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Efficient e Health System through Better Management and Empowerment

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ABSTRACT

The term eHealth is widely used by many individuals, academic institutions, professional bodies, and funding organizations. It has become an accepted neologism despite the lack of an agreed-upon clear or precise definition. This paper examines the field of eHealth holds promise for supporting and enabling health behavior change and the prevention and management of the chronic disease. To establish areas of congruence among contributors to the early development, evaluation, and dissemination of eHealth applications. The use of normalization process theory as a conceptual framework revealed that relatively little attention was paid to (1) work directed at making sense of e-health systems, specifying their purposes and benefits, establishing their value to users, and planning their implementation; (2) factors promoting or inhibiting engagement and participation; (3) effects on roles and responsibilities; (4) risk management, and (5) ways in which implementation processes might be reconfigured by user-produced knowledge.

Keywords: eHealth, Internet, telemedicine, diseases

Introduction

Everybody talks about e-health these days, but few people have come up with a clear definition of this comparatively new term. Barely in use before 1999, this term now seems to serve as a general "buzzword," used to characterize not only "Internet medicine", but also virtually everything related to computers and medicine. The term was first used by industry leaders and marketing people rather than academics. They created and used this term in line with other "e-words" such as e-commerce, e-business, e-solutions, and so on, in an attempt to convey the promises, principles, excitement (and hype) around e-commerce (electronic commerce) to the health arena, and to give an account of the new possibilities the Internet is opening up to the area of health care. Intel, for example, referred to e-health as "a concerted effort undertaken by leaders in health care and hi-tech industries to fully harness the benefits available through the convergence of the Internet and health care." Because the Internet created new opportunities and challenges to the traditional health care information technology industry, the use of a new term to address these issues seemed appropriate.

The World Health Organization (WHO, (2014) defines e-health as the "transfer of health resources and health care by electronic means. It encompasses three main areas: the delivery of health information, using the power of IT, and the use of e-commerce and e-business practices in health systems management." This definition indicates that e-health includes different applications that make the system more efficient and effective, and reduces cost. This section reviews 18 papers regarding challenges faced by e-health and the proposed solution.

> *"e-health is an emerging field in the intersection of medical informatics, public health, and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology"*

E-health applications play an important role in health system reform because technologies become a part of an individual's personal life. This section examines the evolution of e-health by considering the number of published papers on the topic of e-health and chronic diseases. The number of published papers was obtained from the Web of Science database. More information regarding the search terms and duration is included in Appendix 2. After applying the search terms in the database, we obtained Figure 3, which shows the evolution of the published papers across several years.

It is clear that, from 1962 to 1990, only a few papers were published each year during this period however, the great evolution of the published papers began in 1990.

The evolution of e-health published papers is compared to Kondratiev Waves in Figure 4. It is clear that the evolution of published papers in e-health started from the beginning of 1990 and corresponds to the evolution of the information technology wave. This explains how information technologies helped in reforming and improving the health system.

E-Health

Technological evolution has a positive effect on all aspects of life within a country and individual life. Technological advancements play an important role in health

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system reforms and affect most areas of the health system such as new equipment, new ways of communication, better disease management, electronic management of patients' information, etc. However, there are many challenges in implementing e-health. One of these challenges is the absence/uncertainty, regarding the application of e-health from the development stage, planning, coordination between concerned units, and implementation (May et al., 2011; Scott & Mars, 2013; Stellefson et al., 2013). Therefore, an implementation strategy for e-health is required to achieve the best results in transforming the health system into an e-health system (van Limburg & van Gemert-Pijnen, 2010). Moreover, the application of e-health has poor outcomes sometimes due to poor understanding of the whole system, ambiguity regarding the suitability of the telecare system and its role, and how to motivate all parties to engage in the implementation process (Carrera & Dalton, 2014; May et al., 2011).

Another challenge faced in the e-health approach is concerned regarding the integration of e-health into all layers of the system, and lack of coordination between health care units and other related units like the social unit (LeRouge, Gaynor, Li, & Ma, 2010; May et al., 2011). Poor results from applying e-health are obtained when some technologies ignore the interdependencies between technologies, the needs and features of humans, and the economic and social environment (van Gemert-Pijnen et al., 2011). To overcome this challenge, a holistic model, and understanding of e-health is needed, which should work with all layers at different levels of the system. It should consider the relationship between health service, patients, professionals, stakeholders and must consider the economic and social environment as part of the system (LeRouge et al., 2010; Reed, Conrad, Hernandez, Watts, & Marcus-Smith, 2012; van Gemert-Pijnen et al., 2011).

McIlhenny et al. (2011) mentioned that a lack of adequate funds, distance from urban areas, and hard natural features make providing healthcare information difficult in rural areas. McIlhenny et al. (2011) emphasized that the lack of financial resources prevents people in rural areas from accessing health care and getting important health information; it also prevents clinics from providing such services. Therefore, he suggested that using online e-health applications would facilitate the provision of required health information to individuals in rural areas, and could help in the monitoring of some diseases. However, may et al. (2011) considered the absence of incentives and a shortage of financial resources as barriers to the integration of telecare with primary health care services. Therefore, sufficient funds and financial support is essential for the successful application of the e-health approach. Technologies play important role in the health sector and facilitate the advancement of this sector. Table 3 lists examples of the results and outcomes of the application of e-health approaches.

Table 1: Summary of results and benefits of applying e-health approaches

Aim/Approach	Country	Some Results/benefits	Reference
'Do-it-yourself Healthcare' approach	–	- Improves quality and reduces costs, - potentially improving health system sustainability - Epitomizes broader trajectories in the access to and delivery of healthcare, with greater consumer involvement and decentralization - Allows consumers to monitor and manage their health, and guide their healthcare consumption	Carrera & Dalton, 2014
Electronic medical records used to manage chronic diseases in Chronic Care Model (CCM)	**US**	- Establishes patient-centered goals - Monitors patient progress - Identifies lapses in care	Stellefson, Dipnarine, & Stopka, 2013
mHealth application	**Canada**	- More capacity for remote consultation (telehealth between facilities, practitioners, and/or remote communities) - Data organization and analysis, including built-in alerts, automatically-generated text-based and graph-based wound histories including wound images - Tutorial support for non-specialized caregivers - Enhanced patient and caregiver experiences - Enhanced communication between multiple healthcare professionals - Leveraging the software's telehealth capacities	Friesen, Hamel, & McLeod, 2013
An Internet portal, My Health Education & Resources Online (MyHERO) was created in rural areas to	**US**	- Disease knowledge and self-blood glucose monitoring improved with one-on-one education.	McIlhenny et al., 2011

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facilitate locating current, non-commercial, reliable, evidence-based health information			
Telehealth Chronic Disease Self-Management Programs in Rural areas	Northern Ontario, Canada	- Positive experience for the participants - Increased access to more geographically isolated communities	Guilcher, Bereket, Voth, Haroun, & Jaglal, 2013
Web 2.0 health and medical forums	_	- Participants felt greater self-efficacy for managing their disease(s), and benefited from communicating with health care providers and/or website moderators to receive feedback and social support - Participants noted asynchronous communication tools (e.g., email, discussion boards) and progress tracking features (e.g., graphical displays of uploaded personal data) as being particularly useful for self-management support	Stellefson et al., 2013
An Online chronic disease self-management program	Australia	- Significant improvements ($p < .05$) were found at 6 months for four health status measures, six health behaviors, self-efficacy, and visits to emergency departments - Reached rural and underserved people - Effective and reduced health care costs	Lorig et al., 2013

Health promotion, patient empowerment, and education

It is important to see the definition of these terms to have a better understanding of its process and objectives. The below definitions were obtained from WHO entitled health promotion glossary, (World Health Organization, 1998):

Health promotion

Health promotion is the process of enabling people to increase control over and to improve their health.

Empowerment for health

In health promotion, empowerment is a process through which people gain greater control over the decisions and actions affecting their health.

Health education

Health education comprises consciously constructed learning opportunities, involving some form of communication designed to improve health literacy, including improving knowledge and developing life skills, which are conducive to individual and community health.

It is obvious from these definitions that there is some overlapping in the objectives of these concepts. For example, "health promotion" and "empowerment for health" both refer to the process of increasing the patient's power to control their health condition. Also, the term "health education" indicates the tools that could be used to reach the health promotion and empowerment stage.

This section includes a review of the papers that talk about these topics specifically and will shed light on patient education, self-management approach, and personalized care.

E-Health and Patient Awareness

Patient education is a way to increase the quality of patients' health care by providing them with important information and education, which increases their awareness and knowledge of their diseases, to participate in making decisions regarding their health, and to help them to monitor their health conditions. Therefore, patient education is considered a vital element of quality patient care (Hunderfund & Bartleson, 2010). There are different types of patient education: "on the organizational level such as a patient information desk or a specialized officer on patient education; and types on the program level such as consultations of specialized nurses, patient information materials, and patient education policy" (Albada et al., 2007).

The patient education approach faces some challenges and barriers in achieving the aimed results and outcomes of this approach. According to Hoving, Visser, Mullen, & van den Borne (2010), some of these challenges are the shortage of e-health application to support this approach, lack of required and important training for the patients and professionals who know how to work with them, and how to include the social environment surrounding the patient in the process. Bitzer et al. (2009) mentioned that health providers could support patient education by doing three things: First, by providing standardized and well-evaluated education programs. Second, by positioning the patient as a goal and in the center of the process, so that all activities and efforts will be focused on serving the patient. Finally, by providing the required materials and resources to have successful programs. Moreover, he mentioned that to have successful patient education, the

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stakeholders should support and contribute to these efforts, and must provide sufficient funds to provide these services.

Although patient education offers many benefits for the patient, Bodenheimer, Lorig, Holman, & Grumbach, (2002) argue that self-management education could be more useful and effective for the patient and could offer more cost reduction than traditional patient education, and could complement it. This is because traditional patient education offers the patient informative technical skills and information, while self-management education teaches the patient how to manage their health condition by teaching them problem-solving skills. The self-management approach is discussed as follows.

Self-management approach

The self-management approach is considered the main component of the new models and approaches for chronic disease management. After reviewing the different kinds of self-management programs and support, it is obvious that it is an essential element of health system reforms because it is a vital part of the reform in the delivery of healthcare, the relationship between the care providers and the patient, and the use of e-health applications. Novak, Costantini, Schneider, & Beanlands (2013) mentioned that self-management aims to activate the patient by empowering him or her with the knowledge and skills to manage their daily care and treatment; and participate in the decision making concerning their health conditions.

Another study states that "Three categories of self-management processes were identified: focusing on illness needs; activating resources; and living with a chronic illness" (Schulman-Green et al., 2012). However, there are challenges to sustaining these self-management processes and integrating them into the patient's daily life, because the patient has to take care of their daily healthcare and medical treatment. To overcome this challenge to the following four phases were suggested: "seeking effective self-management strategies, considering costs and benefits, creating routines and plans of action, and negotiating self-management that fits one's life" (Audulv, Asplund, & Norbergh, 2012).

Some studies show that self-management still did not reach the desired outcomes because of different reasons or incorrect application of the approach. Therefore, "there is a need for better understanding of how we can encourage both patients and health care providers to engage in productive interactions in daily chronic care practice, which can improve health and social outcomes" (Elissen et al., 2013). Some studies address this issue by exploring the role of the different parties in the process and suggest some approaches to strengthen the self-management approach. For example, it is suggested, "Healthcare professionals apply some empowerment elements including "building partnership," "listening," and "reflection" and some strategies including "motivation and self-awareness" and "review and continuous self-management" (Kuo & Wang, 2013). Additionally, Anderson & Funnell (2005) mentioned that to achieve success in the self-management approach, the relationship between the patient and the healthcare professional must be redefined, clarifying the role for each of them, which is different from the normal health system approach. Moreover, empowerment plans should not be set only to empower patients, but should also empower the nurses, because "empowered nurses are more likely to empower their patients, which results in better patient and system outcomes" (Laschinger, Gilbert, Smith, & Leslie, 2010).

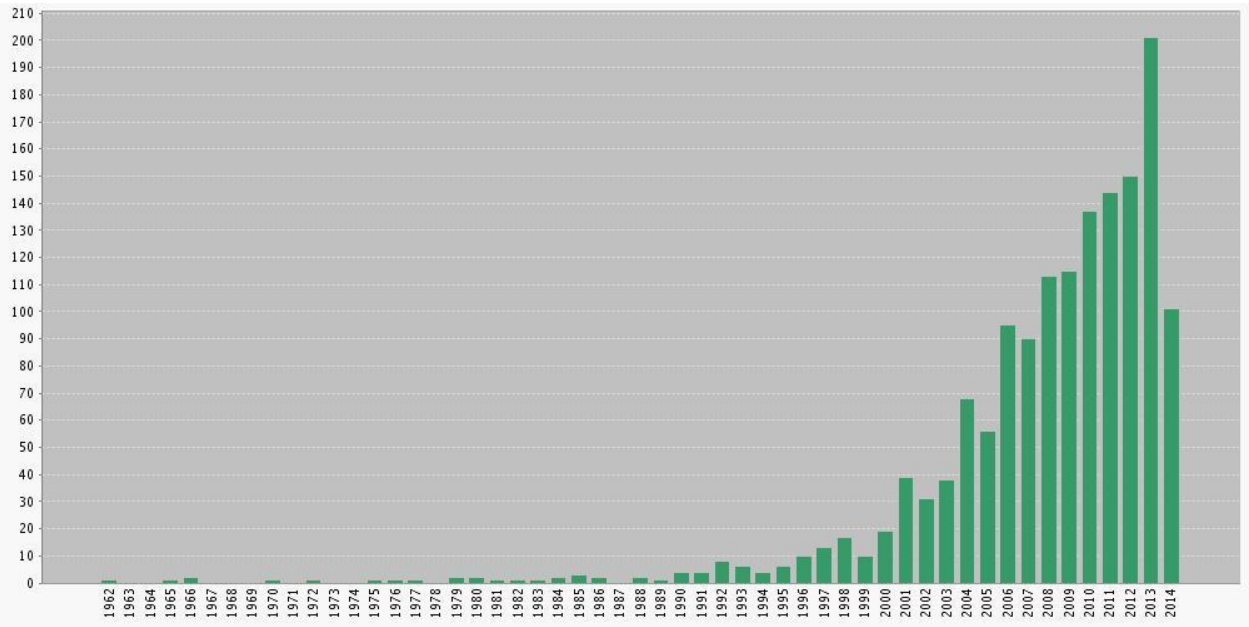

Figure 3: Evolution of published papers on e-health topics

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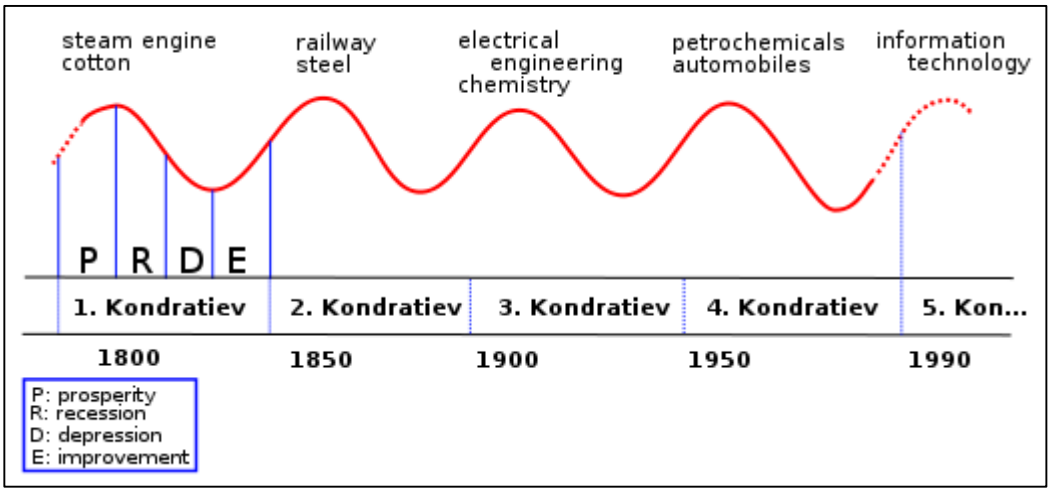

Figure 4: Kondratiev Waves: Different periods of technological evolution
Source: Jsbgeography, 2011

The e-health infrastructure is considered the main part of health system transformation because it is the main unit in newest systems and approaches for facilitating work such as personal home care, telecare, personalized self-management system, remote monitoring, remote health, and telehealth. Therefore, technologies play an important role in healthcare, are considered to be a facilitator for wider healthcare delivery, and allow more patient participation in the health process. Research shows that "telecare and assistive technology is feasible to support self-management of chronic conditions within the home and local community environments" (Zheng et al., 2010).

Moreover, the Internet could be considered a major contributor to the advancement of health systems, as it allows for the speedy and accurate dissemination of useful information within the different health institutions, doctors, and patients. It also facilitates access to health care and information to the rural areas in many countries. Figure 5 illustrates the different uses of the Internet and its advancement in past and future periods. The Internet provides reduced costs, and in the future, is expected to provide excellent opportunities for the advancement of the healthcare systems in the period of the Physical-World Web; which could offer the ability to monitor and control distance objects, i.e., the patients.

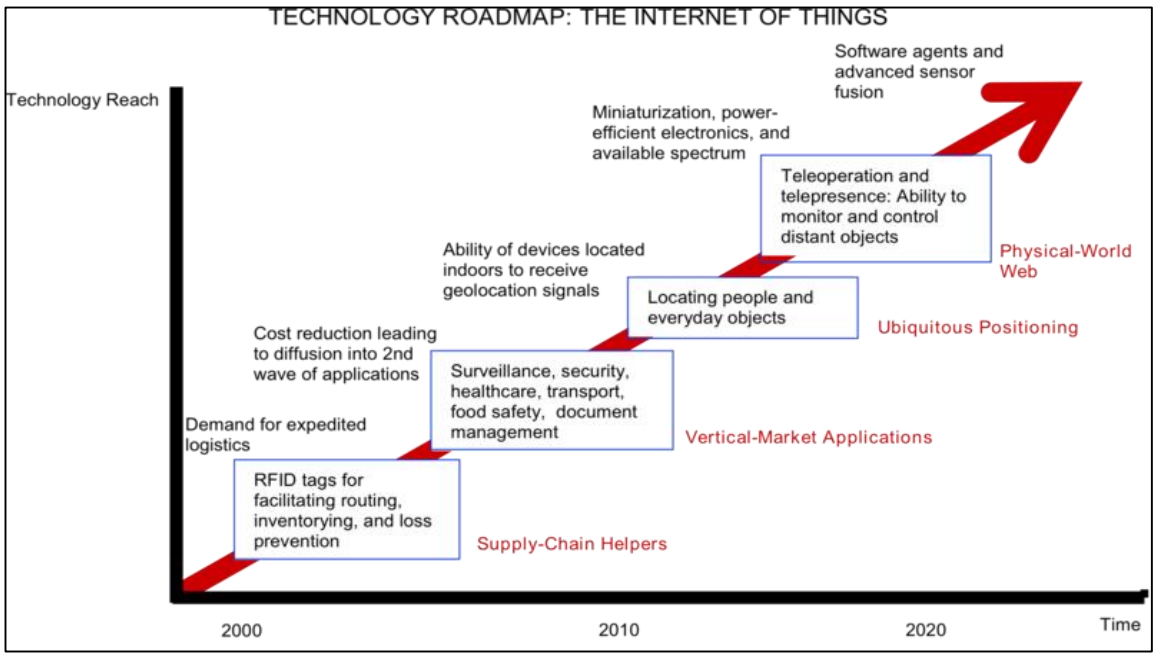

Figure 5: The evolution of Internet usage
Source: SRI Consulting Business Intelligence, 2008

The comparison between published papers on e-health in figure 3 and figure 4, Kondratiev Waves, different periods of technological evolution, emphasized that health systems utilize and benefit from the evolution of the information technology wave. Because the Kondratiev wave suggests that this period will extend to 2030, countries should benefit and

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invest in information technologies. The evolution in internet usage shown in figure 5 supports the recommendation to invest in information technology infrastructure because incorporating the Internet into different technologies and programs can increase system efficiency and reduce cost. Additionally, the Internet is expected to provide excellent opportunities for the advancement of healthcare systems in the Physical-World Web period shown in figure 5, which could offer the ability to monitor and control distance objects, that is, the patients. This can be achieved by the following

1. *Efficiency* - one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and patient involvement.
2. *Enhancing quality of care* - increasing efficiency involves not only reducing costs but at the same time improving quality. E-health may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.
3. *Evidence-based* - e-health interventions should be evidence-based in the sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation. Much work still has to be done in this area.
4. *Empowerment of consumers and patients* - by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, e-health opens new avenues for patient-centered medicine and enables evidence-based patient choice.
5. Encouragement of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner.
6. Education of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers)
7. Enabling information exchange and communication in a standardized way between health care establishments.
8. Extending the scope of health care beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. e-health enables consumers to easily obtain health services online from global providers. These services can range from simple advice to more complex interventions or products such as pharmaceuticals.
9. *Ethics* - e-health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy, and equity issues.
10. *Equity* - to make health care more equitable is one of the promises of e-health, but at the same time there is a considerable threat that e-health may deepen the gap between the "haves" and "have-nots". People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively. As a result, these patient populations (which would benefit the most from health information) are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases.

Conclusion

In conclusion, this chapter reviewed the needs of patients with chronic diseases, which should be satisfied by the current health system to ensure efficiency and sustainability because studies consider the chronic disease burden to be the main health challenge globally.

Through this work, it is clear that the current health system could be adjusted to be able to meet the needs of patients with chronic disease. There is no need to build from scratch a new health system, because not only would this approach be costly, but also all the required resources are already available. A more effective system could be created by simply adding complementary services and resources, principally through greater collaboration with community institutions. Such collaborations would improve the efficiency of the system and cut costs by avoiding duplicating services already offered by other institutions. Finally, all care models, as well as the business models, emphasize integration and collaboration between health organizations, the community, patients, and policymakers.

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