

**“A Review article on Mobile Health Tools”**

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## REVIEW ON MOBILE HEALTH TOOLS

### Abstract :-

- In a world of constant technological advances, it is important that healthcare professionals make use of technology to support patients and provide health care to ensure an optimal quality of life. Mobile health (mHealth) uses mobile technologies to assist healthcare professionals in providing efficient and adequate patient care. Mobile applications play an important role in mHealth, as they allow users to access information quickly, at the touch of a finger. This report discusses how mHealth assists pharmacists in providing patients with the best care possible
- Through the use of mobile applications, pharmacists can stay up to date with disease state guidelines, maintain adequate pharmacy stock inventories, access drug information systems, review patient health information and use tools to calculate individual drug doses and to accurately convert between units of measurement. Mobile devices may also assist pharmacists by converting smart phones into point-of-care diagnostic tools, such as otoscopes or blood pressure monitors. Mobile applications can also help patients manage disease states, improving their medication adherence, and logging important health history. mHealth mobile applications have the ability to support pharmacy practice, as well as patients' lives.
- Although mHealth is constantly advancing in global health care, patient confidentiality risks, variable IT literacy and internet access requirements are barriers that stand between patients/healthcare providers and the ability to fully take advantage of mHealth technologies. The goal of mHealth in the field of pharmacy should be to support and assist individuals in providing safe, effective and efficient patient-centred care.

**Introduction:-**

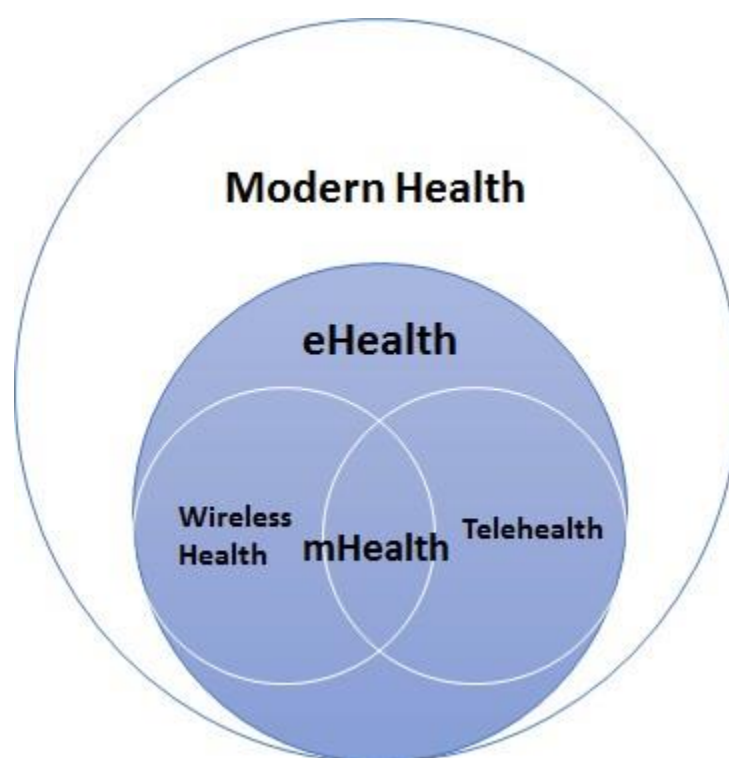
- Technology is rapidly evolving. The evolution of technology has benefited healthcare providers worldwide, including pharmacists and patients. With these ongoing advances, pharmacists can improve patient care through more efficient availability and communication of information.
- Many low- and middle- income countries are facing challenges to provide timely and effective health care due to economic limitations, geographic barriers, workforce shortages and governance issues.<sup>1</sup> One solution to these challenges is mobile health (mHealth). mHealth involves the application of mobile devices and other forms of wireless technology to provide health care. In developed countries, mHealth is providing a modified level of service, such as online treatments, wearables, monitoring of health status, and prescriptions.<sup>2</sup> However, with the rapid growth and innovation in mHealth, there is a large focus on the application of mHealth on a global scale, especially in developing countries.
- The resolution paves the way for the World Health Organization (WHO) to establish a global strategy on digital health that identifies priority areas, including where the WHO should focus its efforts, and engages countries to optimise their health systems in sync with the global digital health agenda.

A major goal of mHealth is to provide quality health education and pharmaceutical care to all patients to meet their healthcare needs.

- mHealth has a potential to support pharmacists in their key roles as defined by good pharmacy practice (GPP).<sup>3</sup>
- The uptake of mobile technology in pharmacy practice varies according to geographic conditions, practice settings, regulation and resource availability. Advancements in technology have played a major role in enabling healthcare professionals to develop and mould their clinical and pharmaceutical skills to provide safe and effective care.

### Mobile Health tools definition:-

The World Health Organization (WHO), in collaboration with the Global Observatory for eHealth, has defined mHealth as –medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices<sup>5</sup>. Furthermore, mHealth is considered to be a component of eHealth (Figure 1). eHealth is a broad, umbrella term referring to the –health services and information delivered or enhanced through the Internet and related technologies<sup>1</sup>.



eHealth and mHealth Relationship

## Types of Mobile Health Tools:-

- There are different types of mHealth technologies available worldwide. These technologies appear in different devices and across a large spectrum. Some mHealth devices are mobile applications pre-loaded with information available at the touch of a fingertip, while others require additional devices to be –clipped or –fitted onto the mobile phone itself to become a diagnostic tool. These tools have the capability to support healthcare providers and provide real-time results.
- For the purpose of this document, a selection of examples has been made based on criteria of being developed by pharmacy professional associations. Although there are many more examples of commercially available mHealth apps developed by industry and other stakeholders, those apps are not covered in this document. mHealth is a massive area. Examples of apps that are intended to be used by pharmacists to support their daily activities are explained in detail. There are many other mHealth apps for use by patients to facilitate them in their disease- and/or health-management; these will not be covered in this document.
- Currently, there are many mobile apps that aid healthcare providers. These range from reference apps, such as national formularies and literature databases, to more diagnostic or practical apps to support day-to-day practice, such as apps providing medical advice, or connecting to GPs. Reference apps are used by healthcare providers to provide quick, evidence-based medical information. These apps are updated regularly. Diagnostic apps allow healthcare providers to provide information to and gather data from their patients about their health, to formulate differential diagnoses, and to provide self-care solutions. Practical apps provide logistical support to healthcare providers. For example, Pro Delivery Manager provides pharmacies with the ability to track their deliveries and ensure their drivers are delivering medicines safely to their patients.
- Mobile devices also play a role within mHealth. These devices fit onto smartphones to convert them into a diagnostic tool. For example, a clip-on device converts a smartphone camera into an otoscope. Other devices include wireless blood pressure monitors and pulse oximeters. Mobile devices allow healthcare professionals to provide real-time results to their patients; for example, when the otoscope device is used, patients can view a photograph of their ear canal after the healthcare provider has examined them

## TYPES OF HEALTHCARE APPS



### APPS FOR CLINICAL USE AND ASSISTANCE IN DIAGNOSIS

These apps offer personal health record (PHR) access, including digital imaging (MRI/X-ray) viewing abilities, reviewing electronic charts and lab test results, or the possibility to check up on symptoms.



### APPLICATIONS FOR REMOTE MONITORING

Include lifescans for patients with diabetes, remote heart monitoring, ECG viewing, oxygen level remote checks, and telehealth services.



### REMINDER APPS

Used to help patients manage their prescriptions and/or appointments.



### APPLICATIONS FOR EASY MEDICAL REFERENCING

Include ICD-9/10 reference guides, evaluation and management (E&M) coding, and other specialized medical reference materials.



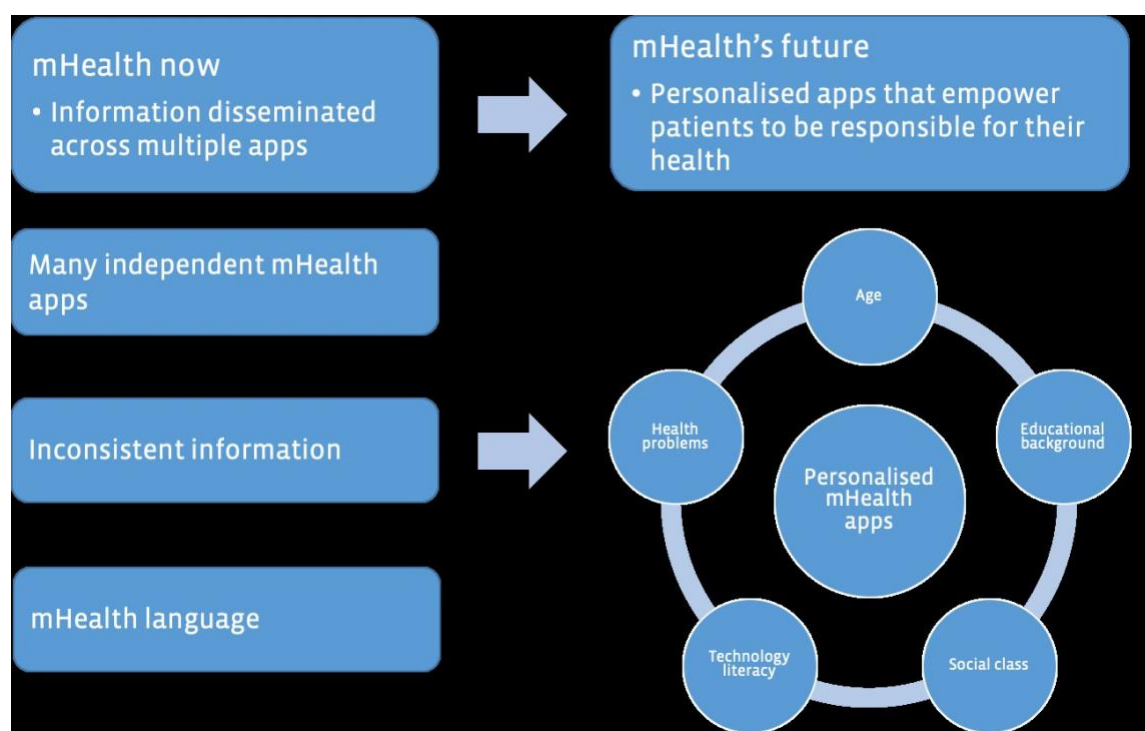
### APPS FOR MAINTAINING A HEALTHY LIFESTYLE

These include pregnancy and baby development applications, diet and exercise monitoring, healthy nutrition, and fitness tracking apps.

## Mobile Health apps: Today and in the future

mHealth is an evolving area. There are never-ending new developments within technology, therefore it is important to keep one up-to-date with the pace of the new technologies evolution. Figure depicts an overview of the types of mHealth used today in different areas of health care.

To start, measurement tools take a biological sample in real time. This leads into the diagnostic tools that allow for clinical decisions to be made. Once a diagnosis is made a treatment plan can be made using mHealth. Global mHealth tools use all of this information to provide healthcare in remote areas, information on health and prevention of diseases, and provide disease surveillance. Additionally, for every mHealth technology that is developed, each one must also be updated constantly. For example, recalibrations of devices and updates of information must be in accordance with current guidelines. Barriers and enablers of mHealth usage will be explored further later in this document.



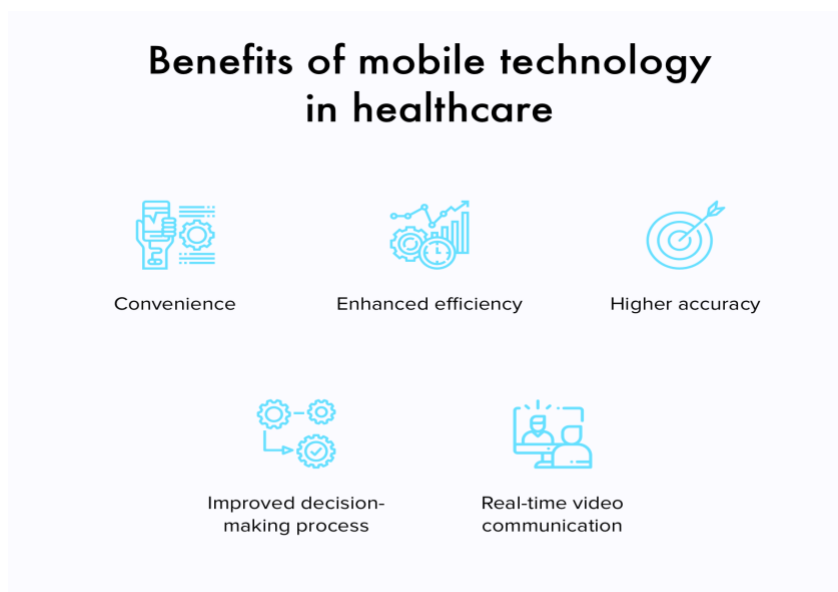


## Mobile Health and pharmacy practice :-

### 1. Benefits of mHealth:-

As mHealth is an expanding and evolving field, population growth coupled with advancement in technology has provided a gateway to enable patients and healthcare providers alike to gather support through mobile technology. For years, pharmacists have been incorporating new technologies and tools into their daily work to support their various roles in order to meet patients' needs and society's expectations. As patients are becoming more digitally dependent, the emerging technologies are enabling them to take a proactive role and make daily decisions about their health. Pharmacists should support their patients to make informed and educated decisions about their health in a safe manner. As healthcare providers with knowledge and expertise in health and medicines- related topics, pharmacists should also act as critical evaluators of different mHealth tools that are available to their patients.

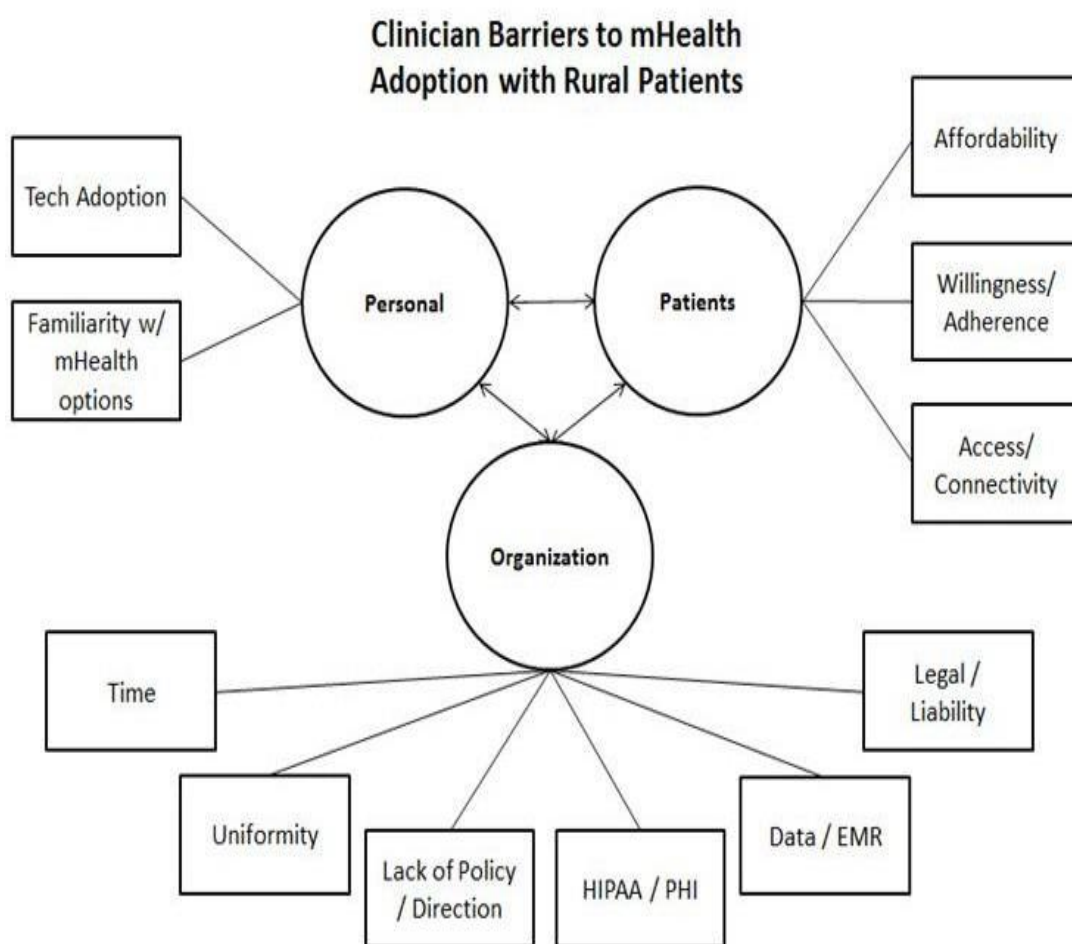
In pharmacy practice, pharmacists can use mHealth tools to provide high-quality services and patient care, with fitness for purpose and support available according to patients' specific needs in different parts of the world. Through its portability, mHealth enables pharmacists to access clinical patient information and clinical references more consistently and can provide more flexibility in their work. Incorporation of mHealth into standard practice of care supports more efficient, effective and safer pharmaceutical care to patients.



## 2. Barriers to mHealth :-

It is possible that mHealth may be misused or misinterpreted by patients. As patients become empowered to be more proactive in their health care, pharmacists are presented with a perfect opportunity to step in and ensure the appropriate use of mHealth, which includes preventive care, treatments and self-management.

Countries around the world confront similar health challenges in terms of ageing, chronic and degenerative diseases, communicable diseases and provider shortages, all of which could be mitigated by deployment of mobile health technologies. However, there seems to be a lack of means, ability and finances to support the expansion and sustainability of mHealth.



## Functions of mobile Health tools in pharmacy practice:-

Combining the role of pharmacists with mHealth platforms can improve patient experience, by allowing them to interact remotely with the pharmacist. Pharmacists are increasingly using mHealth apps at the point of care to improve patient care. Many of these apps are not designed to replace the functionality of desktop resources, but rather to complement them and allow access to information at the time it is required.

### ➤ *Apps developed for community pharmacy: Patient interface with pharmacy:-*

Community pharmacists can use mHealth platforms to improve the quality of pharmacy care they provide to their patients. Functionality is varied depending on the nature of the community pharmacy role and the services it provides.

#### • Medicines management apps:-

##### 1. *Online ordering of prescription items:*

Patients are able to order prescriptions through medicines management apps. In locations where electronic prescriptions are available, such apps can allow these prescriptions to be dispensed and supplied, often through distance supply (e.g., mail order).

In locations where paper prescriptions are required, consumers may leave prescriptions at the pharmacy for online ordering and refill. Some apps have the capacity for patients to send details of their paper prescription to the pharmacy, either through a photo of the prescription or a prescription barcode linked to a prescription exchange server. The paper prescription must then be presented at the pharmacy when the medicine is collected, or sent via mail.

##### 2. *Access to dispensing history (automatic medicines list):-*

Traditionally patients have not had readily available access to their dispensing records. Synchronisation of pharmacy dispensing records with patients via mobile apps provides them with the opportunity to view important information about dispensed medicines via mobile devices, e.g., date of dispensing, medicine dispensed and dose of medicine.

##### 3. *Reminders to take medicines*

Apps may provide reminders to patients to take medicines at prescribed times, often through

links to the medicine profile or reminders set up by the pharmacy. They may also include functionality for the patient to denote that the medicine has been taken. This can

provide a useful record of medicines use for consideration by pharmacists and prescribers.

#### 4. *Medicines information*

In addition to dispensing records, additional medicines information can be made available to consumers in the app, e.g., images of medicine (tablet image) and consumer medicines information (how to take the medicines, indications, possible adverse effects, product description etc.).

#### 5. *Quality use of medicines advice*

In addition to providing medicines information, mHealth can also include referral to consumer medicines information sources, such as medicines websites developed by government or non-government bodies.

#### 6. *Direct messaging*

Pharmacists can send messages to patients via a secure app, either as an individual direct message or via a mailing list to a larger group. This functionality can be used for a variety of purposes such as:

- Communicating medicines safety information (e.g., a drug recall);
- Marketing of pharmacy products or services;
- Responding to patients' queries or concerns;
- Providing quality use of medicines messages, such as advice regarding media stories involving medicines; and
- Communication of opening hours during holiday periods.

#### 7. *Online chat with pharmacists*

Mobile apps may provide functionality for consumers to communicate directly with pharmacists. Some apps have a –live chat function. Other mechanisms for provision of advice could include a –submit question function. Mobile apps often include contact details for pharmacies, such as phone numbers and email addresses.

#### 8. *Online commerce*

Online commerce via mobile platforms lets consumers interact at a location outside the pharmacy or at a time outside of its hours of operation for a variety of services, including:

- Ordering prescription medicines and other products for purchase from the pharmacy for delivery or postage;

- -Click and collect services (the purchase of medicines using an online platform for pick-up by the consumer at a nominated location, usually at a pharmacy); and
- Retail product ranges beyond what is available in the pharmacy.

Many apps, such as the CVS Pharmacy app, allow customers to access content in multiple languages. This increases the accessibility of the pharmacy services to more people.

### ➤ **Apps developed, used, recommended, and endorsed by professional pharmacy bodies**

#### *I. Pharmacy locator with geographical data*

Geographical data allows patients to locate nearby community pharmacies based on their location. The app also contains personalised reminders of appointments or information about medication, vaccination or health diaries. The app also shows pharmacies on duty at night or during weekends

Example: Austrian Chamber of Pharmacists' Apo-App Pharmacies and Medicines

#### *II. Recording patient consultations/care episodes*

The ability to directly input a record of patient care at the point care is provided supports higher quality clinical notes and reduces the likelihood of omissions.

Example: United States' Pharmacy Ambulatory Care Tracker

#### *III. Patient symptoms history resources*

Some apps allow patients to keep personal logs of disease-specific symptoms in order for physicians and pharmacists to help assess disease control or medication adherence.

Example: Allergy Diary app allows allergic rhinitis patients to daily track their symptoms along with disease specific medication adherence

#### *IV. Quality management systems*

mHealth extends to activities which support the safe and effective operation of community and hospital pharmacies. Functionality can include reporting of incidents, and monitoring of business and quality indicators.

Example: Sifarma Safety app integrates with the pharmacy software system to give the pharmacy manager better control of the performance and activity of the pharmacy. It includes a set of performance indicators, alarms and customisable events that allow the manager to monitor and react to business evolution, and to quickly detect any deviations from normalcy, as well as market variations.

➤ **Reference resources for pharmacists:-**

1. *Drug information*

Clinical reference texts and drug databases are increasingly available via mobile devices (e.g., smartphone, tablet computer, etc.). Many of these resources are also available on desktop computers and as printed reference texts. Functionality of the apps typically includes searches for drug indications, dosages, contraindications, interactions, adverse drug reactions, availability, etc.

Examples: Micromedex, Lexicomp, Medscape, MIMS, BNF

2. *Calculators*

Clinical calculators are intended to guide clinical decision-making, such as for drug dosing of drugs with a narrow therapeutic index (e.g. vancomycin or phenytoin dosing), or clinical indicators (such as creatinine clearance).

Examples: QxMD, Lexicomp, ClinCalc Medical Calculator

3. *Guidelines*

Guidelines provide evidence-based recommendations to pharmacists. These tools are used in a pharmacist's daily practice to provide the best patient care possible.

Examples: International Society for Peritoneal Dialysis guidelines, oncology guidelines available through the US National Comprehensive Cancer Network and Epocrates, Sanford Guide for the Antimicrobial Therapy, American College of Cardiology/American Heart Association for hypertension guidelines

4. *Literature databases*

Mobile devices can often link to academic databases, including health journals, where internet access is possible. This functionality, through web-browsers or apps, can provide pharmacists with access to resources.

Examples: *British Medical Journal*, *New England Journal of Medicine*, *The Lancet*, Pubmed, MEDline

5. *Continuing education and professional development activities*

Continuing education and professional development are a part of the duties of a practising pharmacist in order to stay up to date on the latest medical treatments and services. Mobile devices provide an accessible platform for pharmacists to perform these activities. Tools that support continuing education provide pharmacists with patient case studies, lessons on new treatment options, treatment reviews, and more.

Examples: Medscape Education, *BMJ Best Practice*, *Pharmacy Times*,

#### 6. *Diagnostic support tools/point-of-care diagnostics*

Some point-of-care diagnostic therapeutic devices are now designed to be used with mobile devices, such as those that measure respiratory function or blood glucose levels. Although these are primarily intended for consumer use in the management of chronic health conditions (such as diabetes), their connectivity and convenience mean they can be used by pharmacists in screening or monitoring services.

Examples: Dexcom Continuous Glucose Monitoring, Air Smart Spirometer, KardiaMobile

#### 7. *Medicines availability*

There are mobile tools which provide information to pharmacists about medicines availability, shortages and alternative treatments. Drug shortages affect daily practice and it is important for pharmacists to be able to access this information easily and quickly.

Examples: Drug Shortages, Orange Book, Food Safety Alerts & Tips, FDA Recalls, Market Withdrawals & Safety Alerts

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#### 9. *Patient information repository*

Some apps provide pharmacists with patient health information and patient prescription histories. Many institutions have their own specific app which contains patient medical records. These apps allow pharmacists to have access to the patient's medical information when computers are not available or convenient to use.

Examples: Epic Haiku, MySNS Wallet, Patient Portal, Care360 Mobile



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### ❖ **Pharmacists' roles and needs:-**

Many emerging technologies might impact the future of a pharmacist's work. As such, pharmacists will need to:

- Contribute to scaling up mHealth projects according to their capacity
- Ensure that the technology being developed and used has the necessary oversight of healthcare professionals; automation is beneficial, but needs proper control
- Promote the use of mobile technologies to their patients and position themselves as points of contact for patients with medication-related issues
- Keep up-to-date with emerging technologies and recognise their potential impact
- Cement their central role in managing non-communicable diseases, especially as existing technology becomes more widely used
- Recognise the needs of their patients and the role pharmacist-patient interaction plays in disease management; patients may feel reluctant to adopt new technologies and will require guidance from their pharmacists and other healthcare professionals.

## ❖ Examples of mobile Health apps around the world

### 1. Medscape

is a website providing access to medical information for clinicians; the organization also provides continuing education for physicians and health professionals. It references medical journal articles, Continuing Medical Education (CME), a version of the National Library of Medicine's MEDLINE database, medical news, and drug information (Medscape Drug Reference, or MDR). At one time Medscape published seven electronic peer reviewed journals.

<i>Type of site Health information</i>	
<b>Available in</b>	English, German, Spanish, French, Portuguese
<b>Owner</b>	WebMD
<b>URL</b>	Medscape.com
<b>Alexa rank</b>	▼ 2,817 (As of January 2020)
<b>Registration</b>	Required
<b>Launched</b>	May 22, 1995

### 2. Lexicomp

is a developer of clinical information solutions. The company's products include mobile apps, Lexicomp Online, reference handbooks, and desktop software.

<b>Type</b>	<b>Incorporated</b>
<b>Industry</b>	Healthcare
<b>Founded</b>	1978
<b>Headquarters</b>	Hudson, Ohio United States
<b>Key people</b>	Steven M. Kerscher (COO)
<b>Products</b>	Mobile apps Reference handbooks Online software
<b>Services</b>	Clinical Information, Advanced Technology
<b>Website</b>	www.lexi.com

### 3. A pill reminder

is any device that reminds users to take medications. Traditional pill reminders are pill containers with electric timers attached, which can be preset for certain times of the day to set off an alarm. More sophisticated pill reminders can also detect when they have been opened, and therefore when the user is away during the time they were supposed to

take their medication, they will be reminded of it when they return. This reminder can be in the form of a light, which also helps for deaf or hearing-impaired users.

A new take on the pill reminder is as a cellphone that uses the cellphone's alarm system to remind the owner to take the medication. These programs can keep track of missed doses as well. It is just not smartphones that do this; the Pantech\_Breeze was a flip phone offered by AT&T in the United States from 2009 to 2013, which supported this feature.

#### Other examples of mobile health tools:-

NAMES	INTRODUCTION
Epocrates / Epocrates Plus	Drug information application that allows review of drugs interactions, safety of brands, generics and OTC medicines as well as doses, Black Box Warnings, pharmacology and manufacturing.
<800> HazRx™	<800> HazRx™ is a mobile app developed by the USP Convention for healthcare workers who might be exposed to hazardous drugs in any healthcare setting. This app helps to identify if the drug being handled is hazardous, provides information on how to safely handle hazardous drugs in accordance with establish standards, and keeps users up-to-date on the list of over 1,000 hazardous drugs with monthly updates.
Pharmacy Ambulatory Care Tracker (PACT)	This app allows practitioners to quickly and easily log the full details of patient encounters and interventions, maintaining a dynamic, ongoing record of care. The app tracks pharmacists' patient encounters across 37 different disease states and then aggregates the data into a subscription-based dashboard. Pharmacy directors and administrators can use the PACT dashboard data to track staff performance and determine which interventions and treatments improve patient outcomes.
BNF & BNFC app	This app is using the British National Formulary (BNF) and BNF for child for healthcare professionals who prescribe and administer medicines. It allows offline access to up-to-date practical information on prescribing, dispensing and administering drugs.
babyl health	Babyl is a digital healthcare provider that combines the latest technology with the knowledge and experience of doctors to make health care simpler, better, more accessible and affordable for people everywhere. Services include booking appointments, prescriptions and medical records.

## ❖ Conclusions

The pace of uptake, development and utilisation of mHealth across the globe is and will continue to be varied. The implementation of access technologies will likely continue, but diagnostics and maintenance is only one part of health care — approaches to develop interventions or enact systematic change will still be necessary. As such, pharmacists have and will continue to have a pivotal role to play in this area of innovative health care.

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Thank you.....