

Smartphone Applications for Healthcare Professionals: A Systematic Review in Three Platforms

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Abstract

In the last few years there has been increased utilization of smartphone technology by general public as well as healthcare professionals. One of the key features for increasing usage of smartphones is the ability to use applications, commonly termed as Apps. The present study aims to find out the available healthcare apps in three platforms (Android, Windows, iOS) and classify them. In addition, we examine the availability of app for drug and poison information centre to provide drug and poison information services. We performed a broad search for healthcare apps in three main platforms (Android, Windows, iOS), during 29/June/2016 to 31/December/2016 considering predefined inclusion and exclusion criteria. The available healthcare apps were categorized, based on their fundamental function into six categories; Drug information, Disease information and management, Drug interactions, Prescription manager, Multifunctional apps, and apps for Drug and poison information centre. Comprehensive review that includes description, logo, platform, download size, rating and cost of 277 included apps from a total of 9178 identified healthcare apps was prepared. Further this systematic and comprehensive review process in main three platforms shows there is no app for drug and poison information centre to provide drug and poison information service.

Keywords: Smartphone apps • Healthcare apps • Android • Windows • ios • Drug and poison information centre • Classification of health care apps

Introduction

In the last few years there has been increased utilization of smartphone technology by general public as well as healthcare professional. Now smartphones have totally replaced the functionality of a pager, cell phone and a PDA (Personal Digital Assistance) [1]. In the early years of telephoning and computing, Nikola Tesla and Theodore Paraskevokoc in the year 1909 and 1971 came forward with a device that has the combination of both telephony and computing. The computer dealer's exhibition (COMDEX) in 1992 showcased IBM's prototype device named "ANGLER", first mobile phone with PDA features that allowed the user to make and receive telephone calls, facsimiles and emails. The prototype had many PDA features including a calendar, address book and notepad along with many interesting features such as maps, stocks news, etc. Bellsouth executives introduced "Simon personal communicator" in the market for public use in August 1994. Although the term "smartphone" was not coined until 1995, Simon's features and capabilities enables to refer it as a first smartphone [2]. Ericsson R380 by Ericsson mobile communication of the early 2000s was the first mobile device termed as "Smartphone" [3].

Smartphones and platforms

Smartphones are essentially cell phone with advanced technology

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and computing capability. US federal communications commission defines smartphones as mobile devices with cell phone capability having an HTML, browser that allows easy access to open internet; an operating system that provides a standardized interface and platform for application developers; a larger screen size than a traditional handset and touch screens/and or a QWERTY keypad.

Smartphones function on an operating system (OS) that is specially designed to support running third party applications. Six major smartphone OS platforms are Symbian OS, Palm OS, Windows, Blackberry, IOS and Android. In the span of few years, by providing detailed and accurate information the smartphones have explored to their limits [4].

Applications

One of the key features for increasing usage of smartphones is the ability to use applications, commonly termed as Apps. Apps pre-installed or downloadable are applications software that runs on smartphones or tablet devices, developed by third party who can be an individual developer or an organization [1,4].

Owing to half of the healthcare practitioners having smart phones use apps in their day to day practice, there are wide range of healthcare apps providing extensive information to support clinical decision-making and better patient care. Today, healthcare apps have better usage comparing any other source of information and benefitted healthcare professionals due to quicker access to information [1,4].

Drug and poison information centre

Drug and Poison Information Centres (DIC) are the places where registered pharmacists provide any drug related information to healthcare professionals and public for better patient care. The services include collecting, reviewing, evaluating, indexing and distributing information on drugs to health care workers; by accessing to clinical experiences, libraries, research facilities and educational materials.

The main function of Drug and Poison Information Centre is to provide written and/or verbal information or advice related to drugs or therapy to health care providers, organizations, committees, patients and to public in response to their query to help better patient care by all means. WHO supports independent drug and poison information centres as a core component of national programs to promote better healthcare to all [5,6].

The present study aims to find out the available healthcare apps in three platforms (Android, Windows, iOS) and classify them. In addition, we examine the availability of an app for drug and poison information centre to provide drug and poison information services.

Methodology

We performed a broad search for healthcare apps in three main platforms (Android, Windows, iOS), during 29/June/2016 to 31/December/2016.

Inclusion and exclusion criteria

Two steps selection process was adapted. First step involves the listing of all available apps from the three platforms followed by narrowing down the number of apps.

The apps available under category medical (iOS), health + fitness (Windows), medical (Android), were selected. From this list the apps of the following nature: Workouts, BP measurement, Calorie monitoring, fitness, yoga, ECG view, heart beat rate monitoring, heart sounds, surgical procedure, radiology assistant, vision test, cosmetics, pregnancy guide, dose calculator, IV infusion rate calculator, dental care, human anatomy atlas, hearing check, sleep analysis or aid, blood glucose monitoring, smoking cessation, stress measurement or management, clinical communication, pulse oximeter, body height and weight measurement (fat percentage, BMI, lean body mass), medical dictionary, diagnosis dictionary, medical lectures, blood group detector, acupressure tips, consult doctor, medical abbreviation, lab values, baby care, antimicrobial manual, language therapy, medical handbooks, menstrual calendar, journal club, nutrition checker, medical news, reproductive health, traditional/alternative medicine, apps for medical representatives, drug quiz, were excluded.

Apps were included if they contained information or tools concerned with drug safety, drug information, contraindication, mechanism of action, pharmacokinetic, disease information and management, drug interactions, apps for drug and poison information centre, therapeutic information and medication reminder. Among them apps in IOS with content rating less than 10+ and Android apps of total downloads less than 500 were excluded.

The available healthcare apps were categorized based on their fundamental function into six categories. The description, download size, rating, and cost of individual apps were collected from individual app description or associated webpage [7-9].

Results and Discussion

The flow diagram of the review process is shown in Figure 1. One hundred and twenty-four (44.77%) apps were available in Google Play store, whilst twenty-seven (9.74%) apps were available in Microsoft store (Windows Phone Apps), and one hundred and twenty-six (45.49%) apps were available in iOS (Apple Store). Healthcare apps available both in offline and online in various platforms are represented in Figure 2. The comprehensive review of these healthcare apps is

given in Table 1.

Categorization of health care application

Presently there is wide range of healthcare applications for different platforms of smartphones available to aid health care providers and patients, by providing accurate evidence-based medicine information, easy access, and clinical decision-making support at their palm to achieve better health care. To enable better understanding of the apps we categorized them in to Drug information, Disease information and management, Drug interactions, Prescription manager, Multifunctional apps, and apps for Drug and poison information centre. Figure 3 show the detail of the classifications.

Drug information apps: These includes eighty-two (29.6%) apps providing information by drug names search on dosing, contraindication or warnings, adverse effects, mechanism of action, pharmacokinetics, indication, lab test interferences, adverse drug reactions, precautions, patient care consideration, storage of drugs, clinical information and patient education. The advantage of these apps includes comprehensive and up-to-date drug information. Many apps have search features that allow the user to search for any drug by generic or brand name. Some of these apps provide medical substitutes.

Disease information and management Apps: One hundred and twenty-three (44.4%) apps providing in-depth and consultative information about diseases, signs and symptoms, risk factors, causes, complications, abnormalities in lab values, management according to recent guidelines, or evidence based medicine (EMB) were categorized as disease information and management apps.

These apps help the healthcare professionals to find reliable information for evidence-based medicine to maintain safe and effective drug therapy for patients. It allows clinicians to minimize errors in the

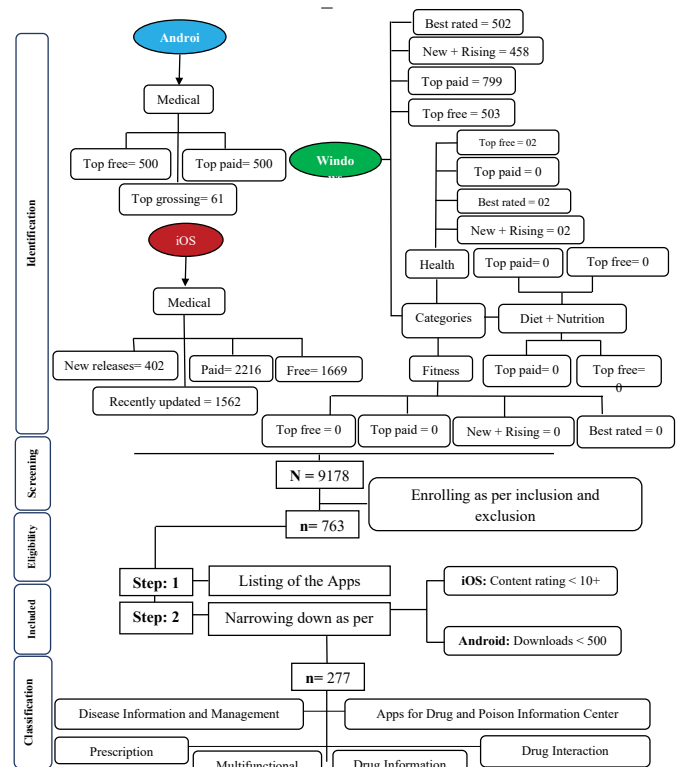


Figure 1. Flow process of the review of healthcare Apps.

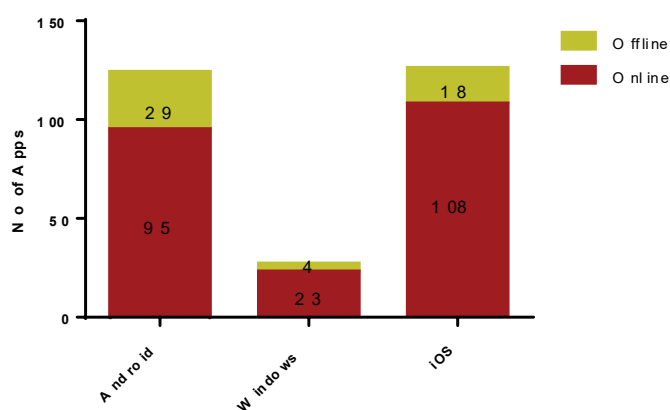


Figure 2. Healthcare Apps available in various platforms.

vulnerable patient population, and to provide preventive care to the patient which further helps to avoid complications.

Drug interactions apps: One of the most frequently useful situations of apps for healthcare professionals is detecting drug interactions. Six (2.16%) apps were identified to be directly useful in providing drug interactions among drugs, herbal supplements, food and even drug lab test values interferences. They also provide the mechanism, severity, onset, clinical management and monitoring parameters.

This kind of apps allows clinicians to check a patient's entire medication list for potentially harmful interactions and view severity ratings ranging from minor to major can eventually prevent or reduce greater number of clinically significant drug interactions.

Prescription manager: Forty-six (16.6%) apps provide prescription cost service, help consumer to locate store for medicine at lowest price, identify pill by colour, shape, and imprint.

These apps help patients mainly by medication management and believed to increase medication adherence and produce better outcomes.

Multifunctional apps: We classified the apps that has two or more overlapping functions as specified in methodology into this category. Seventeen (6.13%) of such apps provide a combinational health care services like drug information, disease information and management, drug interactions and prescription manager. The advantage these apps have, are the centralization of many important services in a single app, to enable mainly healthcare professionals and public for information gathering to aid in clinical decision-making and practice of evidence based medicine at the point of care (Tables 2-4).

Apps for Drug and Poison Information Centre: After a careful search, we couldn't find any apps for drug and poison information centre providing drug and poison information service meeting our inclusion and exclusion criteria.

Need of the Drug and Poison Information Services: [10-13] Promotion and provision of independent unbiased drug information and poison management options to improve patient care.

Fundamental activity of growth of clinical pharmacy education and practice

- Provide accurate and appropriate drug information for the patient specific queries.
- Drug information services provide healthcare practitioner with

timely, evidence-based drug information to promote safe and rationale use of medications.

- Drug information services assist in variety of other situations like: development of therapeutic guideline, antibiotic guidelines and formulary preparation.
- By providing drug information it is reported to prevent adverse drug events.
- In a world where over a million formulations are available in the market, practitioners have limited access to reference books or computer based databases resources easy access to reliable and independent information is fundamental for the rationale and effective use of drugs.

Advantages of smartphone app

Overall there are a wide number of health care applications for smartphones in different platforms that demonstrate comprehensive medical information leading to achieve appropriate clinical decisions and deliver healthcare services with better accuracy and confidence. Also, certain apps make patients comfortable with their treatment by improving their overall experience and health and become engaged participants in the process

Mobile devices and apps provide many benefits for healthcare professionals perhaps most significantly increased access to point of care that has been shown to support better clinical decision-making and improved patient outcomes [1]. The use of mobile devices by health care professionals has transformed many aspects of clinical practice [1]. Mobile devices have become common place in health care settings, leading to rapid growth in the development of healthcare apps for many OS platforms [1,4]. Numerous apps are now available to assist healthcare professionals with many important tasks such as, information and time management, health record maintenance and access, communications and consulting, reference and information gathering, patient management and monitoring, clinical decision-making, medical education and training [1]. Also, healthcare apps are routinely useful in two situations:

Updating knowledge: The smartphone healthcare apps are helpful for healthcare professionals to maintain up-to-date knowledge about the growing medical industry and provide information about the new drugs.

Emergency time: The smartphone healthcare apps provide flexible information anywhere at any time to healthcare professionals and patients [14].

Advantages of mobile apps















Benefit by reducing time: [1,15] The smartphone healthcare apps are helpful for healthcare professionals in reducing time spent in accessing information and it also fosters better communication that can result in success and potentially increased patient outcome. The research found that 86 percent of healthcare professionals believe that healthcare apps will increase their knowledge of patients' conditions. 96 percent of users think that healthcare apps help to improve patients' quality of life, and 72 percent of healthcare professionals believe that healthcare apps will encourage patients to take more responsibility for their health.

















Benefits in providing quality care: [16] Health care information access, affordability, and quality are problems all around the world. Mobile technology offers ways to help with these challenges. Through

Table 1. The comprehensive review of healthcare apps - 2016 status.

S.No	Healthcare Apps	Description	Logo	Platform	Download Size ^a	Rating ^b	Cost
1	1 mg-Save on Medicine/Lab Tests	1 mg provides drug information, health information, medicine substitutes, medicine ordering. Enable to book lab tests. Also empowers to compare the drugs by prices		Android	10 MB	4.2	Free
	Windows			2 MB	4.3	Free	
2	21 Children Health Issues That Every Parent Must Know	This app guides the user to prepare for situations like fever, flu, cold, allergies, migraine, motion sickness, etc		iOS	84.5 MB	12+	190 INR
3	Abbott Brand Info	This application provides the user with an easy access to complete prescribing information on all 300 + Abbott brands		Android	6.16 MB	4.5	Free
4	ACT for Meningitis	App meant to raise awareness and educate society about sign and symptoms of meningitis		iOS	11.9 MB	12+	Free
5	AIDS Directory	This app covers definitions, sign and symptoms of AIDS and related terms, causes, precaution to avoid disease. Works Offline		iOS	2.7 MB	12+	60 INR
6	AIDSinfo Drug Database	Access to information about drugs approved to treat HIV infection, drugs used to treat other infections or diseases common to people living with HIV. Also provides information on HIV/AIDS-related drugs that are being studied in clinical trials. Works offline		Android	3.7 MB	4.0	Free
7	Alzheimer's Disease Pocket Card	The app helps HCP and physicians for care of patient with Alzheimer disease at the point of care. It provides latest information on detection, diagnosis and management of Alzheimer disease		iOS	124 MB	12+	Free
8	Anesthesia Drug Box	This app contains information over 150 drugs that are commonly used in the field of anaesthesia		iOS	9.5 MB	12+	670 INR
9	Antibiotics pocket	Its contain antibiotic regimen of broad range of infection, information for treatment of multi drugs resistance organisms, drug administration including dose, cost, bioavailability, elimination and common side effects		iOS	47 MB	12+	300 INR
10	Antibiotic Therapy Free	Provides overview and treatment of common human infections		Android	0.96 MB	4.0	Free
11	Antibiotics and infection	App provides information regarding anti-bacterial agents and their use in bacterial infections. Information available are available forms, anti-bacterial spectra, indications & adverse effects, the first line antibiotics, alternatives available, and their dosages and durations		Android	3.8 MB	4.0	Free
	Antibiotics & Infections				3.8 MB	4.0	265.60 INR
12	Antimicrobial Companion	It contains primary care guidance on antimicrobial prescribing from public health England. A content management tool enables boards to customize this guidance to local needs if required. A decision aid for antimicrobial prescribing for urinary tract infections		iOS	68.5 MB	12+	Free
13	Arthritis Symptoms and Suggested Treatment	This app provides information for the symptoms and treatment of rheumatoid arthritis		iOS	66.8 MB	12+	190 INR




14	Assist UK – Drug Interactions Checker & Warnings	The app offers complete prescribing information for all medicines. Flagged alert on drug- drug interaction and warning. Work offline		iOS	43.7 MB	12+	Free
15	Asthma @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of asthma to improve patient outcome		iOS	13 MB	12+	Free
16	Bacterial Vaginosis Symptoms	App provides information on causes, symptoms and treatments of bacterial vaginosis		Android	2.4 MB	4.1	Free
17	Breast cancer @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of Breast cancer to improve patient outcome		iOS	15.9 MB	12+	Free
18	Canadian Drug pocket	Its provide residence physicians and other health care professionals with important pharmacological data		iOS	29.7 MB	12+	300 INR
19	Cancer 101 Treatment	Comprehensive overview on the symptoms and treatment of cancer		Android	6.10 MB	4.2	Free
20	Cancers! The Guide to Breast, Lung, Prostate Cancer Science, Therapy, Diagnosis, Treatment, Update & Glossary Handbook	Helps learning more about the cancer in different organs with their therapy		iOS	8.4 MB	12+	Free
21	Cardiology pocket	Overview of the current approaches to diagnosis and treatment of heart and cardiovascular diseases		iOS	59.6 MB	12+	620 INR
22	CareZone	Helps to keep a single list of medications, dosages, refill information and prescribing documents		Android	33.74 MB	4.4	Free
23	CheapestMedicine	Help for searching the generic drug with cheapest price		Android	1.6 MB	3.3	Free
24	Chicken Pox Remedies – Symptoms & Treatment	The app provides information on signs, symptoms and treatment of Chicken Pox		iOS	70.1 MB	12+	190 INR
25	Chemo Aid	This app assists patients who may be using the penguin cold caps technology to reduce hair loss from chemotherapy. It allows the user to set the date of each chemo treatment, and then it will schedule all the cold cap related events and prompt on the iOS device. This avoids using a conventional egg timer to time the 30+ events associated with each chemo treatment. Chemo aid helps to manage the medications associated with treatment. Each medication can be added, along with the associated schedule. Schedules can be general (as in daily, weekly, etc) or tied directly to the start of chemo treatment. All scheduled medications are added to the calendar, which generates an alert for each medication at the time and date when it is taken.		iOS	17.4 MB	12+	120 INR








26	Children's Health Pocket	The app provides medical information on common and rare diseases and medical conditions and immunizations for the children		iOS	137 MB	12+	190 INR
27	Chronic Diseases	Available is the information on Chronic diseases, their causes, symptoms, prevention, control and treatment		iOS	42.8 MB	12+	Free
28	CIMS India	Provides drug information, medical calculators, News & Continuing Medical Education		Android	8.9 MB	3.9	Free
29	Clinical Pharmacology	Clinical Pharmacology offers answers to all drug questions. Furthermore, to find the precise drug information allow search by drug name, indication, contraindication or adverse reaction. Evidence supported clinical algorithms to identify drug interactions or adverse reactions. Also help in identifying pills		Android	5.2 MB	3.9	Requires Individual or Institutional Subscription
30	Clinical Sense	Clinical Sense consists of a series of scenarios to test the clinical judgement of the user (Physician) In this app, the user assumes the role of a physician who has to navigate through plethora of tricky situations, each having multiple decisions with very different outcomes		Android	8.4 MB	4.5	Free
31	Clinicalkey	Helps rapid access of evidence based information in diagnosis and treatment		Android	4.08 MB	4.2	Requires Individual or Institutional Subscription
				iOS	13.1 MB	12+	
32	Clinicians Drug Reference 2011	App provides information on more than one thousand of the most commonly used medicines		Android	3.8 MB	3.8	Free
33	COPD @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of COPD to improve patient outcome		iOS	13.1 MB	12+	Free
34	DailyRounds Doctor's CME&Cases	Daily Rounds presents clinical cases that are curated by a team of Doctors		Android	9.9 MB	4.7	Free
35	Davis's Drug Guide 2015	Davis's Drug Guide delivers information on over 5,000 trade name and generic drugs. Each monograph, with its focus on safety, includes details on pharmacokinetics, dosing, side effects, interactions, assessment etc		Windows	2.85 MB	4.0	Free preview & subscription
36	Davis's Drug Guide	Davis's Drug Guide delivers information on over 5,000 trade name and generic drugs. Each monograph, with its focus on safety, includes details on pharmacokinetics, dosing, side effects, interactions, assessment etc		Android	4.73 MB	4.0	Free preview & subscription
37	Dermatology A-Z	It provides insights on diseases affecting skin, hair and nails, and the latest medical and cosmetic treatment		iOS	7.1 MB	12+	Free
38	Diabetes @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of diabetes to improve patient outcome		iOS	11.6 MB	12+	Free
39	Diabetes Clinical Care	It contains information on the diagnosis and management of diabetes mellitus and chronic kidney disease		iOS	40.6 MB	12+	Free













40	Diabetes Drugs Dictionary	Provides information on diabetes drugs		Android	1.13 MB	4.2	Free
41	Diabetes Mellitus Pocket	It includes treatment protocols for inpatient and outpatient diabetes management		iOS	30.6 MB	12+	620 INR
42	Diabetes Pilot Pro	It is an app for managing diabetes		iOS	12.9 MB	12+	Free for one week, Subscription
43	Diabetes Treatment	Provide information about diabetes treatment. Covers the symptoms and treatment of diabetes		Android	6.1 MB	4.7	Free
44	Diagnosis & Therapy: The Pro Symptom Checker & Tracker for Physical, Occupational, Speech ddx & Blood Test Guide FREE!	The app discusses the most important topics in medical diagnosis and therapy and is ideal for medical professionals, interns, medical students		iOS	8.8 MB	12+	Free
45	Dictionary Diseases&Disorders	Provides information on symptoms, disease and treatment. Works offline		Android	33.41 MB	4.5	Free
46	Digestive Disorders: Facts on Food Biology of Digestion & Nutrition System Anatomy Health Tips 1000!	The app discusses the most important topics in digestive disorders meant for medical professionals		iOS	8.6 MB	12+	Free
47	Digital Drug Index	It provides information regarding generic drugs based on structured index		Android	1.8 MB	4.2	Free
48	DIMS	Drug Information Management system is the mobile drug index app for instant clinical drug information references		Android	11 MB	4.6	Free
49	Diseases Dictionary Medical Diseases Dictionary Offline: FREE	Offers detailed description of major medical conditions and treatments. Works offline		Android	5.81 MB	4.6	Free
				iOS	16.4 MB	17+	Free
50	Disease Dictionary	It contains medical disorders and disease with definitions, symptoms, causes and treatment information. Works offline		Android	18 MB	4.1	Free
51	Disease Dictionary	Offers information on causes, diagnosis and treatment of various medical conditions. Works offline		Android	2.7 MB	4.6	Free
52	Disease hand book	This app contains detailed information on symptoms, causes and treatment for medical disorders and diseases. Works offline		iOS	17.6 MB	12+	Free
53	Diseases and Symptoms	App provides information on symptoms of major diseases along with their precautions.		Windows	1.39 MB	5.0	Free
54	Diseases Dictionary Free 2016	App provides definitions, signs & symptoms, diagnosis, causes, prognosis, prevention and treatment of medical conditions. Works offline		Windows	15.45 MB	4.2	Free
55	Disorder & Diseases Dictionary	Offline app provides information about symptoms, disorder and treatment		Android	31.93 MB	4.6	Free

56	Disorder & Diseases Dictionary	Offline app provides information about symptoms, disorder and treatment		Android	31.70 MB	4.5	Free
57	Doctor +	This app lists medicines for treatment of common diseases like cough, fever, insect bites, loose motions, sprain, headache etc. It also has a reminder system to remind take medicines		Windows	1.91 MB	4.2	Free
58	Don't Forget Remedy	Reminds taking pills just in time, through sending notification		iOS	15.8 MB	12+	60 INR
	Don't Forget Remedy Gold				7.6 MB	12+	620 INR
59	DoseOrganizer	Reminds taking pills just in time, through sending notification		iOS	18 MB	12+	60 INR
	DoseOrganizer Lite						Free
60	Dosecast - Medication Reminder	App reminds taking pills just in time, through sending notification along with medicines doses. Dose cast works offline		Android	Varies with device	4.3	Free
	Dosecast						
60				iOS	48.3 MB	12+	Free
61	DrBond - For Doctors	The app has index for access to drug updates, drug information and dosage information		Android	22 MB	4.3	Free
61	Drug A-Z	The app A-Z provides information on worldwide clinical drugs and marketed chemical and biologic drugs since 1995		iOS	12.3 MB	12+	Free
63	Drug Brands	Allow to lookup for drug information by brand name, company name or molecule name. Features includes price of the brand medicine and identify any pill by imprint, shape or color.		Android	3.19 MB	3.8	Free
64	Drug Counselling	Free and offline. Provides information on drug administration, counseling and guides for medication device use		Android	15 MB	4.3	Free
65	Drugs Dictionary 2016	It provides information about drugs: uses, dosage, how to take, side effects, precautions, drug interactions, missed dose and storage. Works offline		Android	7.8 MB	4.2	Free
66	Drug Formulary	Drug Formulary contains monographs of drugs and regimens used in systemic cancer treatment, and symptom management information used to care for cancer patients in Ontario. Patient information sheets are also available		Android	Varies with device	4.6	Free
67	Drug Guide	The app has search feature and bookmarking facility for drugs by name, brands and category. The app provides information such as drug name, synonyms, drug category, brands, price, description, indication, dosage, pharmacology, toxicity and drug interaction. Works offline		Android	8.2 MB	4.3	Free
68	Drugs in Emergency & ICU	A quick reference guide for drugs used in emergency and intensive care		Android	2.9 MB	4.0	336.55 INR












69	Drug Index & Guide	It provides medical information over 30,000+ brand names and 2000+ generic drugs. Useful in giving clinical information for physicians, medical students, nurses and other healthcare professionals. Offers interaction details, important patient monitoring instructions, patient teachings etc		Android	2.6 MB	4.0	Free
70	Drug INFO	Offline database application provides information like description of drug, interaction, mechanism of action etc		Android	4.5 MB	4.5	Free
71	Drug Info	This app provides drug details like manufacturer, dose, side effects etc.		Windows	3.64 MB	3.0	Free
72	Drug Information FlashCards	Drug Information Flash Cards have information on commonly prescribed drugs. The flashcards are grouped in chapters based on the drug class		Android	Varies with device	3.9	Free
73	Drug Reference Health Prof TR	App consists of drug monograph. Features are Easy-to-spot icons to identify special drug information including IV compatibilities/incompatibilities and high alert warnings		Android	3.8 MB	4.2	Free
74	DrugDoses	DrugDoses contains more than 2050 entries. It lists drugs commonly prescribed for both adults and children		Android	Varies with device.	4.3	1015.93 INR
75	Drugs Book	Drugs Book is mobile drug application with more than 2000 entries of drug data. Drugs information including name, synonym, group, ATC code, CAS number, description, indication, pharmacodynamics, mechanism of action, classification, categories, toxicity, experimental properties, absorption, half-life, dosage, drug interaction, food interaction, and references. This application can be used online or offline		Android	9.0 MB	4.4	Free
76	Drugs Classification Beta	App contains classification of more than 1000 drugs with their examples		Android	1.50 MB	3.8	Free
77	Drugs Dictionary	It provides information about drugs: uses, how to take, side effects, precautions, drug interactions, missed dose and storage		Android	5.6 MB	4.3	Free
78	Drugs dictionary – Best Drugs & Medical Dictionary	It provides information about the drugs: uses, dosage, how to use, side effects, precautions, drug interactions, missed dose and storage. Works offline		iOS	20.5 MB	12+	Free
79	Drugs Dictionary Offline	App provides drug information like mechanism of action, side effects, precautions and dosage information. It also gives the available brands in Indian market to compare and save up to 50% on prescription medicines. Works offline		Android	6.8 MB	4.4	Free
80	Drugs Dictionary Offline: FREE	It provides information about drugs: uses, dosage, how to take, side effects, precautions, drug interactions, missed dose and storage. Works offline		Android	2.4 MB	4.1	Free
				iOS	16.5 MB	12+	Free
				Windows	10.79 MB	4.3	Free
81	Drugs Handbook	Provides information about the drugs: uses, how to take, side effects, precautions, drug interactions, missed dose, storage, works offline		Windows	5.15 MB	3.9	1.49 USD














82	Drugs Medicine Dictionary	Provides information on drugs		Android	3.35 MB	4.0	Free
83	Drugs.com Medication Guide	The app provides Drug information, check interactions and set up medication record. Also, useful to identify pills and drug interaction		Android	11.15 MB	4.2	Free
84	DrugScape	Free drugs database and medical encyclopedia based on Medscape, BNF and Micromedex		Windows	21.01 MB	4.5	Free
85	DrugsMobi	App supports pill identification, provides side effects and dosage information		Windows	80.92 KB	4.0	Free
86	DynaMed Mobile	DynaMed is the evidence based clinical resource for point of care		Android	6.3 MB	3.7	Free
87	Eat Your Pills	App reminds taking pills just in time, through sending notification along with medicines doses		Windows	1.81 MB	0	Free trial version
88	Ebola Disease	This app gives detailed information about Ebola diseases (transmission, causes, treatment and prevention)		iOS	13.4 MB	12+	190 INR
89	ECG A – Z Pro	App for students and practitioners to strengthen their ECG reading capabilities: causes, symptom, pathology, diagnosis, treatment and clinical examples		iOS	7.1 MB	12+	620 INR
90	Ekgoli	App can show the cheaper substitute for prescribed drugs. Support to ordering by uploading the prescription for Allopathic medicines, Homeopathic pills, cancer and other specialty drugs. Service available in (INDIA) Delhi, Faridabad, Ghaziabad, Noida. Also help to book Lab Test		Windows	3.37 MB	0	Free
91	eMedic	App is the mobile field guides for first responders, EMTs, paramedics and other medical professionals. No subscription is required		iOS	7.4 MB	12+	620 INR
92	Emergency Medicine Stanford Review	Emergency medicine review provides the full spectrum of emergency medicine		iOS	56.2 MB	12+	Free
93	EMS Pediatric Guide	Reference in emergency medical care and provides critical information of pediatrics emergencies		iOS	25.2 MB	12+	250 INR
94	Encyclopedia of Medicine	It is a health reference product about a wide variety of health topics such as diseases, disorder, conditions, diets, treatment and diagnostic tests		iOS	558 MB	12+	300 INR
95	Encyclopedia of Senior Health	This app covers wide variety of topics: Diseases, condition and treatment Nutrition/diet concern, drugs and vitamins		iOS	140 MB	12+	250 INR
96	Encyclopedia of Cancer	This app contain collection of 450 entries, provide in-depth coverage of specific cancer types, diagnostic procedure, treatment, cancer side effect and cancer drugs		iOS	180 MB	12+	250 INR

97	Encyclopedia of Mental Health	The app provides information about mental health, disorders, drugs and treatment		iOS	68 MB	12+	300 INR
98	Endocrine Diseases: Facts on Endocrinology, Hormones and Fast Metabolism Dictionary!	The app discusses the important topics in endocrine diseases for medical professionals and others		iOS	8.5 MB	12+	Free
99	Epocrates Plus Epocrates Reference Tools for Healthcare Providers	<p>Key Features:</p> <ul style="list-style-type: none"> • Review drug prescribing and safety information for thousands of brand, generic and OTC drugs • Check for potentially harmful drug-drug interactions among up to 30 drugs at a time • Identify pills by imprint code and physical characteristics • Access timely medical news and research information • Find providers for consults and referrals in the Provider Directory • Select national and regional healthcare insurance formularies for drug coverage information • Perform many calculations, such as BMI and GFR <p>In addition, disease information, clinical practice guidelines, alternative medications, lab guides, coding and more content is available by upgrading to an Epocrates Plus subscription</p>		Android iOS	8.86 MB 75.3 MB	4.3 12+	Free Free
100	ERres- Emergency Medicine	ERres is a bedside tool containing the various medication lists, algorithms, decision rules, clinical policies and core content for emergency care providers.		Android	14.18 MB	4.3	634.24 INR
101	Express Scripts	The Express Scripts mobile app offers eligible members the ease and convenience of managing their prescriptions and pharmacy care anytime, anywhere. Key features: Offers home delivery for medications, refill and renew home delivery prescriptions, view medications and set reminders. Helps to find and compare medications price		Windows	702.21 KB - 1.36 MB	3.4	Requires membership
102	Find my Medicine	An app helpful for frequent travelers to find the equivalent name of the medicines in the 12 countries (except prescription drugs)		Android	4.10 MB	3.7	Free
103	Free Micromedex Drug Reference for Internet Subscribers	It provides clinical care professionals with on the go access to drug information. Works offline		iOS	5.6 MB	12+	Free of charge to subscribers of micromedex
104	Gastroenterology Pocket	The content cover latest diagnostic and management concepts in various topics in Gastroenterology and hematology		iOS	49.6 MB	12+	620 INR



105	Generic drugs encyclopedia	Encyclopedia of Generic Drugs provide following details about the generic drugs: Full generic information including therapeutic class, indications, adult doses, pediatric doses, doses in renal impairment, doses in hepatic impairment, contraindications, boxed warning, warnings/precautions, adverse reactions, overdose reactions, drug interactions, lab interactions, food interactions, mechanism of actions, metabolism, pharmacodynamics, assessment, monitoring, patient counselling, administration, same I/V compatible and I/V incompatible list, pregnancy category, lactation, storage conditions, ATC classification. Following details of various drug brands available in market are provided: brand name, constituents of brand with amount, manufacturer name and complete address including contact number and email id, type of preparation like tablet, syrup, cream etc. and price per unit		Android	165 KB	3.7	Free
106	GIPIOS	Glaucoma in perspective is an app guides on care on glaucoma		iOS	49.7 MB	12+	Free
107	Gynecologic Cancers @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of gynecologic cancers to improve patient outcome		iOS	20.0 MB	12+	Free
108	Heart conditions & Treatments	It provides resources for newly diagnosis and other heart related diseases (causes, symptoms and treatment)		iOS	14.8 MB	12+	120 INR
109	Hepatitis C @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of hepatitis to improve patient outcome		iOS	20.1 MB	12+	Free
110	HIV Health Tracker	App to remind to take medication, and record blood tests results for CD4 and viral load		Windows	645.35 KB - 1.07 MB	4.1	Free
111	Hypoparathyroidism @Point of Care	Provides a streamlined clinical decision support tool for clinicians to obtain content enabling better decisions, better outcomes and better care		iOS	12.6 MB	12+	Free
112	iChemo Deluxe	Contains chemotherapy monographs. A chemotherapy educational tool that even allows simulation		iOS	6.6 MB	12+	620 INR
113	iCancer Health: Cancer Care - Virtual Care at Home	It helps to manage chemo and oncolytics medication, track and report overall health symptoms and treatment plan		iOS	91.7 MB	12+	Free
114	Idiopathic Pulmonary Fibrosis @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of idiopathic pulmonary fibrosis to improve patient outcome		iOS	20.4 MB	12+	Free
115	iHealthy	Work even offline, contains medical information of 13000+ drugs, 1000+ supplements and herbals, 20000+ diseases and 34000+ symptoms		Windows	13.49 MB	4.1	Free
116	Immune Disorders: The Immune System and Facts on Immunology & Allergy	The app discusses important topics in immunology and is ideal for all medical professionals, medical residents, interns, nurses, medical students and others		iOS	8.4 MB	12+	Free

117	Immuno-Oncology @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of Cancer disease to improve patient outcome		iOS	22.3 MB	12+	Free
118	InfantRisk Center HCP	It gives health care providers information about prescription and non-prescription medications and their safety during pregnancy and breastfeeding. First year free subscription		Android	12.65 MB	2.7	330 INR
119	Injuries & Wounds: First Aid, CPR & Choking, Wound Care Terminology Central	The app discusses the most important topics in injuries and is ideal for all medical professionals, medical residents, interns, nurses, medical students and others		iOS	8.7 MB	12+	Free
120	iPharmacy Pill ID & Drug Info	App helps to find the lowest price for the prescription. Identify pill by color, shape and imprint, helps to understand & manage medication treatment, and reduce health bill		Android	5.56 MB	4.1	Free
121	IV Drug Compatibility	It provides health care professionals quick access in checking the compatibility of any two of most of the intravenous drugs at the y site		iOS	119 MB	12+	190 INR
122	Kidney Conditions & Treatment	Helps people with kidney disease with medical information		iOS	16 MB	12+	120 INR
123	Kidney Diseases Facts: Urology Health Eval Tips Tool, Simulations, Guide and Behavior with Renal & Dialysis Glossary Review!	The app discusses important topics in Kidney disease and is ideal for all medical professionals, medical residents, interns, nurses, medical students and others		iOS	9 MB	12+	Free
124	Lexicomp	Lexicomp includes drug monographs, interactions, patients leaflet, etc		Android	Varies with device	4.2	30 days free trial
125	Liixuos Drugs Dictionary	It provides information on drugs like indication, description, mechanism of action, pharmacodynamics, pharmacokinetics, absorption, clearance, metabolism, and volume of distribution, route of elimination, protein binding, half-life, toxicity, type and group of drugs.		Android	4.9 MB	4.5	Free
126	Liverpool HEP iChart	This app allows searching for potential drug - drug interaction between hepatitis drugs and other medications, as recommended by international treatment guidelines. Work offline		iOS	13.5 MB	12+	Free
127	Liverpool HIV iChart	This app allows searching for potential drug - drug interaction between HIV drugs and other medications, as recommended by international treatment guidelines. Work offline		iOS	15.6 MB	12+	Free
128	Major Depressive Disorder (MDD) @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of depressive disorder to improve patient outcome		iOS	19.6 MB	12+	Free
129	Manage My Pain Lite	Pain management app to record, track, analyze and share pain details		Android	Varies with devices	4.0	Free
	Manage My Pain Pro					4.3	220 INR
130	Mankind Medisurf	It is an application for doctors with the features like drug search, monographs, medical dictionary, pregnancy category, disease information, etc		Android	5.24 MB	4.5	Free













131	MASCC Antiemesis Tool (MAT)	MASCC Antiemesis is app for the cancer patient receiving chemotherapy that helps their doctors in evaluating if and how much the anticancer treatment is causing nausea and vomiting		iOS	19.7 MB	12+	Free
132	MD on Call	App designed primarily for junior residents, interns and medical students to manage some frequent on call situations and specific conditions		Android	7.13 MB	4.7	477 INR
133	Med Helper Pill Reminder	This app keeps track of the medications, doctors appointment and alarm when medicines are running or about to expire		Android	2.96 MB	4.3	Free
	Med Helper Pro Pill Reminder				2.64 MB	4.6	270.42 INR
134	MedReminder	Reminds taking pills just in time, through sending notification		Windows	1.05 MB	3.7	Free
135	Medica Reminders	Reminds taking pills just in time, through sending notification		Windows	4.97 MB	4.2	252 INR
136	Medical Dictionary Diseases	It has detailed information on 5000+ of diseases, 1000+ of common drugs and more than 30000+ medical terms from medical encyclopedia. Works offline		Android	4.8 MB	4.5	Free
137	Medical Dictionary- Diseases	Offline App provides medical diseases & disorders with detailed definitions, signs & symptoms, diagnosis, causes, prognosis, prevention and treatment.		Android	7.32 MB	4.3	Free
138	Medical Dictionary - Diseases	A free medical dictionary offline app on medical diseases and disorders with detailed definitions, signs and symptoms, diagnosis, causes, prognosis, prevention and treatment. Works offline		iOS	56.7 MB	12+	Free
139	Medical Disease Dictionary	Provide details of diagnosis, treatment, syndrome, signs and symptoms of diseases. Works offline		Android	22.66 MB	4.2	Free
140	Medical Drug Dictionary	App provides information on drugs: indications, dosage, how to take, side effects, precautions, drug interactions, missed dose and storage. Works offline		Android	8.25 MB	3.7	Free
141	Medical Drug Dictionary	App provides information on drugs: indications, dosage, how to take, side effects, precautions, drug interactions, missed dose and storage. Works offline		Android	15.48 MB	4.2	Free
142	Medical Drugs Guide Dictionary	Provide drug information like dosage, precautions, drug interaction and storage. Works offline		Android	1.88 MB	4.0	Free
143	Medicea by Medicea Technology	Medicea Technology Solutions offers India's largest medicine database with more than 400,000 medicines listed. Provide information on active pharmaceutical ingredients as well as the price in the market. Medicea keeps user informed about alerts on fake, substandard and miss labeled drugs on a real time basis		Android	4.4 MB	4.8	Free
	Medicea			Windows	2.81 MB	0	Free
144	Medicine Content	Offers 70000+ products details. Provide information on composition, side effects, and effects of ingestion during pregnancy and lactation. Allows drug search, multiple drug search substitute search and symptoms search		Android	2.13 MB	4.1	Free
145	Medicine Handbook	Provides information on drugs: uses, dosage, how to take, side effects, precautions, drug interaction, missed dose and storage. Works offline		Android	3.10 MB	3.7	Free















146	Medicine Help – Find Medicines	Helps to find out cost effective generic drug substitutes for brand drugs		Android	888 KB	3.2	Free
147	Medicine M.R.P-Health Free app	This application provides information on the medicines name and price		Android	1.0 MB	3.9	Free
148	Medicine Manager	Reminds taking pills just in time, through sending notification to user		Windows	1.59 MB - 2.93 MB	4.0	\$1.29
149	Medicine MRP in INDIA	Provides information on maximum retail price of medicines in India		Android	5.32 MB	4.3	Free
150	Medicine Pocketbook	It is a medical handbook app that provides all information about drugs used for medication: uses, dosages, how to take, side effect, precaution, drug interaction, best dose and storage. Works offline		iOS	11.5 MB	12+	Free
151	Medicine Reminder	App to remind taking pills just in time, through sending notification		Android	4.6 MB	3.8	Free
152	Medicine Reminder Free	Reminds taking pills just in time, through sending notification		Android	2.2 MB	3.3	Free
153	Medicine Tracker	Reminds taking pills just in time, through sending notification		Android	667 KB	3.6	Free
154	MedicineList+	This app is a Medication reminder system. Records and set medicine reminders for prescription, nonprescription and complimentary medicines. Allows adding medicine by barcode scanning, making note of emergency contact, medicare cards and medical insurance. Assists nurses, doctors and care givers to keep track of patients		Android	11.0 MB	4.2	Free
155	Medicine and Treatment	User can search the app by disease name and app shall auto sort the medicine for the searched disease		Windows	3.28 MB - 7.13 MB	3.8	0.99 USD
156	Medicines Compendium UK	The app features include 5000+ brand names and generic drugs listings. Provides indications, dosing, administration, side effect, and medicine interactions		Android	4.6 MB	4.5	379.21 INR
157	Medicopia - Drug Reference App	Medicopia is a mobile pharmacopeia application intended for use by healthcare professionals at the point of patient care. It serves as a reference tool allowing health care providers to access prescription information on medications approved for use in the Indian market. The information contained in the application includes generic as well as brand names of medicines, indication(s) for their use, dosing for specific illnesses, adverse drug reactions, contraindications for use and pharmacology of the drug		Android	4.84 MB	4.3	Free
158	MedMemo	Provide information about medicines, check drug-drug, drug - food interactions, dosage forms, prices and other brand names. App to remind taking pills just in time through sending notification.		iOS	10.5 MB	12+	Free

159	Medminder	App to reminder taking pills just in time through sending notification		Windows	4.1 MB	0	\$1.49
160	Medrills: Pediatric Medical Emergencies	App contains instructional animation to provide understanding the medical task of pediatric medical emergencies. Help to assess for fever, vomiting, dehydration, and a host of other ailments. Help to identify and treat common household poisons children often meet		iOS	59.9 MB	12+	250 INR
161	Meds Tracker Free	App to remind taking pills just in time, through sending notification		Windows	1.09 MB - 1.32 MB	3.5	Free
162	Medscape	Medscape provides clinical answers at the point of care. Key features include formulary information, Drug interaction checker, drug reference tool, medical calculators, information on 4400+ disease and conditions. In addition, Medscape consult allows physician to ask clinical questions, share interesting images and challenging cases. Works offline		Android	4.8 MB	4.4	Free
163	MedsDiary – Never miss a medicine!	App to remind taking pills just in time through sending notification. Works offline		iOS	43 MB	12+	60 INR
164	Mental Illness: Facts on Anxiety, Depression, Bipolar Disorder, ADHD, PTSD, OCD Test, Screening, Treatment and Self Help Management Free!	The app discusses important topics in depression, phobias, bipolar disorder, schizophrenia and many others, and is ideal for all medical professionals, medical residents, interns, nurses, medical students and others		iOS	8.6 MB	12+	Free
165	Free Micromedex Drug Reference	Provides concise medicine information on 4500+ drugs. Works offline		Android	9.9 MB	4.1	Free for micromedex customers
166	Free Micromedex Drug Interact	Drug interaction checker. Works offline		Android	12 MB	4.4	Free for micromedex customers
166	Micromedex Drug Interactions (outside US & Canada)			iOS	5.4 MB	12+	Free for micromedex customers
167	Micromedex IV Compatibility (outside US & Canada)	It enhances patient safety by pinpointing potentially dangerous combinations. Works offline		iOS	14.3 MB	12+	Free for micromedex customers
168	Micromedex NeoFax Essentials (outside US & Canada)	Evidence based drug information to efficiently and safely manage drug therapy to neonatal patients. Works offline		iOS	21.3 MB	12+	Free for micromedex customers
169	Micromedex Pediatrics (outside US & Canada)	It is reliable resource for on the go access to evidence based drug information to efficiently and safely manage drug therapy for pediatric patient. Works offline		iOS	21.5 MB	12+	Free for micromedex customers
170	Micropedia - Medical Microbiology	Provide concise review of pathogen's clinical presentation including mode of transmission, symptoms, lab and image findings relevant diagnostic testing treatment and additional pearls		iOS	6.5 MB	12+	Free
171	MIMS	Provides information on medicines licensed in the UK. MIMS offers a 30-day free trial, later a year subscription for £9.99		Android	7.69 MB	4.0	Free for 30 days trial

















172	Mobile REMM – Radiation Emergency Medical Management	It provides guidance for HCP primarily physician about clinical diagnosis and treatment of radiation injury during radiological and nuclear emergency. Works offline		iOS	9.1 MB	12+	Free
173	MPR	Information for over 4,300 prescription and OTC products. Works offline		Android	12.23 MB	4.3	Free
174	Multiple Myeloma @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of multiple myeloma to improve patient outcome		iOS	18.7 MB	12+	Free
175	Multiple Myeloma Resource Center	Its provide information about the myeloma: the diagnosis, symptoms and the treatment		iOS	11.8 MB	12+	Free
176	Multiple Sclerosis @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of multiple sclerosis to improve patient outcome		iOS	20.5 MB	12+	Free
177	Multiple Sclerosis Diagnosis & Management	Its contain information on the diagnosis, classification and management of multiple sclerosis		iOS	88.6 MB	12+	Free
178	My Breathefree	This app help patients with chronic breathing problems like Asthma, COPD in managing their condition better and leading a normal and active life. It helps to take medicine doses on time by timely dose reminders.		Android	3.82 MB	4.5	Free
179	My Injury	The app provides users with detailed information about identification of the most common injuries and treatment		iOS	94.7 MB	12+	420 INR
180	My Knee Injury	The app provides users with detailed information about identification of the most common knee injuries and treatment		iOS	91.7 MB	12+	120 INR
181	My Meds	Reminds taking pills just in time, through sending notification		Windows	10.84 MB	4.4	189 INR
182	My PillBox (Meds&Pill Reminder)	My pillbox (Meds & Pill reminder) is designed to help the user to track and remind the medications		Android	2.2 MB	4.2	Free
183	MyDawaai	App help to find the equivalent brands with prices and their generic names		Android	3.60 MB	3.9	Free
184	MyMeds	Medication management app: refill reminders, medication usage history, finds best price for the prescriptions, information about medication and their side effects		iOS	12.7 MB	12+	Free
185	Natural Apnea Remedies - Stop Sleep Disorder & Snoring	This app provides information on sleep apnea, signs and symptoms, diagnosis, treatments and life style changes		iOS	67.2 MB	12+	150 INR
186	Navia: Health Manager	Personal treatment manager. Track ones treatment, sets reminder for each medicine dose and for follow up		Android	8.80 MB	4.5	Free
187	NbN- Neuroscience based Nomenclature	App to enhance treatments and improve psychiatric health. Provides information on medicines: pharmacology, mode of action, interactions, efficacy, side effects etc		iOS	5.2 MB	12+	Free




188	neurology guide	The app is divided into various parts and contains the core neurological information required; latest advances in the diagnosis and management of neurological diseases are also covered		iOS	18.6 MB	12+	Free
189	New drugs	Provides brief description of drugs for medical, dental, nursing & all para-medics and students		Android	1.4 MB	4.1	Free
190	Non-Small Cell Lung Cancer@ Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of non-small cell lung cancer to improve patient outcome		iOS	20.6 MB	12+	Free
191	Nurse's Drug Handbook	Includes index of all generic, trade and alternate drug names, pregnancy risk category, controlled substance schedule, indications and dosages, incompatibilities and contraindication, adverse reactions, interactions, nursing consideration, warning and precautions		Android	32.98 MB	4.2	30 days free trial, 1556.45-1650.00 INR
192	Nursing Antineoplastic Drugs	Provides information on medicines: safety alerts, black box warnings, clinical alerts, FDA approved indications, evidence-based off-label uses for drugs, overdose signs and symptoms, adjust –a-dose information, interactions, contraindications and cautions, patient teaching guidelines		iOS	35.3 MB	12+	Free (29 drug entries) Purchase for access to all 278 drug entries
193	Nursing Care Plans - Free	Provides nursing care plans for various ailments		Android	8.60 MB	4.2	Free
194	Nursing Psychiatric Drugs	Provides information on medicines: safety alerts, black box warnings, clinical alerts, FDA approved indications, evidence-based off-label uses for drugs, overdose signs and symptoms, adjust –a-dose information, interactions, contraindications and cautions, patient teaching guidelines		iOS	35.5 MB	12+	Free (41 drug entries) Purchase for access to all 372 drug entries
195	Omnio	Drug guide, disease guide, calculators, newsfeed, interaction analyzer, pill identifier and dosing calculator		Android	20 MB	4.3	Free
196	OncAmigo	Oncamigo is an app to help oncology professionals including adult and pediatric oncologists, oncology nurses, fellows, residents, etc. This app has chemo regimens for both adult and pediatric malignancies. Provides information such as dosage, schedule, dose modification in renal and hepatic impairment, brand names, emetogenic potential updated every 3 months to include new treatment regimens		iOS	1.9 MB	12+	620 INR
197	OneRx-Drug Savings & Coupons	Helps saving upto 90% on prescription medications with or without insurance. OneRx allows entering insurance details to find copay. Also, can lower copay with coupons and discounts and find the cheapest pharmacy for the medication		Android	13 MB	4.2	Free

198	Ophthalmology pocket	<p>Features: Eye anatomy, Refraction errors and their management, Diagnosis and management of temporal arteritis, endophthalmitis, central vein occlusion, central artery occlusion, and retinal detachment, symptoms, diagnosis, and therapy of glaucoma, macular degeneration, keratoconjunctivitis sicca, and uveitis. Classification and therapy of diabetic retinopathy and diabetic macular edema Algorithms for the management of acute pupillary block and primary open angle glaucoma, images to test for color blindness and a visual acuity test chart</p>		iOS	30.4 MB	12+	370 INR
199	Pain Management pocketcards	Its provides guidelines on the assessment and management of pain		iOS	45.8MB	12+	300 INR
200	palmEM: Emergency Medicine	App provides comprehensive, evidence-based reference for physicians, dentists, pharmacists, nurse practitioners, and other health care practitioners		Android	13 MB	4.3	370.45 INR
201	palmPEDI: Pediatric Tape	Designed to provide information for medical professional, interns, nurses in an emergency or intensive care setting		Android	2.6 MB	4.5	65.94 INR
202	Paramedic meds	This medical app is a quick reference for nearly 100 most common drugs and drips used. Works offline		Android	375 KB	4.5	162.98 INR
203	Parkinson's Disease @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of parkinson's disease to improve patient outcome		iOS	20 MB	12+	Free
204	Pediatric pocket	The app includes diagnostic and treatment guidelines, management algorithm drug and administration table commonly used in pediatric medications		Android	21 MB	4.7	99 INR
				iOS	34.8 MB	12+	620 INR
205	Pediatrics App	Helps doctors to manage the paediatric patients better. Offers common paediatric conditions, paediatrics drugs and dosages		Android	6.05 MB	4.3	Free
206	Pharma Drug Dictionary	Pharma Drug Dictionary is a offline encyclopedia having all the information related to drug like uses, description, dosage, drug interaction, drug category, drug brand, etc. Works offline		Android	8.5 MB	3.8	Free
207	Pharmacology	Provides information on drugs: mechanism of action, side effects, interactions etc		Android	1.32 MB	4.0	Free
208	Pharmacology MBBS	Provides information on drugs: mechanism of action, side effects, interactions etc		Android	1.12 MB	4.1	Free
209	Pharmacopoeia	App provide information over 400 drugs for both students and physicians		Android	1.79MB	4.2	Free
210	PharmaGuide	Provides information on drugs		Android	9.86 MB	3.9	Free for cephalosporins. Complete data available through yearly subscription

211	Pharmapedia Pakistan	Offline access to information on generic drugs (dosages, indications etc), medicine brands in Pakistan with prices and available forms, alternate brands		Android	7.6 MB	4.7	Free
212	PharmEasy- 20% off Medicines!	PharmEasy delivers medicine to doorstep at a flat 20% discount and gives more than 40% discount on diagnostic tests. All orders with a valid prescription shall be delivered within 24 hours at no delivery cost. Delivery of medicines is available in the following cities: Mumbai, Delhi, Kolkatta, Pune, Bengaluru, Noida, Jaipur, Ahmedabad and Chennai. Diagnostic tests are available in Mumbai, Delhi and Kolkatta		Android	7.9 MB	4.2	Free
213	Pill	Reminds taking pills just in time, through sending notification		Windows	4.0 MB	0	1.49 USD
214	Pill Identifier and Drug List	Identify Brand and Generic drugs by name. This drug reference guide provides information like product NDC #, manufacturer, over-the-counter (OTC) or prescription, uses, warning, direction and ingredients of about 60,000+ drugs.		Android	4.9 MB	4.1	Free
				iOS	17.5 MB	12+	Free
215	Pill Reminder	Reminds taking pills just in time through sending notification		Android	210 KB	3.3	Free
216	Pill Time	Reminds taking pills just in time through sending notification		Windows	2.48 MB	0	0.99 USD
217	Pillzzz 2	App to remind taking pills just in time through sending notification		Windows	8.0 MB	4.0	Free
218	Pocket Doctor First Aid	Provide management of the most common diseases, injuries, damage in the home and on the road before the arrival of medical assistance		iOS	23.7 MB	12+	120 INR
219	Pocketmednotes	Detailed collection of information for doctors and medical students with over 1000 pages of easily accessible information on drugs, diseases and basic medicine		Android	1.2 MB	4.6	Free
220	PPD Drug Information	Contain drug information for over 3000 products. Users can search by brand, generic and even by company		Android	10.03 MB	4	Free
221	Prognosis: Emergency Medicine	Prognosis: Emergency Medicine allows testing decision-making skills in a risk-free environment while sharpening ones clinical knowledge by giving cases. All the cases and discussion are reviewed by 120+ physicians across 27 specialties		Android	5.4 MB	4.6	Free
				iOS	15.6 MB	12+	Free
222	Prognosis: Hematology	It brings the latest therapeutic guidelines regarding the management of hematological diseases and its associated complications		iOS	14.6 MB	12+	Free
223	Prognosis: Infectious diseases	It brings the latest therapeutic guidelines regarding the management of infectious diseases and its associated complications		iOS	14.5 MB	12+	Free
224	Prognosis: Neurology	It brings the latest therapeutic guidelines regarding the management of neurological diseases and its associated complications		iOS	14.9 MB	12+	Free
225	Prognosis: Respiratory	It brings the latest therapeutic guidelines regarding the management of respiratory system disorders and its associated complications		iOS	14.8 MB	12+	Free

226	Prognosis: Rheumatology	It brings the latest therapeutic guidelines regarding the management of rheumatology and its associated complications		iOS	14.6 MB	12+	Free
227	Prognosis: STDs	It brings the latest therapeutic guidelines regarding the management of STDs and its associated complications		iOS	14.8 MB	12+	Free
228	Prognosis: Diabetes	It is to bring the latest therapeutic guidelines regarding the management of diabetes mellitus and its associated complications		iOS	14.7 MB	12+	Free
229	Prostate Cancer @Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of prostate cancer to improve patient outcome		iOS	20.2 MB	12+	Free
230	Psoriasis/Psoriatic Arthritis @ Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of Psoriasis/Psoriatic Arthritis to improve patient outcome		iOS	19.7 MB	12+	Free
231	Psych Drugs & Medications: Prescription Psychiatric Medication Pocket Guide in Psychiatry	The app provides information about various psychotropic medications such as antidepressants, antipsychotics, mood stabilizers and anti-anxiety drugs		iOS	7.6 MB	12+	Free
232	Psychiatry Pocket	It includes treatment guideline, management algorithm and commonly used psychiatric medication		iOS	42.9 MB	12+	620 INR
233	Psychosomatic Consultation pocketcard	The app contains a checklist of items to be addressed during a psychosomatic consultation		iOS	29.4 MB	12+	300 INR
234	Quick Rx Plus	QuickRx is offline drug reference guide useful to general physicians, specialist, medical students, nurses and other healthcare professionals for clinical drug information of evidence based medicines. Works offline		Android	945 KB	4.1	Free
235	QuickEM	It provides differential diagnosis, history, physical exam, tests and treatments for over 50 of the most common complaints to emergency department		Android	15.84 MB	4.6	Free
236	QUICKmedicine	It is an encyclopedia of medicines that provides key facts guide to medical conditions and disease		Android	10 MB	4.0	79 INR
237	Quido-Rx Digitization	Remind taking pills just in time through alarm. Also keeps record of blood sugar and BP		Android	12.67 MB	4.6	Free
238	RapidRx – Smarter Healthcare	The product is a mobile prescription order entry system solely developed for use in India. By using this App doctors will be able to electronically prescribe drugs to patients and the patients will receive the prescription as a text message. The generics, brands, strengths, route and dosage details are built-in into the application		Android	2.6 MB	4.2	Free
239	refRx Drug Directory App	refRx is a drug reference tool to access prescribing information on nearly 1000 generics and over 15,000 brands in India, with a multi search capability across generic, brand, class and company		Android	11.70 MB	4.3	Free
240	Respiratory Tract Infection	App for students to learn basic thought process behind patient assessing with Group A <i>Streptococcal Pharyngitis</i> , Bacterial Rhinosinusitis, Acute Otitis Media (AOM)		iOS	1.5 MB	12+	Free

241	Rheumatoid Arthritis (RA) @ Point of Care	It provides specific evidence based medical content: topics and diagnosis, treatment and care management of Rheumatoid Arthritis to improve patient outcome		iOS	19.3 MB	12+	Free
242	RX Pal Family Pill Minder Free	Easy to use medicine, pill, medication reminder application to help multiple family members to take their medications, vitamins, or birth control pills on time, keep track of their prescriptions, and manage their medication. Full version of this app is available without Ads and with refill reminders		Android	215 KB	4.1	Free
243	Sanford Guide: Antimicrobial Rx	It provides clinicians the current, concise and reliable information of infectious diseases		Android	1.8 MB	4.2	29.99 USD/year
244	Signs & Symptoms Diabetic Macular Oedema	App helps the patient to self-manage Diabetic Macular Oedema using interactive tools. This app provides information regarding signs and symptoms and management of Diabetic Macular Oedema		iOS	16 MB	12+	Free
245	Signs & Symptoms Dyslipidaemias	This app provides information regarding signs and symptoms and help self-manage Dyslipidaemias		iOS	17.7 MB	12+	Free
246	Signs & Symptoms Migraine	This app provides information regarding signs and symptoms and help self-manage migraine		iOS	18 MB	12+	Free
247	Sign & Symptoms Anaemia	This app provides information regarding signs and symptoms and help self-manage anemia		iOS	15.2 MB	12+	Free
248	Sign & Symptoms Cholesterol	This app provides information regarding signs and symptoms and help self-manage cholesterol		iOS	18 MB	12+	Free
249	Skin Care, Diseases Dictionary & Treatment Offline	Overviews the symptoms and treatment of skin disease		iOS	13.3 MB	12+	Free
250	Spine Conditions & Treatment	This app provides details about spine diseases: causes, symptoms and treatment		iOS	24.9 MB	12+	120 INR
251	Stroke Prevention in Afib @ Point of Care	Its provides relevant, evidence based disease specific medical content: support discovery and practice change in stroke prevention in atrial fibrillation/venou thromboembolism		iOS	19.6 MB	12+	Free
252	Tarascon Pharmacopoeia	App provides drug information and multiple drug interaction details. Feature of this app is consist of unique Canadian trade names and drugs		Android	11.21 MB	4.3	Free for trial USD 39.99 for an year
253	Thyroid Disease – Helpful Guide	Provides information on diagnosis and treatment of thyroid disease		iOS	72.1 MB	12+	190 INR
254	Thyroid Symptoms Treatment	Provides information about thyroid treatment		Android	5.26 MB	3.9	Free
255	Top 800 Disease Condition	Includes information on 800 diseases in detail with search option		Android	2.05 MB	4.0	Free
256	TRC Pharmacology	TRC provides basic pharmacological knowledge: pharmacodynamics, pharmacokinetics and drug mechanisms in context of (patho)physiology		iOS	37.5 MB	12+	Free

257	Trial Drugs A2Z	Drug index, Medicine catalog, Formulation guide & quick drug reference with complete drug information, brand information for doctors, nurses, pharmacists, chemist, hospitals, critical care centers		Android	1.3 MB	4.1	Free
258	Up To Date	Find clinical answers including evidence-based recommendations at the point of care or anywhere - quickly and easily		Android Windows	2.5 MB 3.0 MB	4.5 3.4	Requires Individual or Institutional Subscription
259	Youwell - Health Organizer	App to remind taking pills just in time, through sending notification. Store result of regular measurements like BP, blood sugar level etc		iOS	33.6 MB	12+	Free

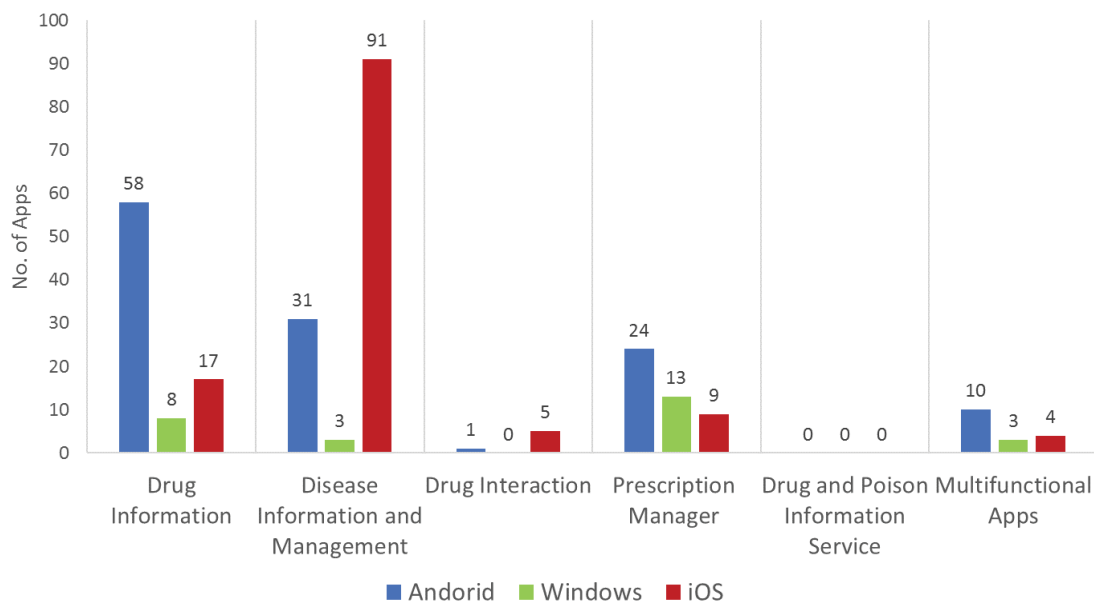


Figure 3. Healthcare apps – 2016 Status.

mobile health care applications, sensors, medical devices, and remote patient monitoring products, there are avenues through which health care delivery can be improved. These technologies can help lower costs by facilitating the delivery of care, and connecting people to their health care providers. Applications allow both providers and patients to have access to reference materials, lab tests, and medical records using mobile devices.

Benefits to healthcare professionals: [9,14,17,18] Ideally, healthcare professionals require access to many types of resources in a clinical setting, which can also be easier by using smartphone healthcare apps.

Communication capabilities like voice calling, video conferencing, text, and email.

Hospital information systems (like electronic health records (EHRs), electronic medical records (EMRs), clinical decision support systems (CDSSs), picture archiving and communication systems (PACSs), and laboratory information systems (LISs).

Informational resource like textbooks, guidelines, medical literature, drug references.

Clinical applications software like disease diagnosis aids, medical calculators.

Benefits to patients: [4,9,19,20] “Mobile apps for smartphones

are changing the way doctors and their patients approach medicine and health issues” said by Vincent De Robertis, Senior Vice President of Global Health Care at Research Now, patients with heart disease can send information about their heart rate straight to their doctors, accessories allow diabetics to monitor their blood glucose levels by sending the results straight to their smartphone, and nutritionists can see trends in patients caloric intake and exercise patterns. Apps are improving healthcare professional’s knowledge of their patients, while patients feel a lift in their quality of life.

Safety and quality

Medical apps are the most dynamic field in medicine system and are widely used as a quick reference by a majority of healthcare providers and patients. Their faster accessibility makes them a vital tool in gathering and analyzing an information resulting in better clinical practice, system consistency, and convenient communications [21]. Though, studies stated that more than 85% of healthcare professionals own a smartphone and among them nearly 50% utilize the medical apps in the point of patient care [1,22,23], unfortunately, there has been minimal illustration of the safety of medical apps [22]. Some numerous strategies are to be established to develop evidence-based medical apps while withholding their open nature [22]. As medical apps allow the user to feed the patient information along with medical tests results to automatically provide the management plans., therefore, providing the appropriate utilization of the information technology is exigency.

Table 2. Drug information and Drug interaction apps.

S. No	Drug Information Apps	Drug Interaction Apps
1	Abbott Brand Info	IV Drug Compatibility
2	AIDS info Drug Database	Free Micromedex Drug Interact
3	Anesthesia Drug Box	Liverpool HEP iChart
4	Assist UK – Drug Interactions Checker & Warnings	Liverpool HIV iChart
5	Canadian Drug pocket	Micromedex Drug Interactions (outside US & Canada)
6	Clinical Pharmacology	Micromedex IV Compatibility (outside US & Canada)
7	Clinicians Drug Reference 2011	
8	Davis's Drug Guide 2015	
9	Davis's Drug Guide	
10	Diabetes Drugs Dictionary	
11	Digital Drug Index	
12	DIMS	
13	DrBond - For Doctors	
14	Drug A-Z	
15	Drug Brands	
16	Drug Counselling	
17	Drug Formulary	
18	Drug Guide	
19	Drug Index & Guide	
20	Drug INFO	
21	Drug Info	
22	Drug Information Flash Cards	
23	Drug Reference Health Prof TR	
24	Drug Doses	
25	Drugs Book	
26	Drugs Classification Beta	
27	Drugs Dictionary	
28	Drugs dictionary – Best Drugs & Medical Dictionary	
29	Drugs Dictionary 2016	
30	Drugs Dictionary Offline	
31	Drugs Dictionary Offline: FREE	
32	Drugs Handbook	
33	Drugs in Emergency & ICU	
34	Drugs Medicine Dictionary	
35	Drug Scape	
36	Drugs Mobi	
37	Free Micromedex Drug Reference	
38	Free Micromedex Drug Reference for Internet Subscribers	
39	Generic drugs encyclopedia	
40	iChemo Deluxe	
41	iHealthy	
42	InfantRisk Center HCP	
43	Lexicomp	
44	Liixuos Drugs Dictionary	
45	Mankind Medisurf	
46	Medical Drug Dictionary	
47	Medical Drugs Guide Dictionary	
48	Medicea	
49	Medicea by Medicea Technology	
50	Medicine Content	
51	Medicine Handbook	
52	Medicine Pocketbook	
53	Medicines Compendium UK	
54	Medicopia - Drug Reference App	
55	Micromedex NeoFax Essentials (outside US & Canada)	

55	Micromedex Pediatrics (outside US & Canada)
56	MIMS
57	MPR
58	NbN- Neuroscience based Nomenclature new drugs
59	
60	Nurse's Drug Handbook
61	Nursing Antineoplastic Drugs
62	Nursing Psychiatric Drugs
63	Paramedic meds
64	Pharma Drug Dictionary
65	Pharmacology
66	Pharmacology MBBS
67	Pharmacopoeia
68	Pharma Guide
69	Pharmapedia Pakistan
70	Pill Identifier and Drug List
71	Pocketmed notes
72	PPD Drug Information
73	Psych Drugs & Medications: Prescription Psychiatric Medication Pocket Guide in Psychiatry
74	Quick Rx Plus
75	refRx Drug Directory App
76	Tarascon Pharmacopoeia
77	TRC Pharmacology
78	Trial Drugs A2Z

Colour Code indicates availability in platforms: Android, iOS, Windows, Andorid+iOS+Windows, Andorid +iOS

Table 3. Disease Information and Management & Prescription Manager Apps.

S.No	Disease Information and Management	Prescription Manager
1	21 Children Health Issues That Every Parent Must Know	CareZone
2	ACT for Meningitis	CheapestMedicine
3	AIDS Directory	Chemo Aid
4	Alzheimer's Disease Pocket Card	Don't Forget Remedy
5	Antibiotic Therapy Free	Don't Forget Remedy Gold
6	Antibiotics & Infections	Dosecast
7	Antibiotics and infection	Dosecast - Medication Reminder
8	Antimicrobial Companion	DoseOrganizer
9	Arthritis Symptoms And Suggested Treatment	DoseOrganizer Lite
10	Asthma @Point of Care	Eat Your Pills
11	Bacterial Vaginosis Symptoms	Ekgoli
12	Breast cancer @Point of Care	Express Scripts
13	Cancer 101 Treatment	Find my Medicine
14	Cancers! The Guide to Breast, Lung, Prostate Cancer Science, Therapy, Diagnosis, Treatment, Update & Glossary Handbook	HIV Health Tracker
15	Cardiology pocket	iPharmacy Pill ID & Drug Info
16	Chicken Pox Remedies – Symptoms & Treatment	Med Helper Pill Reminder
17	Children's Health Pocket	Med Helper Pro Pill Reminder
18	Chronic Diseases	Medica Reminders
19	Clinical Sense	Medicine Help – Find Medicines
20	COPD @Point of Care	Medicine M.R.P-Health Free app
21	DailyRounds Doctor's CME&Cases	Medicine Manager
22	Dermatology A-Z	Medicine MRP in INDIA
23	Diabetes @Point of Care	Medicine Reminder
24	Diabetes Clinical Care	Medicine Reminder Free
25	Diabetes Mellitus Pocket	Medicine Tracker
26	Diabetes Pilot Pro	MedicineList+

27	Diabetes Treatment	Medminder	72	Mental Illness: Facts on Anxiety, Depression, Bipolar Disorder, ADHD, PTSD, OCD Test, Screening, Treatment and Self Help Management Free!
28	Diagnosis & Therapy: The Pro Symptom Checker & Tracker for Physical, Occupational, Speech ddx & Blood Test Guide FREE!	MedReminder	73	Micropedia - Medical Microbiology
29	Dictionary Diseases&Disorders	Meds Tracker Free	74	Mobile REMM – Radiation Emergency Medical Management
30	Digestive Disorders: Facts on Food Biology of Digestion & Nutrition System Anatomy Health Tips 1000!	MedsDiary – Never miss a medicine!	75	Multiple Myeloma @Point of Care
31	Disease Dictionary	My Breathefree	76	Multiple Myeloma Resource Center
32	Disease hand book	My Meds	77	Multiple Sclerosis @Point of Care
33	Diseases And Symptoms	My PillBox (Meds&Pill Reminder)	78	Multiple Sclerosis Diagnosis & Management
34	Diseases Dictionary Free 2016	MyDawaai	79	My Injury
35	Diseases Dictionary Medical	MyMeds	80	My Knee Injury
36	Diseases Dictionary Offline: FREE	Navia: Health Manager	81	Natural Apnea Remedies - Stop Sleep Disorder & Snoring
37	Disorder & Diseases Dictionary	OneRx-Drug Savings & Coupons	82	neurology guide
38	Ebola Disease	PharmEasy- 20% off Medicines!	83	Non-Small Cell Lung Cancer@ Point of Care
39	ECG A – Z Pro	Pill	84	Nursing Care Plans - Free
40	eMedic	Pill Reminder	85	OncAmigo
41	Emergency Medicine Stanford Review	Pill Time	86	Ophthalmology pocket
42	EMS Pediatric Guide	Pillzzz 2	87	Pain Management pocketcards
43	Encyclopedia of Cancer	Quido-Rx Digitization	88	palmEM: Emergency Medicine
44	Encyclopedia of Medicine	RapidRx – Smarter Healthcare	89	palmPEDI: Pediatric Tape
45	Encyclopedia of Mental Health	RX Pal Family Pill Minder Free	90	Parkinson's Disease @Point of Care
46	Encyclopedia of Senior Health	Youwell - Health Organizer	91	Pediatric pocket
47	Endocrine Diseases: Facts on Endocrinology, Hormones and Fast Metabolism Dictionary!		92	Pediatrics App
48	ERres- Emergency Medicine		93	Pocket Doctor First Aid
49	Gastroenterology Pocket		94	Prognosis: Diabetes
50	GIPIOS		95	Prognosis: Emergency Medicine
51	Gynecologic Cancers @Point of Care		96	Prognosis: Hematology
52	Heart conditions & Treatments		97	Prognosis: Infectious diseases
53	Hepatitis C @Point of Care		98	Prognosis: Neurology
54	Hypoparathyroidism @Point of Care		99	Prognosis: Respiratory
55	iCancer Health: Cancer Care - Virtual Care at Home		100	Prognosis: Rheumatology
56	Idiopathic Pulmonary Fibrosis @Point of Care		101	Prognosis: STDs
57	Immune Disorders: The Immune System and Facts on Immunology & Allergy		102	Prostate Cancer @Point of Care
58	Immuno-Oncology @Point of Care		103	Psoriasis/Psoriatic Arthritis @Point of Care
59	Injuries & Wounds: First Aid, CPR & Choking, Wound Care Terminology Central		104	Psychiatry Pocket
60	Kidney Conditions & Treatment		105	Psychosomatic Consultation pocketcard
61	Kidney Diseases Facts: Urology Health Eval Tips Tool, Simulations, Guide and Behavior with Renal & Dialysis Glossary Review!		106	QuickEM
62	Major Depressive Disorder (MDD) @ Point of Care		107	QUICKmedicine
63	Manage My Pain Lite		108	Respiratory Tract Infection
64	Manage My Pain Pro		109	Rheumatoid Arthritis (RA) @Point of Care
65	MASCC Antiemesis Tool (MAT)		110	Sanford Guide: Antimicrobial Rx
66	MD on Call		111	Sign & Symptoms Anaemia
67	Medical Dictionary - Diseases		112	Sign & Symptoms Cholesterol
68	Medical Dictionary - Diseases		113	Signs & Symptoms Diabetic Macular Oedema
69	Medical Disease Dictionary		114	Signs & Symptoms Dyslipidaemias
70	Medicine and Treatment		115	Signs & Symptoms Migraine
71	Medrills: Pediatric Medical Emergencies		116	Skin Care, Diseases Dictionary & Treatment Offline
			117	Spine Conditions & Treatment
			118	Stroke Prevention in Afib @Point of Care
			119	Thyroid Disease – Helpful Guide
			120	Thyroid Symptoms Treatment
			121	Top 800 Disease Condition

Colour codes indicates availability in platforms: [Android](#), [iOS](#), [Windows](#), [Andorid +iOS](#)

Table 4. Multifunctional Apps.

S. No	Multi-Functional Apps
1	1 mg-Save on Medicine/Lab Tests
2	1mg
3	Antibiotics pocket
4	CIMS India
5	Clinicalkey
6	Doctor +
7	Drugs.com medication guide
8	DynaMed mobile
9	Epocrates plus
10	Epocrates reference tools for healthcare providers
11	Medical dictionary diseases
12	MedMemo
13	Medscape
14	Omnio
15	UpToDate

Colour codes indicates availability in platforms: **Android**, **iOS**, **Windows**, **Android+Windows**, **Android+iOS**

Fortunately, the previous studies have not been reported any danger to patients by medical apps [22]. Accordingly, the FDA took step-up and published a general guideline to regulate the quality and safety of a certain medical apps. The FDA described the apps to be under the concern such as, apps that regulate and control the medical devices and also apps that deliver the patient specific medical data device such as electrocardiographic. Moreover, apps that involve in generating diagnosis and treatment recommendation, additionally apps that provide medical measurements through using attachments or sensors [24]. Predominately, medical professional's involvement is mandatory in developing accurate evidence-based and reliable medical apps.

Currently better standards and validation practices regarding mobile apps need to be established to ensure the authenticity of information/function delivered by healthcare apps. By doing so a barrier can be created to the entry of mobile apps into the market, increasing the quality and safety of the apps use for the healthcare professionals.

Transformation

Kathleen Sebelius, Secretary of US health and human services in her keynote address at the 2011 annual Health summit in the Washington stated about health as the biggest technology breakthrough of this time, used to address the nation's greatest challenge [25]. There are numerous reasons for the high degree of exuberance for the concept of medical apps which include the high capital being spent on health care every year, rapid and substantial increase in the mobile phones and the need for delivering an evidence-based medicine and individualized patient care. Medical apps benefit the health care providers and the consumers in numerous ways such as disease diagnosis and management, drug information, patient education [25]. These provide enough evidence that mobile apps can transform the current medical system and be a remarkable service. Medical apps usage has its ability in analyzing, tracking of medical information and eliminating some numerous unwanted medical emergencies. A wide range of medical apps are developed for treating acute as well as chronic diseases. Hypertension, Diabetes mellitus and other chronic conditions which accounts for about 90% of health care spending can be appropriately treated and well monitored through medical apps which in turn reduce the rush at the emergency departments of hospitals [25,26]. Medical apps have transformed the system to a self-care and self-management platform to a patient, while the physician can deliver a needful service

to the patients who need critical care [26]. Additionally, clinicians can have reduced time demands and focus on another field of medicines which need more efforts and researches. Medical apps hence continue to revolutionize the current healthcare system.

Future trends

The rapid advancement in medical apps and their increased usage turns medical apps into an integral part of the daily health care practice in coming up future. It's growing accessibility and updated medical information delivery has dragged it to play a substantial role in clinical care system already. Moreover, its widespread usage give way to its bright future a head [4,14,27]. Recent studies showed that junior doctors (two years of their practice) have caused prescription errors that varied from almost 7-10%. Nevertheless, significant error rates occur also among expert doctors. Adoption of medical apps by healthcare professionals have shown to significantly reduce medication errors [28]. Medical apps avoiding errors or providing potential solution for practicing errors have marked its place in future healthcare technology [8]. Accurate, updated, safe, cost-effective and scientifically sound medical apps facilitate its acceptance among the health care professionals [22]. However, it is an inevitable fact that medical apps hold potential dangers. Healthcare authorities, regulatory bodies and other accrediting bodies should take enough responsibilities in assessing the quality of medical apps. Looking forward, it is expected that since medical apps successfully established in the medical world, there should be more efforts and research on selection, implementation and usage of quality medical apps [22]. Hence the effective and timely use of medical apps not only has a huge role in self-care of patients but also it hones skills of a physician.

Expansion challenges

Though medical apps are trending in the current healthcare system, its open nature withholds a few challenges for its growth. While medical apps continue to improve the healthcare system through its convenient usage, better clinical decision-making, high accuracy and productivity, there are several disputes arising ranging from immense support to strong objection [9,27]. Challenges include the questionable reliability in clinical decisions made through medical apps and questions are often raised regarding the reliability and appropriateness of a generated care plans. Another concern of debate about medical apps usage is the confidentiality of patient data with respect to privacy. The ethical issue arising out of the protection of patient data is worth considering [14,28]. In addition, medical apps are observed to create a care gap between patient and physicians as they do not keep often a direct doctor-patient relationship. Therefore, lack of a doctor-patient rapport is suspected to reduce the quality of patient care. Nevertheless, the rapid development and increased use of medical apps in the present medical system has disadvantaged the older health care professionals who are not so familiar to adopting mobile devices [29]. Moreover, significant objection has aroused against medical apps because of their continuous use in personal and professional lives of physicians. Many medical, legal, and ethical issues have been raised and put as a challenge to the acceptance of medical apps in healthcare setup [9,27]. Overall, a transparent and standard conduct is necessary for bringing up high quality medical apps that encourage a comprehensive healthcare system.

Conclusion

Medical apps are already valuable and inevitable tools for

healthcare professional in this century of advanced technology. Numerous apps are available to assist healthcare professional in many tasks. Moreover, these applications help to bridge the gap between the healthcare providers and patients. However rigorous and critical evaluation, validation is required to improve the quality and safety of these tools. Medical apps that provide accurate, timely meaningful guidance information are likely to transform the healthcare from episodic and reactive to continuous and proactive. Comprehensive review that includes description, logo, platform, download size, rating and cost of 277 included apps from a total of 9178 identified healthcare apps was prepared. Further this systematic and comprehensive review process in main three platforms shows there is no app for drug and poison information centre to provide drug and poison information service.

References

- [1] Ventola, C Lee. "Mobile devices and apps for health care professionals: uses and benefits." *Pharm Ther.* 39 (2014): 356-364.
- [2] Simon, IBM – "World's first Smartphone. It's History Time! [Internet]." Itshistorytime.com. (2017) [cited 10 October 2017].
- [3] Nosrati, Masoud, Karimi Ronak, and Hasanvand Hojat Allah. "Mobile computing: Principles, devices and operating systems." *World Applied Programming.* 2 (2012): 399-408
- [4] Mosa, Abu Saleh Mohammad, Yoo Ilhoi, and Sheets Lincoln. "A systematic review of healthcare applications for smartphones." *BMC Medical Inform Decis Mak.* 12 (2012): 67
- [5] Sreekanth, SK, and Deepa Sreekanth. "Need and importance of drug information centres in Indian hospital system." *Int J Med.* 2 (2015): 9 - 16.
- [6] Hunashal, R, Kudagi B, Kamadod M, and Biradar S. "Drug Information Center". *Int J Med Inform.* 4 (2007): 1-6.
- [7] Free, Caroline, Phillips Gemma, Galli Leandro, and Watson Louise, et al. "The Effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: A systematic review." *PLoS Med.* 10 (2013): e1001362.
- [8] Haffey, Faye, Brady Richard, and Maxwell Simon. "Smartphone apps to support hospital prescribing and pharmacology education: A review of current provision." *Br J Clin Pharmacol.* 77 (2014): 31-38.
- [9] Ozdalga, Errol, Ozdalga Ark, and Ahuja Neera. "The smartphone in medicine: A review of current and potential use among physicians and students." *J Med Internet Res.* 14 (2012): e128.
- [10] Esmaeili, Maysam, Gholami Kheirollah, Hajimiri Mir Hamed, and Javadi Mohammad Reza, et al. "A two-year utilization of the pharmacist-operated drug information center in Iran." *J Res Pharm Prac.* 3 (2014): 117.
- [11] Shadnia Shahin, Soltaninejad Kambiz, Sohrabi Farrokh, and Rezvani Manijeh, et al. "The Performance of Loghman-Hakim Drug and Poison Information Center from 2006 to 2008." *Iran J Pharm Sci: IJPR.* 10 (2011): 647-652.
- [12] Costa, De Sousa Ivelisse, Pereira de Lima David Juceni, and Noblat Lúcia de Araujo Costa Beisl. "A Drug Information Center Module to Train Pharmacy Students in Evidence-based Practice." *Am J Pharm Educ.* 77 (2013): 80.
- [13] Pohjanoksa-Mäntylä, Marika, Antila Juha, Eerikäinen Sari, and Enäkoski Marianne, et al. "Utilization of a community pharmacy-operated national drug information call center in Finland." *Res Social Adm Pharm.* 4 (2008): 144-152.
- [14] Mickan, Sharon, Tilson Julie, Atherton Helen, and Roberts Nia Wyn, et al. "Evidence of effectiveness of health care professionals using handheld computers: A scoping review of systematic reviews." *J Med Internet Res.* 15 (2013): e212.
- [15] "Survey: 46 percent of clinicians plan to use health apps in practices by (2020) [Internet]." *Mobi Health News.* (2017) [cited 10 October 2017].
- [16] Darrell, M West. "Improving health care through mobile medical devices and sensors brookings." *Edu.* (2017) [cited 10 October 2017].
- [17] Kim, Junetae, Lee Yura, Lim Sanghee, and Kim Jeong Hoon, et al. "What clinical information is valuable to doctors using mobile electronic medical records and when?" Eysenbach G, ed. *J Med Internet Res.* 19 (2017): e340.
- [18] Ristau, Ryan, Yang Jessica, and White John. "Evaluation and evolution of diabetes mobile applications: Key factors for health care professionals seeking to guide patients." *Diabetes Spectrum.* 26 (2013): 211-215.
- [19]. "Are Mobile Medical Apps Good for Our Health? A new study by research now reveals that doctors and patients say 'Yes' [Internet]." Marketwire. (2017) [cited 10 October 2017].
- [20]. Choi, Jong, Yi Byoungkee, Park Jong Hwan, and Choi Kyesook, et al. "The Uses of the Smartphone for Doctors: An Empirical Study from Samsung Medical Center." *Healthc Inform Res.* 17 (2011): 131.
- [21] Baumgart, Daniel C. "Smartphones in clinical practice, medical education, and research." *Arch Intern Med.* 171 (2011): 1294–6.
- [22] Buijink, Arthur Willem Gerard, Visser Benjamin Jelle, and Marshall Louise. "Medical apps for smartphones: Lack of evidence undermines quality and safety." *Evid Based Med.* 18 (2013): 90-2.
- [23] Franko, Orrin I. "Smartphone apps for orthopaedic surgeons." *Clin Orthop Relat Res.* 469 (2011): 2042–8.
- [24] Digital Health [Internet]. *Fda.gov.* (2017) [cited 10 October 2017].
- [25] Steinhubl, Steven R, Muse Evan D, and Topol Eric J. "Can mobile health technologies transform health care?" *JAMA.* 11 (2013) ;310: 2395-6.
- [26] Sinsky, Christine, Willard-Grace Rachel, Schutzbank Andrew, and Sinsky Thomas, et al. "In search of Joy in practice: A report of 23 high-functioning primary care practices." *Ann Fam Med.* 11 (2013): 272-278.
- [27] Wallace, Sean, Clark Marcia, and White Jonathan. "It's on my iPhone: Attitudes to the use of mobile computing devices in medical education, a mixed-methods study." *BMJ Open.* 2 (2012): e001099.
- [28] Dornan, Tim, Ashcroft Darren, Heathfield Heather, and Lewis Penny, et al. "An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education – EQUIP study." *General Medical Council.* (2009).
- [29] Moodley, Amaran, Mangino Julie, and Goff D. "Review of infectious diseases applications for iPhone/iPad and android: From pocket to Patient." *Arch Clin Infect Dis.* 57 (2013): 1145-1154.

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