical management system is essential. It involves information technology, as stated by important from demand to supply, as well as the importance of information about drugs itself both from the point of use and the side effect or consequences of use.

Medicine management is an approach based on evidence to prescribe and manage the patient’s medicines to ensure the safety, tolerability, and effectiveness of treatments. With good medicine management, patients experience more satisfactory, safer and suitable care. It helps practitioners to advise the drug for patients in the best way (Chen *et al.*, 2016). The main intention of medicine management is to enhance the efficiency of treatments and attain the best consequences for the individual patient. According to “Ernest” three components of the Medicine Management System (MMS), which are Electronic Health Record (EHR), E-prescription, and Clinical Decision Support System (CDSS) are widely used. Despite the importance of MMS, the adoption rate of information system in Malaysian hospitals are very low where only 15.2% of the hospitals are using the information system, and all those systems are not integrated and have different features (Ernest E *et al.*, 2016). Sell report that is used to confirm the sold drugs to particular receiver. And specially the expiry report confirms the date of expired of drugs, exclude selling of expired drugs to customers. So these reports are used in my system.

According to “K. M. Nasution and Mohd Noah” a pharmacy management system is, especially, to facilitate managing the supply of medicines needed by a hospital, which makes it easier to treat hospital patients in general. This system involves information technology and databases as a repository of information that is useful in managing the hospital, various tools needed to build a reliable system, and this paper discusses those interests’ compliance with data enhancements and manual drug supply activities being automated completes this brief review (Nasution *et al.*, 2020). GRN process is used in my

system that confirm the items have been received as expected, in accordance with the original order.

Drug management system is a management system that has been developed with the aim to increase the accuracy and improve the safety and effectiveness of a pharmacy-shop. With this program, you can make use of pharmaceutical stores in a database for the conduct of the study. According to “Kurniawan and Ikhsan” with the rapid development of computer communication technology in click or tap here to enter text. National health reform in China, hospitals have significantly changed their ways in dealing with medical information. Many hospitals introduced hospital information system (HIS) to store, dispose, and manage plenty of medical information by computers, and clinical pharmacy management system (CPMS) is the core part of HIS (Kurniawan and Ikhsan, 2018). Nowadays three components of the Medicine Management System (MMS), which are Electronic Health Record (EHR), e-prescription, and Clinical Decision Support System (CDSS) are widely used. According to “Rabbia Alamdar and Allan Mathews” medicine management is an approach based on evidence to prescribe and manage the patient’s medicines to ensure the safety, tolerability, and effectiveness of treatments (Alamdar *et al.*, 2019). The DMS system helps to manage every information about the patients like their personal data, comprehensive medical data, previous medical histories along with their diagnoses, treatments, investigations, and other medical decisions. Apart from that, DMS help in improving the safety, quality as well as one of the most affordable options available in the healthcare industry. According to “A. Jesudoss” the proposed system not only detects inappropriate drugs automatically but also allows users to input such information for any non-prescription medicines that the residents take. Every participant can fully track the residents’ latest medicine use online and in real time (Jesudoss, Jacob Daniel and Jerom Richard, 2019).

According to “V. Furdyk” consequently, reforming the healthcare system in Ukraine provides for the implementation of one of its principal directions – the formation of state personnel policy within the healthcare system. One of the essential components of the policy is the development of personnel policy of military medical service, which involves introducing mechanisms for updating the system of its staffing. In this regard, attention is paid to the military medicine management and training system 47 quality of administration in the system of military medicine, which is close to public administration in terms of its methodological basis since it is regulated by statutory acts and the system of orders (Furdyk, 2021). Medicine management system (MMS) came into the picture of hospital management as early as 1960 and have ever since been evolving and synchronizing with the technologies while modernizing healthcare facilities. In today’s world, the management of healthcare starts from the hands of the patients through their mobile phones and facilitates the needs of the patient. MMS was introduced to solve the

complications coming from managing all the paper works of every patient associated with the various departments of hospitalization with confidentiality. MMS provides the ability to manage all the paperwork in one place, reducing the work of staff in arranging and analyzing the paperwork of the patient

3. Methodology

This section of the research paper will go through and describe the various research methodologies that were employed, as well as how they were implemented and utilized in a way that helped us answer for our research question. Both qualitative and quantitative research has been conducted as we used both statistics and words to support our findings.

The method of acquiring and finding data to support our findings was to look for academic sources on websites such as Google Scholar and Research Gate, the information acquired was then analyzed to determine if it could be used to back up our conclusions or add value to our research paper. Both primary sources and secondary sources were used in this paper, the secondary sources were the academic research conducted about the topic and the primary source was a survey of 6 questions that surveyed 74 physicians in medical sector and the medical representative in the Sri Lanka, asking them questions about drug management being implemented in their field, as discussed earlier. The questions asked in the survey will be stated along with their answers in further detail in the analysis section. We included both short answer questions and rating questions in survey order to get both qualitative and quantitative research material.

4. Analysis

This research paper conducted a survey with a list of 5 questions sent to physician in medical sector and the medical representative to find out the impact that Drug Management System (DMS) has on the healthcare industry. first began by asking about, what is your profession in medical sector. This was important because this would give us an insight into whether there was a specific department in healthcare that was ahead when it came to adoption of Drug Management.

For the second question, the majority of the doctor and the medical reps do not have exposure to Artificial Intelligence at all in their workplace currently. To be precise, 39 participants answered in the negative whereas only 17 answered positively. This reasoning is well supported by the survey as most of the respondents that use DMS do not have direct contact with patients and are only used by doctors and medical reps. But the survey also indicates that there is a shift in acceptance of DMS since a few doctor and medical reps, who have a lot of interactions with patients, have also used DMS in their workplace. In the third question, most respondents agree that DMS can give faster and more

accurate responses in healthcare services, and this is unsurprising given how advanced today's computer systems are and how much faster their processing capability is when compared to 10 or even 5 years ago.

In the fourth question, most of the respondents, 81.1% to be precise, agree that DMS would help reduce workload of health professionals. This is because DMS would help take care of the paperwork while they can quickly move from one customer to another.

Question 5 is more specific for the group that is using DMS at work currently; however out of the total 74 correspondents, half of them claim to have a moderate impact on the workplace. Only 27% of the respondents in the survey are using AI in low level respondents from the total number of surveyed professionals.

These are the interpretations that we obtain by analyzing from the survey questions answered by various health professionals working in the healthcare industry in Sri Lanka. The following images are the results of the survey along with the question statements.



Figure 1: Percentage of professional's working with DMS

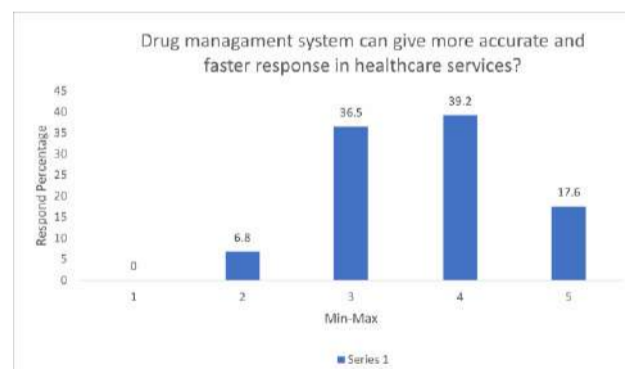


Figure 2: Percentage of response

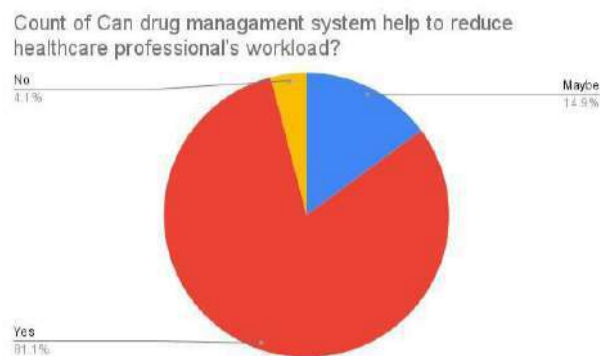


Figure 1: Help of DMS

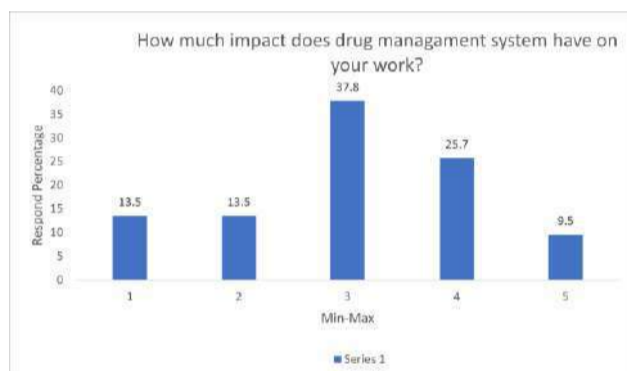


Figure 2: Percentage of impact

5. Discussion

As discussed in the previous section, among doctors have the highest exposure to DMS. This article further discusses the advances made in recent years in DMS in the medical field. Another article surveyed healthcare professionals including doctors and nurses on the advantages of AI, that included question statements like “AI can speed up the process in healthcare?” and “AI can help reduce the number of errors in DMS?”, majority of the respondents agreed with the statement (R Abdullah & B Fakieh, 2020).

The response to a question posed in our survey also produced a result, with approximately 70% of respondents in favor of the statement "DMS can provide more accurate and faster response". according to the same study, A moderate amount of people believe DMS will be able to replace them in their professions, which is in stark contrast to the results of our survey, which indicated that 52.7% of respondents did not believe DMS will be able to replace them at work.

From our finding that, 81.1% of the respondent professionals also believe it will reduce the healthcare workers workload. This is also a very positive step, particularly during a crisis like the Covid 19 outbreak, when

professionals are dealing with higher rates of work overload and burnout. According to the “Raju Vaishya” that DMS has reduced the workload of the healthcare professionals during this Covid 19 pandemic (Raju Vaishya, 2020).

This study also is in line with our finding that DMS will reduce the professional’s workload. It encourages more organization and businesses to work on projects to reduce the workload especially during this pandemic. At the same time, 14.9% of the responding health professional’s also do not believe that DMS reduced the workload of the healthcare professionals soon. Much previous research has shown that machines will not be able to replace a doctor’s or the other health professional’s interpersonal skills when handling the drugs. According to the “Jorg Goldhan” this is mainly attributable to the psychological and psychosocial angles involved in a physician patient relationship. AI base DMS will find it difficult to achieve such a level of social skills despite its long-term abilities of deep learning and machine learning skills (Jorg Goldhan, 2018).

Regardless of the fact, that DMS is still in its preliminary stages, some of its consequences include having a favorable impact on clinical scenarios in the healthcare industry. However, the results are not yet fully obvious, and the healthcare industry is only now beginning to feel the impact of DMS at work. Since the growing adoption of electronic medical record systems across many healthcare platforms, AI-based DMS software has been in the development stages. IBM Watson, Google, and other multinational software giants have been in the forefront of developing such platforms.

Despite the welcoming attitude, professionals in healthcare widely recognize the fact that DMS is not flexible enough to suit the needs and demands of every patient which they encounter in daily practice. This should be taken with more importance due to the bias in our research due to the increased correspondence from doctors and medical reps combined and effectively using DMS their workplace. Hence this bias emphasizes this point of research.

6. Limitations

There are a few limitations to this study that should be noted. One limitation is that our sample size 74 people is small, making it difficult to assess statistical significance in replies and differences between them, particularly amongst occupations. The sample size was kept small to encourage people to take the survey and prevent muddying the results. Second, there is the issue of selection bias since some respondents may have simply been curious about DMS and thus responded positively their preconceived conceptions about DMS. Finally, rather than being from a specific specialty, our survey participants were from a variety of them. A few studies in the past have focused solely on

medical reps and doctor professionals because this field is the most advanced in DMS adoption.

7. Advantages

1. The online drug management software system is a terrific way to manage pharmacy operations as it does not make bills for expired products. This software alerts the staff at the counter about the expired medicines and helps the store owner to systematically purchase latest items.
2. The expiry dates of products get displayed when the billing is done for different batches of the same product. The right batch of the item is chosen based on the FIFO (First In, First Out) and LIFO (Last In, First Out) policy.
3. The store owner or pharmacist can maintain a separate register that has details of all the drugs stored in the store with the help of the pharmacy folder. This is an excellent feature as it keeps track of the composition of medicines and provides substitutes of the medicine that is not available for sale. This is a life-saving alternative in case of emergencies.
4. With the help of DMS, store owner and pharmacists can monitor the patient's treatment as per defined safety standards. Pharmacists can also access and review the sales history of drugs.
5. Customer relationship management module of the DMS software stores all details about the customer. The DMS software helps owners send emails and SMS alerts to customers about lucrative offers and promotional schemes. This wins a customer's trust and increases the owner's customer base.
6. The pharma distribution software has an interesting feature of automatically assigning orders to various distribution channels depending on the supply date of the items and the number of days needed to deliver the order to the customers.
7. Pharmacies interact with several customers every day. The data they collect is stored within the drug management system. Also, the data can be used later for enhancing the business strategy.
8. The software should know how to deal with data to keep information about related items. Adding and storing the details is a huge task and requires automated assistance and not human assistance.

Also, at the end of the month, there is a need to calculate the revenue generated.

9. The admin can maintain a separate folder that includes the details of medicines and drugs stored with the help of the drug information folder. It is a notable feature that keeps you updated about the composition of medicine and substitutes.
10. Particularly for people who are uncomfortable speaking with doctors and pharmacists in person, this approach offers significant convenience. Additionally, ordering drugs is possible without any restrictions on particular matters like sexuality or adolescence that can be embarrassing.

8. Conclusion

In this research paper researcher reached some conclusions and findings. Healthcare DMS in Sri Lanka primarily spread in the specialization of pharmacy.

According to results of the survey:

- 52.7% professionals in the Sri Lanka are not using DMS in their workplace.
- 75% of professionals in the Sri Lanka believe that DMS in the healthcare industry gives a faster and more accurate response in services.
- 81.1% professionals in the Sri Lanka think that DMS would help in reducing the workload on doctors and medical reps.
- Out of the total 74 correspondents, half of them admit that DMS would impact their work.

Researchers can attest to the fact that drug managements well-received by Sri Lankan health practitioners. It's importance and assistance in the healthcare industry has convinced health experts; yet it cannot replace their valuable presence and responsibilities. In other words, doctors, medical reps and other health profession can use DMS to assist them rather than replace them during drug identifying, inspections, and management.

DMS is employed in a variety of medical fields, including maintaining healthcare records and data and drug development, among others. It can also assist physicians in accurately analyzing and treating patients. even when DMS is used effectively, it has some disadvantages, such as cost savings due to increasing machine development, and it also influences human interference, which poses a huge challenge in the workplace.

Every invention will have both advantages and disadvantages, but we must evaluate the good aspects to further the world's progress. DMS has a major impact on the healthcare industry's growth. In order to give more accurate

clinical decisions and enhanced drug management efficiency, DMS requires a huge amount of healthcare data to train and learn from. Drug management techniques of many types are used to evaluate structured and unstructured data from healthcare data warehouses. These procedures enable a customer to receive a more accurate and efficient management, and the faster and more accurate the services.

References

Alamdar, R. *et al.* (2019) "Integrated medicine management system for Malaysian healthcare sector," *International Journal of Research in Pharmaceutical Sciences*, 10(4), pp. 3346–3355. Available at: <https://doi.org/10.26452/ijrps.v10i4.1644>.

Bao, L. *et al.* (no date) *A Novel Clinical Pharmacy Management System in Improving the Rational Drug Use in Department of General Surgery*, *Indian Journal of Pharmaceutical Sciences*. Available at: www.ijpsonline.com.

Chen, L.B. *et al.* (2016) "A comprehensive medicine management system with multiple sources in a nursing home in Taiwan," *IEICE Transactions on Information and Systems*, E99D(6), pp. 1447–1454. Available at: <https://doi.org/10.1587/transinf.2015CBP0006>.

Cushing, A. (2007) *Optimizing medicines management: From compliance to concordance Educational effectiveness of gynaecological teaching associates: A multi-centre randomised controlled trial View project*. Available at: <https://www.researchgate.net/publication/5335337>.

Dheyaa Khudhur, S. (2018b) "Hospital Pharmacy Management System," *Iraqi Journal for Computers and Informatics*, 44(2). Available at: <https://doi.org/10.25195/2017/4425>.

Ernest E, O. *et al.* (2016) "Online Pharmaceutical Management System," *European Scientific Journal, ESJ*, 12(12), p. 139. Available at: <https://doi.org/10.19044/esj.2016.v12n12p139>.

Furdyk, V. (2021) "Military medicine management and training system for medical military managers in Ukraine," *Reality of Politics*, 16(2), pp. 38–49. Available at: <https://doi.org/10.15804/rop2021203>.

Hogan-Murphy, D. (2016) *Bridging the gap-implementation of a successful medicines management system in Cavan General Hospital Antibiotics stewardship View project eHealth implementation View project*. Available at: <https://www.researchgate.net/publication/301754312>.

Iqbal, M.J., Geer, M.I. and Dar, P.A. (2016) "Medicines management in hospitals: A supply chain perspective," *Systematic Reviews in Pharmacy*, pp. 80–85. Available at: <https://doi.org/10.5530/srp.2017.1.14>.

Jesudoss, A., Jacob Daniel, M. and Jerom Richard, J. (2019) "Intelligent Medicine Management System and Surveillance in IoT Environment," in *IOP Conference Series: Materials Science and Engineering*. Institute of Physics Publishing. Available at: <https://doi.org/10.1088/1757-899X/590/1/012005>.

Joseph Herman, M., Sasanti Handayani, R. and Yuniar, Y. (2009) *DRUG MANAGEMENT REVIEWS IN DISTRICT DRUG MANAGEMENT UNIT AND GENERAL HOSPITAL*.

Kurniawan, B. and Ikhsan, M. (2018) "Building IT-based Pharmacy: Computerized Pharmacy Management," in *IOP Conference Series: Materials Science and Engineering*. Institute of Physics Publishing. Available at: <https://doi.org/10.1088/1757899X/407/1/012020>.

"Medicine_management_apparatus_and_medicine_managem" (no date).

Nasution, M.K.M. *et al.* (2020) *Overview of The Pharmacy Management System in a Hospital*, *Systematic Reviews in Pharmacy*.

Rathnayake, W.D.W.T. (2018) *Pharmacy Management System for The Central Pharmacy-Pokunuwita A dissertation submitted for the Degree of Master of Information Technology*. Sharma, B., Dubela, H. and Bohra, A. (2021) "Pharmacy Management System," *International Journal of Electrical, Electronics and Computers*, 6(3), pp. 47–50. Available at: <https://doi.org/10.22161/eec.63.7>.

Somani, S. *et al.* (no date) *Informatics for Medicines Management Systems in Resource-Limited Settings*. Available at: <https://www.researchgate.net/publication/251863685>.

Acknowledgment

As the current finding is based on the collective contribution of the previous works, the authors express their gratitude to all the authors who are indicated in the reference section.

Author Biography

L Rifky Mohamed
Department of information technology, Faculty of Computing, General Sir John Kotelawala Defence University, Rathmanala, Sri Lanka.
36-it-0024@kdu.ac.lk



Ms. D Gunasekera
Lecturer (Probationary) Department of information technology, Faculty of Computing, General Sir John Kotelawala Defence University, Rathmanala, Sri Lanka.
dgunasekara@kdu.ac.lk



Dr. (Mrs.) N Wedasinghe
Senior Lecturer Grade II
Department of information
technology, Faculty of
Computing,
General Sir John Kotelawala
Defence University, Rathmanala,
Sri Lanka. nirosha@kdu.ac.lk

