



## SCHEME FOR DEVELOPING, IMPLEMENTING AND EVALUATING MOBILE APPLICATION FOR DRUG AND POISON RELATED INFORMATION

Fareesa Kauser<sup>1\*</sup>, Wasi Ahmed<sup>1</sup> Atif Zama<sup>1</sup>, Ayesha Arif<sup>1</sup>

St Paul's College of Pharmacy, Turkayamjal, Ranga Reddy District, Telangana.

\*Corresponding author E-mail: [parisadiq36@gmail.com](mailto:parisadiq36@gmail.com)

### ARTICLE INFO

### ABSTRACT

#### Key words:

Poison Information Centre, Drug Information Centre, m-health applications

**Background:** m-Health applications address many emerging issues in provision of health delivery. One such hurdle is the traditional way of organizing the Drug and Poison Information Centre. This can be addressed by m-Health applications that uses evidence-based algorithms to collect, integrate, store and distribute relevant information with a single touch on screen.

**Objectives:** The main aim of this study is to review all currently available literature on smart phone applications to enhance their use through available data regarding drug and poison information. Through this study, our goal is to provide a rigorous overview of the strategies that can be used for future development of m-Health applications specifically as drug and poison information.

**Conclusion:** This review concludes the study of a variety of papers specifically oriented towards strategies that can be applied for the development, implementation and evaluation of apps related to drug and poison information.

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### INTRODUCTION

**Mobile-Health Applications (m-Health apps):** The World Health Organization defines m-Health as “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices”.<sup>(1)</sup> m-Health is a component of e-Health and is stated as the biggest technology breakthrough of our times in clinical practice.<sup>(2)</sup> These m-Health apps are easily accessible and readily downloadable applications into smart phones using a stable internet connection. m-Health apps are widely used for many purposes by patients who are the most exposed group of end-users for activities such as daily monitoring of vital signs, reminders and notifications (Tele-Medicine), scheduling appointments, Doctor-patient communication, symptom checker, access to medical records, Prescription tracking, e-prescriptions, Patient community and Health education.

**Drug and Poison Information Centre:** Drug Information Centre (DIC) is an institutional organization dedicated to provide up-to-date, objective and scientific information on specific medication practices, improving patient outcomes, and ensures a point of reference for aspiring pharmacists regarding medicines and pharmaceuticals.<sup>(3)</sup> Whereas Poison Information Centre (PIC) is the epicentre for all the available data on poisons and their antidotes with the sole concern of toxicological information, advice and timely management of poisoning and prevention.<sup>(4)</sup> Services like collecting reviewing, evaluating, indexing and distributing any information regarding drug and poisons are performed by registered pharmacists and drug poison specialists respectively.<sup>(5,6)</sup> These services can be fulfilled with an app using Evidence-based algorithms that collects, indexes, integrates, stores and distributes all the required information.

After complete research of articles, we have understood that no former study has been undertaken to refer drugs and poison information centres as mobile applications' exclusively. Our goal is to suffice this existing gap, assist in emergence of these apps and form a basis for future prospective studies.

### **Necessities for Drug and Poison Information Centre applications**

- The workload and manual work of the Pharmacists/Health Care Professionals can be decreased simultaneously by reducing the time utilized.
- The apps will offer rapid information anytime, anywhere to the HCPs, pharmacists, nurses, patients, students and general public.
- Accurate responses of queries from general public, can be easily provided by the HCPs.
- The HCPs will be better updated on the current affairs and provisions related to Drug and Poison Information.
- Offline availability of guidelines related to drug, poison and their management can be easily accessible.
- Easy access to all the relevant data regarding drugs and poisons.
- Academic use with precise and accurate information reaching the end-users.

### **METHODOLOGY**

A thorough analysis was done on previously published research papers using the Boolean search strategy on various platforms including Google, PubMed, Medline, Google Scholar and Mendeley from May to June 2022.

Further a multi-centre, retrospective approach was done to provide a rapid scoping review of published research, and the criteria included content of the reviews, selecting period ranging from 1/1/ 2010 to 31/12/2022. After a complete search, we gathered research papers and selected articles that would eventually be utilized in our study. We have cited them by reading the complete article and included titles,

abstracts, and related information. The selection process finally brought forth a total of 8 articles.

### **RESULTS**

Our aim was to identify various papers which specifically oriented towards strategies that can be applied for developing, implementing and evaluating apps for drug and poison information. We have categorized the papers accordingly understanding the diversity of different articles.

### **DISCUSSION**

Upon reviewing, the articles we understood the need to develop and implement apps that serve as mobile-based databases providing drug and poison information services. m-Health apps are used for many purposes in medical field from simple drug reminder to highly complex Clinical Decision Support Systems (CDDS). Why not use them to gather, store and synthesize drug and poison information which saves time, provides rapid distribution of accurate information, handles storage insufficiency and most importantly, that acts as single database? A systematic and comprehensive study conducted by Raja D et al., with the main of classifying overall m-Health apps and additionally examining the availability of Drug and Poison Information Centre apps, concluded that there are currently no apps available for providing drug and poison information services

### **Strategies involved to develop an App for Drug and Poison Information Services**

**Following Guidelines:** A guide to developing m-Health apps was submitted from a developer's point of view by Ioannis A et al., (2016) through performing a literature survey.<sup>(7)</sup> Four pillars for developing these guidelines were prepared as a building tool. These tools are a road map for developer's seeking to develop new apps in this category, which can aid in developing apps for provision of drug and poison information services. They areas outlined in the Table 1.

**Adopting Use case classification model:**

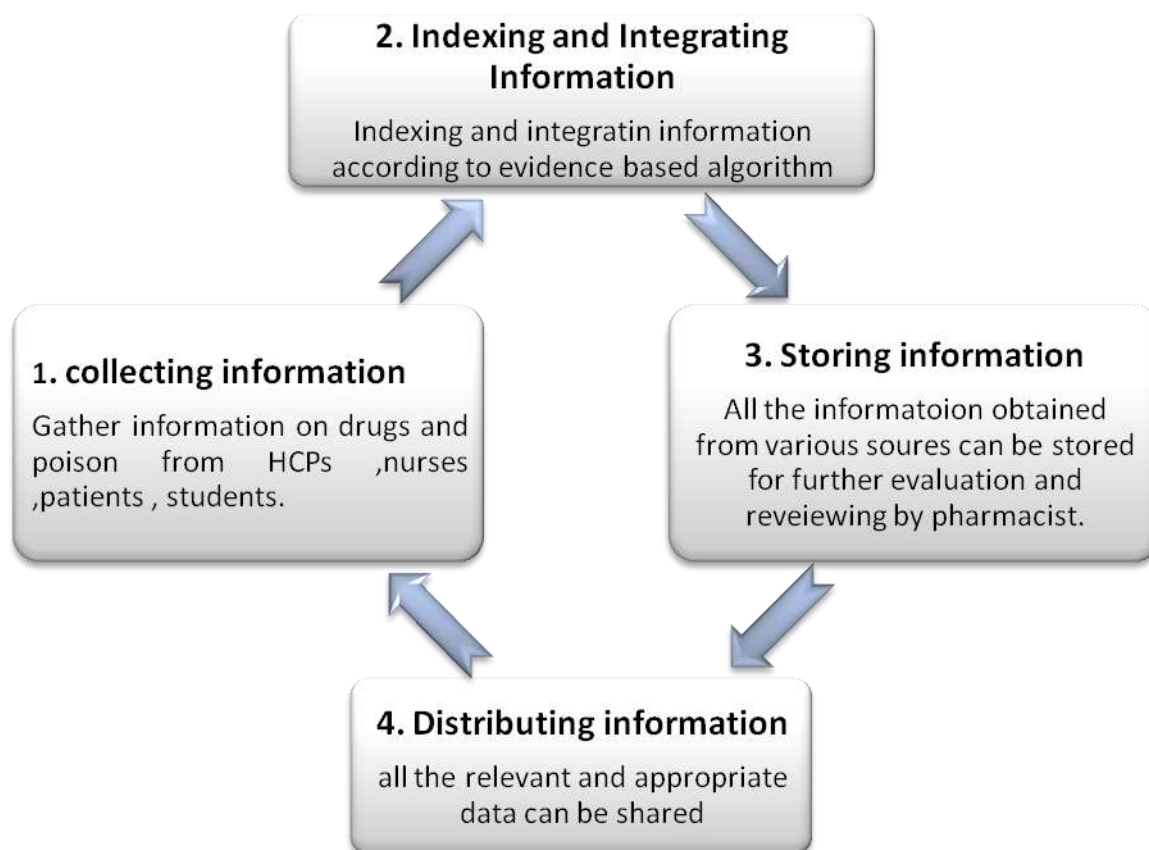
Classifying apps in m-Health category is very important to pave the way for developers in the direction where progress and digitization is needed. Yasini et al., (2015) proposed a UML model for classifying apps from two main platforms iOS and Android<sup>(8)</sup>, they presented 31 different use cases of m-Health apps and further Sadrieh et al.,<sup>(9)</sup> evaluated the use of this UML model in managing drug poisoning cases which concluded that 22 use cases of the 31 introduced were not considered in the development of the apps and additionally they quantified that the application of the use cases can help users select a reliable app for management of drug and poisoning. A use case model adopted in the app store like the, above can increase the visibility of apps this promotes and enforces adoption of these apps into the health care system. Furthermore, a systemic universal categorization of m-Health apps can favour both implementation and evaluation of drug and poison service apps.

**Strategies for evaluating Apps:** According to a report as of October, 2021 there are over 350,000 m-Health apps available in major app stores. App availability has doubled since 2015, with approximately 3.87 million people in the US using a health or fitness app each month, accounting for 30% of adult smart phone owners. While encouraging the use and implementation of these apps, the quality and security of these apps should as well be maintained through a gradual validation process and quality checks. This can only be achieved with an assessment tool. Two of the reviewed assessment tools by Yasini and Loy et al., (2016)<sup>(10,11)</sup> provided dynamic evaluation criteria based on the use cases and characteristics of specific health apps. The relevant criteria are selected for each app according to their use cases. For example, the accuracy of calculations criterion is only used for apps that provide at least one calculation, which can lead to more accurate and efficient evaluation. Some of the most common assessment tools are mobile app rating scale

(MARS) measurement scale for perceived ease of use, and Psyberguide used for long term to quickly identify the relevant apps. Based on literature published, there can rarely be complete and perfect m-Health app assessment criteria, because the same criteria must apply to apps that are changing in development continuously. We need decisive, accurate and reliable criteria to assess the compliance of these apps to the existing regulation. Furthermore, the development of a new evaluation tool for m-health apps based on the development techniques provided in this study could be one of the prospects for the usefulness of this review.

**Strategies for implementing of Drug and Poison Information Services Apps:**

Through the implementation of the m-health apps for Drug and PoisonControl, customers can get hold of a case-specific, personalised advice for poison management. They can start by means of entering age, substance, route, quantity (exposure, dosing strength), presence or absence of signs (and if symptomatic, whether or not all signs and symptoms are predicted and no longer extreme), and time elapsed. Materials may be entered via attempting to find the substance name, checking the tablet imprint, or through texting or typing the product UPC (barcode). Every substance element is matched to an algorithm that defines referral thresholds in a number of methods. For ingestions, bites and stings, the thresholds should make use of age, weight, amount (or variety of bites), signs and symptoms and time elapsed after the exposure. Referral strategies for eye, pores and skin, inhalation and injection exposures can be based on a mixture of toxicity and severity predicted for the ingredient and path, and a symptom evaluation. Evidence-based algorithms can be set up with the aid of Drug and Poison experts and peer reviewed by using a crew of Pharmacists and Medical Toxicologists. Collaborating Poison and Drug facilities additionally play an essential role in continued algorithm refinement, both providing and approving adjustments.



#### **FUTURE PROSPECTIVE**

With an extended quantity of medicines being utilized in allopathy nowadays, drug and poison queries may also proliferate. Extensive variety in brands of medicine and aggressive promotional strategies usually encourage, pharmaceutical group ends in the easy availability of biased information to clinical practitioners and clients. Hence forth, it becomes very vital to offer precise and latest records regarding these drugs and poison to the HCPs and to patients to a certain degree, by means of making DIC and PIC services mobile apps especially applicable in the near future.

Studies have proven that with adherence to the DIC and PIC exceptional assurance protocol, purchaser satisfaction is advanced. The guarantee protocol for DIC and PIC need to be made stringent, so that it would result in high quality services and in the long run good patient outcomes and better quality of life patient. In addition, DIC and PIC can participate in research by supporting young researchers in the fields of Pharmacoepidemiology, Toxicovigilance,

Pharmacoeconomics and rational use of drug therapy. Around the clock DIC and PIC services may be planned nationwide for meeting the expanded need of the Indian health care sector, with overall low budget. However, access to information through smartphones and mobile apps might forge a shadow on traditional DIC and PIC services. Another concern of the debate about the use of medical apps is the confidentiality of patient data in relation to data protection. The ethical question that arises from the protection of patient data is worth considering.<sup>(6,12)</sup>

#### **CONCLUSION**

Through this study we have understood that there arepresently no apps for both drug and poison informationand the existing literature does lack information. Our article only expresses an idea of outline that could be the foundation for future prospective studies where our aim was to fill this gap by providing a complete review.

Regulation framework	Market	Designing and Technical issues	Society
The guidelines like Medical Devices Directives (MEDDEV) Guideline or the FDA Guideline, can be followed before the apps are introduced to the market. Taking these guidelines into account should be a must to ensure the quality and safety of these apps.	The demand and needs of target groups should be understood accordingly with persuading these target groups to not only download them but also to use them effectively. This can be accomplished by maintaining comprehensive, efficient language and maintaining the app's visibility, integrity, and usability.	An important aspect while developing new m-Health apps is the 'market interposition'. This term refers to the encouragement of society to permit self-treatment and unauthorized practice of medicine, because of the technological advancement <sup>(4)</sup> . But the apps currently present in the market do not value health improvement and better quality of life rather place superiority in apps that can gross more market shares. In the technical aspects of an app development, attention should be given to the synchronization across devices.	Ethical aspects should also be kept in mind while developing apps

**Table 1:** Represents the steps and guidelines involved in development of Drug and Poison Information Apps

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