

ICT-Based Consumer Health Information Services to Encourage Patient-Provider Collaboration for Improved Medical Care

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Abstract:

➤ *Background:*

The potential of ICT solutions that are tailored to individual customers is gaining attention. The public's and patients' access to information, as well as the promotion of self-management, depend heavily on this emerging discipline called consumer health informatics (CHI). The majority of patients' willingness to take responsibility for their health and the growing desire of medical professionals to fully recognize each patient's potential gave rise to the notion of CHI.

➤ *Purpose:*

To explain how ICT might enhance patient-provider collaboration in consumer health informatics.

➤ *Methods/Approaches:*

The importance of established CHI applications in healthcare delivery is examined through a systematic assessment of the literature, identification of reference sources, development of search algorithms, and manual search.

➤ *Results:*

The Web, PDAs, messaging apps, smartphones, and other platforms have all seen the development of new consumer health IT applications. Through web-based communication, prompts and reminders, real-time health data transmission to patients and doctors, and personal electronic health information, these applications help patients manage their own health.

➤ *Conclusion:*

New resources are being developed to help patients and the general public make informed decisions regarding their health. These technologies also make it easier for consumers and clinicians to share health information both privately and publicly. To develop new research and IT technologies that are suitable for the healthcare needs of consumers, governments, healthcare organizations, and the ICT sector must collaborate.

Keywords: Consumer Health Informatics, E-Health, Information Communication Technology, Patient-Provider Collaboration.

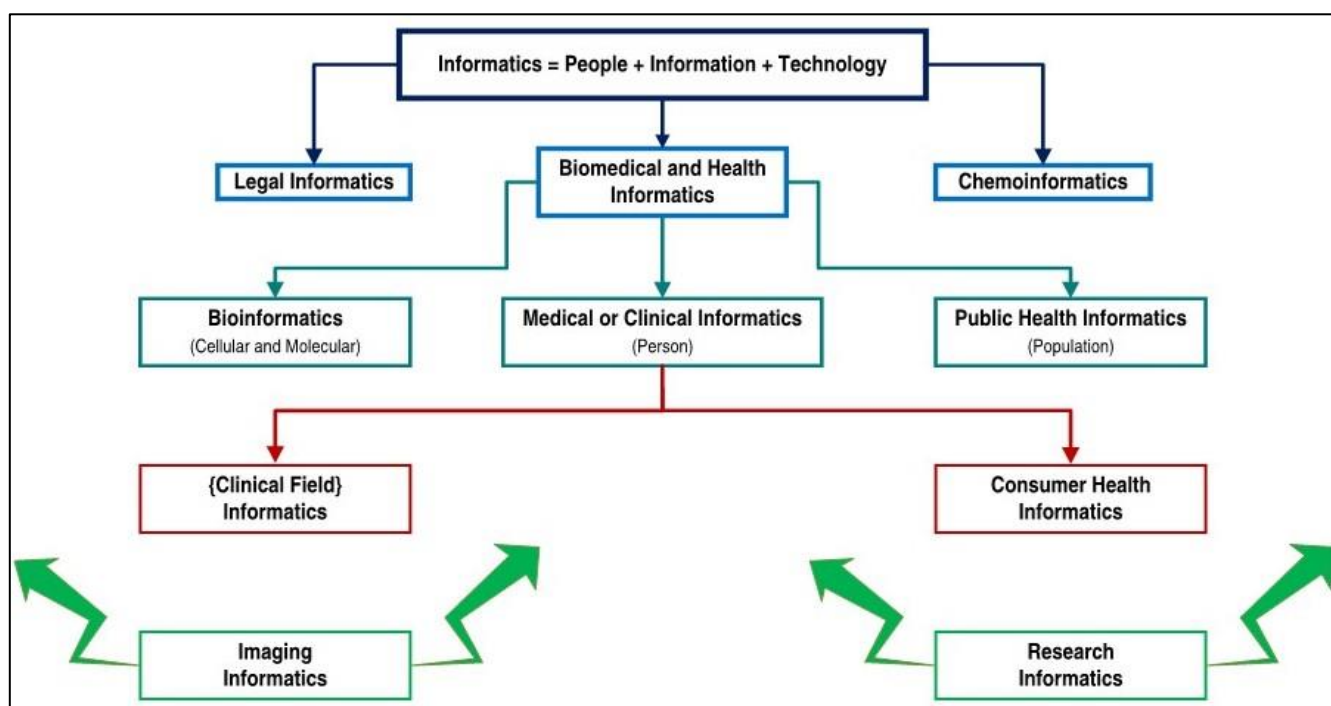
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I. INTRODUCTION

The potential of e-health solutions and information and communication technologies that are tailored to the health requirements of healthcare service consumers is becoming more widely recognized. We call this new field consumer health informatics (CHI). To promote self-care, make informed decisions, encourage healthy habits, and facilitate peer information exchange, Consumer Health Informatics (CHI) is crucial in giving information to patients and the general public.

The subject of informatics, known as "consumer health informatics," or CHI, focuses on the views of patients and consumers as both users and beneficiaries of information systems that enable them to take charge of their own health.

Keep in mind that the patient and the consumer are not the same. "Anyone who seeks or uses healthcare information for nonprofessional work" is one widely accepted definition from the Agency for Healthcare Research and Quality (Robin, A. 2020). This encompasses both those who have a diagnosis (like Type 2 diabetes) and those who do not (like teachers of a child with the disease).



[Fig. 1: Sub-Categories of Informatics (Hersh, W. 2009)]

According to Ouyang, W. et al. (2021), CHI is a type of medical informatics that models and incorporates consumer preferences into medical information systems, assesses consumer information demands, and researches and applies ways to make information available to consumers.

CHI is recognized by the American Medical Informatics Association (AMIA) as a subspecialty of medical informatics that examines how electronic information and communication might be used to enhance healthcare outcomes and decision-making from the viewpoint of the patient or consumer.

The emergence of websites pertaining to consumer health, online support groups, and electronic patient-centered communications poses novel issues for clinical practice. Finding, evaluating, and interpreting health information is a crucial responsibility of healthcare providers and the general public (Maignant, G., and Staccini, P., 2018).

According to Deori, R. et al. (2024) CHI is any electronic tool, technology, or system that: (a) is primarily intended to interact with health information consumers (anyone who seeks or uses healthcare information for non-professional work); (b) interacts directly with the consumer who provides personalized health information to the CHI system and receives personalized health information from the tool or system; and (c) in which the data, information, recommendations, or other benefits provided to the consumer may be used with a healthcare professional but is not dependent on a healthcare professional.

Any person who evaluates healthcare services or information for their own health needs, whether they are patients or not, is considered a consumer of healthcare. A provider is a healthcare professional or facility that meets the demands of the consumer.

The rise of interactive information technology solutions for clients is consistent with the desire of the majority of clients (patients) to take greater responsibility for their health and the growing desire of health practitioners to fully realize the potential of the patient and their family.

Health systems' demand to reduce costs and the belief that providing consumers with more information could improve care quality and save costs by maximizing the patient's and family's capacity for self-help are driving these advancements.

Healthcare customers are under growing pressure to take an active role in their care, which has led to a demand for health information. Additionally, health information technology is becoming more and more necessary to let patients take an active role in their own care (Featherall, J. et al. 2018).

Meke, I. et al. (2008) surveyed Namibian healthcare providers to learn more about their usage of ICTs in healthcare delivery. Twenty-one (21) health professionals from two areas of Namibia—one urban and one rural—completed a series of standardized questionnaires. 100% of respondents considered ICTs to be a crucial instrument for medical care. ICT was seen by 91.00% of health care personnel as facilitating communication with co-workers. The most often utilized ICT instrument for patient admission (36.00%) was the telephone. The next most popular ICT was the personal computer (23%).

Now, consumers are prepared to take an active role in their own healthcare. The doctor-patient relationship is gradually being redefined by a new generation of empowered, computer-literate customers (Ball, M. J., and Lillis, J. 2001).

The development of online-accessible electronic health records is one of the most drastic moves toward consumer empowerment. As with e-banking and e-commerce, this will allow customers to engage in online doctoring.

According to Fiksdal, A. S. et al. (2014), 72% of American Internet users claim to have sought health-related material online. After a personal physician, the internet emerged as the second most reliable source of information in this survey. Before visiting reputable sources for health information, the majority of consumers use Google, and the majority do not verify the source of the material.

Access to high-quality healthcare could be greatly expanded through telehealth. However, the delayed acceptance of telemedicine in everyday healthcare can be attributed to a lack of understanding regarding the implementation's value (Cusack, C. M., 2008).

Customers' usage of ICT to communicate with providers did not seem to be hindered by the lack of in-person meetings or privacy (Kerstin M., 2007).

Advances in consumer health informatics present more prospects and a growing possibility for providing customers with pertinent information. Elderly customers may be able to

obtain their computerized medication lists online if personal data is integrated with explanatory information. Drug information could be incorporated into such systems (Schreiweis, B. Brandner, A. and Bergh, B. 2021).

Therefore, by examining current trends and future directions in consumer health informatics, analyzing issues related to consumers' use of health information technology, and discussing current applications of ICT in consumer health informatics, this study explains the role of ICT in improving the patient-provider partnership in consumer health informatics.

II. METHODS

The literature and data accessible up until 2026 regarding the impact of developed CHI technologies on healthcare delivery were systematically analysed and synthesised. Finding reference materials and developing an analysis strategy for each one were necessary steps in the literature search process.

Medical subject headings (MeSH) terms were used to search electronic databases. In order to locate papers that would be relevant to the topic and the objectives, keywords associated with the idea of CHI applications were used, including consumer, ICT use, patient-provider connection, and informatics. Studies that met the requirements were also found by looking through the references in pertinent evaluations.

MEDLINE, Cochrane Library, Nursing and Allied Health Literature (CINAHL), Google Scholar, and peer-reviewed and grey literature databases were among the data sources that were manually searched.

III. RESULTS

Results show that consumer health informatics and information technology are becoming a significant part of contemporary public health practice.

Current systems are being modified for patients to utilize at home that were created for medical professionals. New consumer health IT apps are being created for use on several platforms, including cell phones, Personal Digital Assistants (PDAs), messaging apps, and the internet. Messaging apps like WhatsApp, Telegram, Arattai, and others have been used to help patients communicate with doctors and get important information about their medical care.

ICT tools that help provide consumers with high-quality healthcare include smartphone applications, self-management systems, electronic personal health records, patient portals, peer interaction systems, telemedicine, eLearning, and mobile health.

Email and text messaging are essential ICT tools designed to support both the patient and the healthcare

provider in their pursuit of optimal health and high-quality care.

IV. DISCUSSION

The two factors, consumerism and information technology, work together to support an information-age healthcare system where people may use ICT to control their own health and obtain health information, using healthcare resources more effectively.

These days, ICT applications serve as a route for providing consumers with health information. Software is available to help customers make well-informed decisions while caregivers customize interventions.

Numerous ICT solutions are being created to improve the quality of health information available online and to help with consumer education. Both patients and providers can gain from the adoption of consumer health informatics solutions (Jimison, H. 2008).

These applications serve a number of functions, such as storing personal health information in an easily accessible manner, providing real-time data on a patient's health condition to patients and caregivers, and supporting self-management through educational prompts and reminders.

Utilizing the messaging features found in some consumer health IT products to facilitate prompt contact between patients and their doctors is one of the potential advantages of these kinds of services (Tang, P. C., and Lansky, D., 2005).

Furthermore, consumer health IT systems can be a comprehensive resource for consumers and their physicians by enabling the collection and integration of data from several healthcare sources. In addition to being convenient, consumer health IT applications play a crucial role in emergencies by giving medical personnel vital health information.

➤ *Smartphone Applications*

Adoption of smartphones has made it possible to swiftly and effectively retrieve a multitude of health information. Consumers frequently use their smartphones to access information on the Internet, including health-related resources. Before choosing to see a doctor, many use their smartphones to check up on health-related information. They utilize it to look for wholesome dishes to prepare at home. Users showed interest in applications that provided guidance and information while they were on the go (Sinha, P. et al. 2013).

➤ *Self-Management Systems*

This includes systems with various functional combinations that use several platforms, some of which respond to user status information in an efficient and timely manner. Some of them enable the transmission and monitoring of data, such as blood glucose or blood pressure. A patient may receive feedback on their health state directly from the system or from the provider who receives

information from the system, depending on how the system is designed.

Giving patients appropriate, customized tools (especially those for self-management) could facilitate the transition of care activities from healthcare practitioners to patients. In this manner, patients become active participants in their care, and medical professionals can focus more on treating more severe illnesses (HIMSS 2026).

➤ *Electronic Personal Health Records and Patient Portals*

Every industry, including healthcare, uses information technology (IT) extensively. IT-enabled healthcare apps are used by many healthcare companies to streamline administrative tasks, departmental health record management, and billing. Some businesses, however, continue to struggle with traditional healthcare procedures and paper-based medical records.

Globally, there is a greater need for improved and more effective healthcare services due to population growth and the development of new, sophisticated medical treatments. Multiple healthcare providers are involved in a patient's treatment due to the intricacy of health issues, which complicates the healthcare process.

For a patient to receive better care, it is becoming more and more necessary to have all of their health information in one location, including their medical history, allergies, lab results, prescription drugs, and so on. Researchers have now discovered that a solution to these problems is to use more IT in healthcare with Electronic Health Records (EHR). As a result, many nations are encouraging the use of EHRs to improve patient continuity of care and increase the use of IT in healthcare services.

An EHR is "A repository of information regarding the health of a subject of care in computer-processable form, stored and transmitted securely, and accessible by multiple authorized users. It has a standardized information model, which is independent of EHR systems. Its primary purpose is the support of continuing efficient and quality integrated healthcare, and it contains information, which is retrospective, concurrent, and prospective" (Sinha, P. et al. 2013).

The Health Information and Management Systems Society (HIMSS) defines an EHR as "an EHR is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports.

The EHR automates and streamlines the clinician's workflow. The EHR can generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface, including evidence-based decision support, quality management, and outcomes reporting.

According to nationally accepted interoperability standards, an electronic record of a person's health information that can be retrieved from various sources and is managed, shared, and controlled by the person is known as an electronic personal health record (PHR) (Dennison L et al. 2013).

An electronic PHR can be either a tethered application that is connected to a particular health care organization's information system or a stand-alone program that permits data to be exported to or imported from other sources or apps. Patients can usually view but not edit data from the provider's electronic health record (EHR) using tethered PHRs, also known as patient portals. Personal identifiers, contact details, health provider information, problem lists, and prescription histories are examples of pertinent data that are frequently kept in a PHR (Jen MY, Kerndt CC, and Korvek SJ. 2026).

Electronic Health Records allow patients and providers to interact electronically.

➤ *Peer Interaction Systems*

The internet has developed into a highly useful tool for both clients and clinicians to solve problems and receive emotional support regarding their health issues. The internet can help you share knowledge about treatment options and experiences, disabling conditions, care facilities, handling complications, current research, and many other issues, but it cannot replace doctors.

Peer interaction may be implemented as standalone programs or occasionally as a component of multi-component applications. These programs can enhance social and personal outcomes and raise the perception of peer support (Dennison L et al. 2013).

➤ *Telemedicine and Telehealth*

Telemedicine is defined as the study, observation, and treatment of patients as well as the training of patients and personnel through technologies that enable quick access to professional guidance, regardless of the patient's location.

Telemedicine makes it possible to monitor patients in vivo, which makes it possible to accurately define the patient's clinical status and evaluate how treatments affect the patient's results. Such an evaluation makes it possible to make well-informed decisions about the best course of therapy for both individual patients and particular patient groups.

Conversely, telehealth presents a huge opportunity for sickness prevention and health promotion. The provision of telematic services and related products that can offer telemedicine services and help raise awareness and increase community and individual involvement in the overall health environment, to improve well-being and wellness, is known as telehealth. It is the use of telematic services to promote and facilitate health and well-being for both individuals and communities.

When patients or clients are geographically separated, telemedicine helps to enhance healthcare services and

encourage healthy lives and education. Patient evaluation, diagnosis, and treatment, ongoing professional education, health promotion, and healthcare administration are all provided by telemedicine facilities for clinical consultation. It is widely used in a variety of settings, including schools, inmate correctional facilities, mobile health facilities, industrial health services, disaster relief groups, and rural healthcare delivery.

➤ *Low-Cost Communication Systems*

This includes an interactive audio-visual tool for better medical communication between medical professionals and their patients.

➤ *Health Applications Websites*

These websites can assist you with tracking, analyzing, and even storing data in a format that you can give to your physician.

➤ *Mobile Health*

Mobile health applications can assist in gathering, evaluating, and using the same data. Certain mobile health apps even use a person's phone's sensors to enhance the data gathered, such as how far they ran or climbed. Other mobile health apps can give you alerts to help you stay on track and assist you in keeping track of important information like your prescription regimen.

According to a recent World Health Organization Global Health Survey (2011), 30% of low- and middle-income nations and 60% of high-income countries acknowledged utilizing SMS messaging and other mobile health communications technologies to increase treatment compliance. Many high-priority health issues are addressed by the associated programs in low- and middle-income nations, such as HIV infection, H1N1 influenza type "A" virus infection, vaccination, reproductive health, and chronic illness management.

➤ *E-Mail and Text Messages*

When it comes to reminding patients of appointments and other crucial information that may be necessary for managing a chronic condition, email and text messages are quite helpful.

Reviews of the literature show that SMS messages and other forms of patient communication between appointments can enhance physiological results and health-related behaviors (Déglise, C., Suggs, L. S., and Odermatt, P., 2012; Wei, J., Hollin, I., and Kachnowski, S., 2011).

Four randomized trials and seven interventional studies were reviewed, and the results showed that text messaging is a useful tool for raising adherence rates (Déglise, C., Suggs, L. S., and Odermatt, P., 2012).

Research on SMS messages' efficacy in promoting health has also demonstrated improvements in treatment outcomes (Fjeldsoe, B. S., Marshall, A. L., and Miller, Y. D., 2009; Haug, S. et al., 2009).

Six months following a txt2stop intervention, the proportion of participants in a smoking cessation experiment with 5800 individuals who had stopped smoking (confirmed biochemically) had more than doubled (Free, C. et al. 2011).

V. CONCLUSION

The integration of consumer health informatics and information technology into contemporary public health concepts and national health care strategies is still in its infancy. Both consumers who want to know how their health is doing and providers whose job it is to provide better information for improved healthcare and decision-making can be found on the Internet.

Patients are becoming more actively involved in managing their own health and in the development of services as more interactive, consumer-facing software emerges. Global healthcare systems are greatly impacted by the transfer of authority and accountability from institutions to individuals.

The integration of services, technology, media, data, knowledge, and communities is a major trend. Patient-centered innovations will both impact and be impacted by changes in the structure and financing of healthcare.

ICT use in CHI can inform patients and the general public, encourage self-care, facilitate informed decision-making, encourage healthy habits, and foster social support and peer knowledge sharing. With more information and better health, consumers will feel more empowered and self-assured thanks to ICT resources.

Patients may now electronically manage, share, and control their health information and take a more active role in their care thanks to new consumer health information technology (health IT) applications. To guarantee that CHI fulfils its potential to enhance the healthcare system, quality, research methods, and accessibility must all be improved.

Additionally, to produce new research and IT breakthroughs that are customized to the health needs of the consumer, governments, healthcare organizations, and the ICT sector must collaborate.

➤ *Conflicts of interest*
None.

➤ *Funding Sources*
None.

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