HEALTH INFORMATION RETRIEVAL AND USAGE AMONG THE ELDERLY

Potential use of the Internet and Personal Health Records in Health Awareness and Accountability

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Abstract: As North America anticipates an increase in the number of individuals expected to retire and fall into the group of "older adults," questions are raised regarding Canada's healthcare system and its ability to deal with this surge in consumption of resources. As the population ages, so too will the demands placed on the current medical work force thus creating a shortage of medical practitioners available. By utilizing information technologies such as personal health records (PHRs) and the internet, it is believed that this can leverage some of the burden away from Canada's healthcare system. By creating awareness and accountability among this aging population through the use of ICT (information communication technologies), cultural and behavioural changes in how this population consumes healthcare resources may be altered. Not only are behaviours being changed due to ICT, but the way in which consumers are utilizing resources and knowledge are also shifting. As the medical community is shifting away from the illness model to that of a more patient centered one, it is important to understand the value of ICT solutions in the prevention and continued well being of a patient in an economy where resources are scarce.

1 INTRODUCTION

With the change in Canada's demographics, more and more individuals are expected to retire and fall under the group of "older adults" or the "elderly". Yet, contrary to popular belief, the increase in the "older adult" population need not necessarily translate into a greater strain on Canada's Healthcare system. With the common view that aging is directly correlated to increased healthcare expenditures, it was observed by Bevand (2010) that only one-third to half of these expenditures will happen in the final years of an individual's life. In other words, it was noted by Lee (2007) that the increased consumption of resources is not entirely due to the population aging (the cost of living of an aging individual), but rather because of higher rates of mortality as the population gets older (cost of dying). Nonetheless, one significant problem does arise from the aging population, namely, the lower number of available healthcare practitioners as the population retires and begins to work less hours (National Center for Health Workforce Analysis, 2006).

One solution to this would involve the integration of technology; in particular the Internet and personal health records (PHRs), in helping to leverage the shortage of available healthcare practitioners providing information and guidance. Coupled with this generation of older adults having healthier lifestyles than their predecessors (Wiser, 2005), these individuals may not necessary utilize public healthcare resources in the traditional sense, of a patient, but rather as consumers wanting to improve and be accountable for their own health. By examining some of the current barriers and issues in how the elderly access and retrieve information on the Internet, this paper will strive to identify how the Internet can be used as a health awareness and information gathering tool. Together with the introduction of PHRs, this paper will depict how greater consumer awareness and accountability can improve the time required with healthcare practitioners in gathering health information.

2 BACKGROUND

In a report conducted by the *National Center for Health Workforce Analysis, Bureau of Health Professions, Health Resources and Services Administration*, five main problems were identified in relation to future healthcare practitioners and an aging population:

1) Many health profession are aging rapidly
2) Most healthcare professionals receive limited training on how to care for the elderly
3) Many health professionals lack diversity
4) Future shortages of health workers to serve the elderly
5) Future demand for health care professionals to serve the elderly will be affected by many factors including health insurance reimbursement policies, emerging technologies, new models of care, and changes in profession-specific scope of practice (National Center for Health Workforce Analysis, 2006, p.3).

From this, it can be expected that as the population ages, future trends in healthcare workers will also change. With a lack of interest in the field of geriatrics from new graduates in the medical profession, the numbers of individuals replacing those retiring are few (Häkkinen, 2009). Couple this with the fact that the aging population will grow exponentially over next couple of years, this shortage of available healthcare practitioners is a huge problem that must be addressed (Robson, 2001). Not only is a shortage of health professionals an issue, but given the behavioral change in the elderly today and those entering retirement, a shift in consumer and patient needs is occurring simultaneously. With the aging population today having more access to information (i.e. the Internet), and being more health conscious, the elderly may seek out particular services due to their "higher level of sophistication (National Center for Health Workforce Analysis, 2006, p.5)." In a study conducted by Maynard (1991), it was observed that as individuals aged, favorable health habits increased within these individuals, and that they believed that certain diseases could be prevented with proper-self management.

With technology being so prevalent today, a transformation is taking place in the way many individuals process and access information. From the complexity of online banking to the simplicity of using parking machines in paying for parking tickets, technology has shifted many cultural and behavioural standards assumed in the past. Healthcare is of course no different. The Internet has provided a vast array of information at ones fingertips, the days of healthcare providers being the sole vessels of healthcare knowledge have long dissipated (Campbell, 2005). A paradigm shift is now taking place within many healthcare systems across the world whereby the medical model is seen as outdated, and the days of a physician telling the patient what to do, are long over (Eysenbach & Jadad, 2001). Instead, a patient centered model has emerged whereby the patient and physician are working together for overall patient well-being. Consequently many new technologies and web-based applications were developed around this patient centered model of care; the most promising, PHRs and consumer portals. PHRs can be described as information reservoirs where one completes medical information is stored and accessible by the patient 24/7 (Shortliffe, & Cimino, 2006). Even though there are many challenges associated in properly developing and using a PHR, the potential of having a complete record of one's medical information in the hands of the patient can have immense benefits (Kim et al., 2007). Accompanied with the use of consumer health applications such as patient portals and online health communities, individuals can share, collaborate, and exchange information regarding various health concerns and issues. By utilizing such tools, elderly individuals can become more proactive in the involvement of their own health and take into consideration the various options prior to accessing public health resources subsequently reducing the frequency of physician consultation and, in optimal situations, eliminating utilization of public health resources for minor concerns completely.

3 THE INTERNET AND PHRs AS A CONSUMER AWARENESS AND ACCOUNTABILITY TOOL

In light of the behavioral changes outlined above, the Internet, together with PHRs can become tools for individuals to gain greater knowledge and accountability in understanding and managing their own health. However, before examining how technology can improve consumer awareness and accountability, it is vital that we have a clear understanding of how elderly individuals seek information. In a literature review conducted by Escamilla (2006), it was found that seniors first tend

to turn to their doctors as their primary source of medical information, and then if all else fails; turn to the Internet for medical information. Given that on average, a physician spends only fifteen minutes per patient, this may not be enough time for seniors to gather the necessary medical information to make decisions about their health (Belzer, 1999). Coupled with findings from the Gladden (2000) study which reveals that communication between patients and doctors are often problematic, in that patients often express dissatisfaction for being labelled as "nosy" when asking for information.

The Internet can become a great tool in helping elderly individuals retrieve medical information at a comfortable pace. Not only does the Internet provide a timeless space for individuals to retrieve information, it also provides individuals a place where they do not feel judged, isolated, or disempowered (Escamilla, 2006). By empowering individuals prior to visiting a physician's office to ask questions, discuss treatment options, express opinions, and state preferences during this time, it has been shown that these individuals have better health outcomes than those who do not (Campbell & Nolfi, 2005). In addition, it was noted by Wicks (2004) that reading was the medium of choice for many elderly individuals, and that a majority of individuals use the library to rent books, audio, videos and participate in library programs. In light of this, library staff and administrators may be considered as resources to encourage these same individuals to try and access information through the Internet. In a study conducted by Campbell (2005) on the use of the Internet to gather healthcare information by the elderly (n = 52), it was found that 86.5% of individuals used the Internet to look up information. Of this 86.5%, it was further found that 63.5% of these participants who used the Internet for health information were influenced to change their current healthcare behaviors (Campbell, 2005). In another study conducted by Campbell (2003) one such behavioral change was when individuals were going to see the doctor, individuals were quoted as asking "…why I am seeing him in the first place?" This statement in itself is significant as it points towards a cultural and behavioral change in how individuals access healthcare resources. Moreover, it was further noticed that because participants have more knowledge and awareness of specific medical conditions and treatment options, these individuals had measurably better health outcomes than those who did not use the Internet (Mahler & Kulik, 1990). In being able to ask specific questions, treatment options, and having an overall higher

understanding of the different illness and their ramifications, individuals today play a more collaborative role with their doctor and allied health professionals in making important decisions regarding treatment options (Campbell, 2003). With 75% of respondents from Campbell's study (Consumer Informatics: Elderly persons and the Internet, 2005) reporting playing a collaborative role in decision making with their physicians. It is hard to deny that the Internet has significant influence in creating greater consumer awareness and accountability with regards to their own health (Campbell, 2005). As health wellness and other related material are becoming increasingly accessible and available on the Internet, older adults will also become more familiar with using this medium to retrieve information in self-diagnosis and remote consultation. In a study conducted by Chou & Wister (2005), it was observed that lay information-seeking behaviour could positively influence health promotion activities for the elderly population. It was found that elderly participants (n = 827, age 50+) within this study who would retrieve and look up information regarding chronic illness, seek assistance from health professionals, gain knowledge of community services, and consult with friends about their own illnesses were more likely to take action in self-care activities (Chou & Wister, 2005). Findings from such studies (Campbell, 2005; Mahler & Kulik, 1990; Campbell, 2003; & Chou & Wister, 2005) help to build on the empirical evidence that information retrieval can translate into significant self-care action by those exposed to ICT. In addition, not only do health promotion activities increase with the individual, health outcomes can also improve as elderly patients remind medical practitioners regarding best practices and proper treatment methods (Campbell & Nolfi, 2005).

Another popular tool emerging in healthcare today is the idea and concept of a PHR. PHRs may be defined as a person's entire medical history at his or her access 24/7. PHRs can house different elements which can include doctor visits, notes, laboratory results, pharmacy information, diagnostic images, and other medical information (Sprague, 2006). In an online survey conducted in 2003 by the Markle Foundation's Connecting for Health Project, it was found that those with chronic illnesses (usually those in the higher age groups) and those caring for elderly parents reported the highest and most urgent interest in PHRs. Given such existing interest in PHRs, the shift in the way individuals manage and account for their health is already in the

midst of a paradigm shift. In a study conducted by Kim et al. (2007), it was observed that participants who used PHRs regularly filled in information in the following elements: 1) medication, 2) health problems, 3) surgeries, 4) lab tests, 5) allergies, & 6) immunizations. Of these elements, the most frequently updated was medication (updated 96% of the time), which suggests that elderly individuals recognize the value in recording their medication in preventing adverse effects. Moreover, the active updating and use of filling in medication history also suggests that the elderly know their medication information reasonably well (Kim et al., 2007). From this, it can be deduced that individuals, when given the opportunity will try and manage their own care, thus displaying accountability in regards to personal well being. As individuals are becoming more active in managing their own care, it is no surprise that these same individuals will also start to become more aware of their own health condition. In a study conducted by Jerden & Weinehall (2004), it was reported that individuals who had access to patient-held health records did change their behaviours. Highlighted below in Figure 1 are the findings from this study.
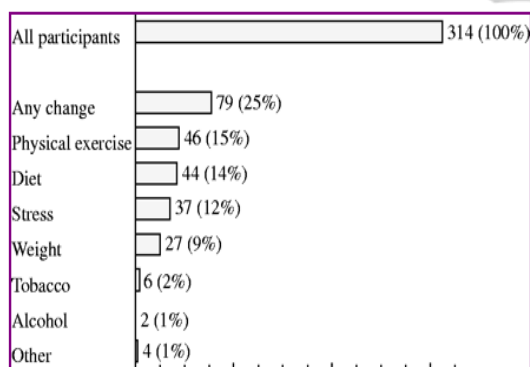

Figure 1: Percentage and Type of Change in Health Behaviour (Jerden & Weinehall, 2004).

As seen in Figure 1, there were significant changes after the implementation of individuals using patient-held health records. However, due to the limitations of the study, the most significant portion, being "any change" could not be further explored. Overall, physical exercise and diet were the most common of the health behaviour changes with fifteen and fourteen percent of participants reporting a change in their health behaviour. As an enabling technology, PHRs can aid individuals to become more actively involved in their own health. In a national survey conducted by The California Healthcare Foundation, it was found that 90 percent

of individuals in the United States wanted to be active partners with physicians, 52 percent wanted to make final treatment decisions for themselves and family members, and 38 percent wanted to make decisions together with their physician (Ball, Smith, & Bakalar, 2007). Given these statistics, a shift in consumer behavior has begun as consumers are taking a more accountable and active role in their own health. In two studies conducted in the fall of 2005 (McInturff; & Markle Foundation), it was found that 60 percent of Americans favored the creation of PHRs and believed that PHRs could improve safety and convenience. Of this same group, 69 percent of respondents said that they would "use it to check for mistakes" in their medical records and medical prescriptions. Additionally, another 58 percent said that they would use PHRs to get lab results over the Internet with 57 percent stating that they would turn to PHRs to contact and communicate with their family physicians. As such, a new trend is emerging in the way people, especially elderly individuals, manage their own health. As stated above, with 90 percent of individuals wanting to be active partners with their medical practitioners and only 9 percent wanting physicians to manage their health for them (Ball, Smith, & Bakalar, 2007). Technologies, in particular PHRs, have enabled individuals to take affirmative action in the delivery of care. With the economy as it is today, the ability for older adults to manage their own health can translate into savings of hundreds of dollars on prescription drugs and other health related expenses through access to information in guiding them in making healthier lifestyle changes.

Through the use of the two technologies as highlighted in this section. Elderly individuals today now have the tools that past generations have long sought after in assisting to make informed healthcare decisions. Through awareness and accountability of their own health conditions and treatment options, elderly individuals can change their health behaviors accordingly in order to live longer, and healthier.

4 BARRIERS TO THE INTERNET AND PHR USE AMONG THE ELDERLY

Given that the Internet and PHRs have just arrived in the healthcare field during the last decade or so, there are of course challenges associated with its adoption and usage among the elderly. Some barriers include, though not exclusively: 1) access to

a computer and the Internet, 2) computer literacy, 3) individuals that have the ability to understand and interpret health information, and 4) that users have the ability to assess the health information available to them (Donahue, personal communications, June 07, 2010). In another article by Tang et al. (2006), two wider range of barriers were discussed which were characterized as "environmental" and "individual-level" barriers. Environmental barriers included organizational, economic, legal, and privacy concerns while "individual-level" barriers included items such as workflow models, challenges to provider autonomy, recognition of value by the patient, and behavioural changes.

Moreover, from the literature, it was found that cognitive functionality and physical limitations among the elderly also played a big part in the adoption of information technology (IT) and information communication technology (ICT). In a study by Lober et al. (2006), it was observed that for many individuals over the age of 65, cognitive barriers were prevalent. With 11% of women and 15% of men over the age of 65 having moderate to severe memory impairment, the ability to navigate and keep track of what information was inputted and retrieved would prove to be daunting (Federal Interagency Forum on Aging Related Statistics, 2008). Furthermore in Lober's study, it was observed that as the population ages, physical limitations begin to limit certain activities. With 21% of the elderly population having visual impairment, 24% (ages 64-74) and 40% (age 75) with hearing impairments, and 60% having arthritis and other rheumatic conditions; this portrays a pretty clear image in how physical limitations can create barriers to IT and ICT adoption when individuals cannot see, hear, or navigate a computer properly (Lober et al., 2006).

Lastly, another common theme found among the literature with regards to barriers to the Internet and PHR adoption, were the terms digital and social divide. The digital divide being defined as the gap between individuals owing or knowing how to use technology, i.e., ICT infrastructure, hardware, and software, has always been a barrier to adoption (Kim et al, 2009). Given that low income families or elderly individuals may not necessarily have the resources to purchase a computer or accessories to optimize these online tools, many individuals are left in the dark. Moreover, accompanied with this notion of low income, is the idea of a social divide whereby the skills required to manipulate and utilize these technical tools are split between the low and high income individuals (Kim et al., 2009). Provided that

those with higher incomes usually have higher levels of education and continued access and training on up-to-date technologies, those on the lower income spectrum are usually the opposite. That is, low income earning individuals on average will never have a chance to learn the skills to use such technologies, and in many instances, may not even be exposed to them.

From listing the number of barriers associated with the adoption and usage of the Internet and PHR, it is hard to believe that these technologies can be used to increase health awareness and accountability. However, given the speed to which technology has advanced, and is continuing to advance, many barriers related to technology and its usage among the elderly are slowly dissipating. As the population ages and technology (computers and the Internet) becomes more common and prevalent in daily lives, the number of elderly individuals who don't have access or don't know how to use a computer will also decrease, thus increasing adoption and usage of the Internet and PHR as a health awareness and accountability tool.

5 DISCUSSION

In light of the number of barriers associated with the implementation, adoption, and usage of the Internet and PHR among the elderly; how then, can such tools be used in the creation of greater consumer awareness and accountability in overcoming the shortage of healthcare professionals in the foreseen future? As it was discussed above, the Internet and PHRs have the capabilities to change not only an individual's health behavior, but it can also place greater emphasis on the individual themselves to be more aware and responsible for the type of treatment they are to receive (Campbell, 2005). Provided that this generation of elderly individuals thrived and worked during the age of the computer, many elderly individuals today are at least aware of the Internet and computer as information gathering tools. Knowing this, the concept of using the Internet or a computer to retrieve or document information is not a new idea. However, even with familiarity and awareness of the computer and the Internet, many websites and computer applications are not user friendly. Due to the fact that not enough consideration has been given to the usability of many of these websites and PHR applications, the implications of usability features can play a big role in the adoption of these technologies (Squire & Preece, 1996). In the article by Lober et al., one of

the main reasons provided to account for the poor adoption rates of elderly individuals with computers was that "they were scared." Given that most websites today and applications are jumbled with many features and options, it is no wonder this is the case. One solution to this would be to gather stakeholder input prior to launching a site or application (or the proper term, usability testing), to ensure it matches the needs of those using it. In addition, another problem with this idea of technology as a social awareness and accountability tool, is the fact that physical ability plays a role in the success of such a strategy. As mentioned earlier, with old age being accompanied usually with some form of physical deterioration, the ability to use tools that are tailored towards able bodied individuals may not be adoptable to this older age group. Even though some tools and/ or applications are geared specifically towards the elderly, the costs associated to these pieces of technology are usually higher. With the knowledge that elderly individuals may not have high incomes, this can become an issue in terms of accessibility.

As elderly individuals become increasingly engulfed in technology, the natural shift towards using computers and the Internet for healthcare needs will become ever apparent. With 5 million adults aged 65 and over who use the Internet to access and search for health related information, this trend will surely continue to grow. Indeed as technology advances, mankind becomes ever more reliant upon it (Campbell & Nolfi, 2005). With elderly individuals (or consumers) using these tools in preparing themselves prior to seeing a family physician, i.e., looking for health information, individuals then can better maximize and utilize the limited amount of time they have with their physicians (Belzer, 1999). By changing the relationship between physician and patient, in that both parties arrive informed, patient outcomes can also be improved as adverse events are more noticeable, mistakes are flagged, and physicians are kept up-to-date with current best practices. However, as consumers are using the Internet to look for health information, the lack of proper training or level of knowledge required to interpret this information, could also have potential harm for individuals retrieving this information (Cline & Haynes, 2001). Although the Internet can never replace the information received and given from physicians, it can, if used and interpreted correctly, can provide useful insight into treatment options and barriers against adverse events. In one survey conducted by Neff (1999), it was found that 67% of

physicians reported having patients who discussed internet retrieved information with them. Given that this survey is a little outdated, one would expect the number of individuals today who discuss information with their physicians should be increasing as more individuals use the Internet to search for information.

In general, if the technologies used by the elderly are tailored towards their individual needs, it is believed that the adoption rates will greatly improve. Due to the fact that old age hinders many physical abilities that many others take for granted, technology may not always be the best fit. However, given the growing body of literature and advancement in technology, the use of the Internet, PHRs have shown to be quite useful in providing individuals with health information which have positively changed their health behaviours. Consequently individuals are more likely to take a greater interest in the control of their health information by being more accountable for it. However, many of these studies and findings are based on able bodied elderly individuals. Thus, this leads to the question those who cannot use these technologies. Will the results be the same? Is this really representative of the elderly population? Nonetheless, as physicians and patients begin to work side by side in sharing and exchanging information, patients will in all likelihood live healthier lifestyles because of this. Moreover, due to the large amounts of health information available on the internet 24/7 with personal health information stored within PHRs, accessible 24/7, the utilization and need to see healthcare practitioners (especially physicians) should also decrease. Individuals will search the internet for minor illnesses and utilize information available from their PHR to share with other health professionals in remote consultation. This subsequently should help move some of the burden away from the healthcare systems since individuals will not need to see physicians as often for minor items, allowing relief for the already small number of health practitioners available.

6 CONCLUSIONS

Technology has grown leaps and bounds over the last century. The internet has opened many new doors for individuals to gather and share information. This in itself is changing the ways many individuals do things. Provided that humans are becoming ever reliant on technologies to perform daily activities, it is only a matter of time until

looking up information on the internet becomes second nature (Givens, 2008). Of course, given the vast amount of information available on the Internet, perhaps having websites meet certain standards in health information would be beneficial in preventing harm (Cline & Haynes, 2001). One example of this is *HON* which stands for *Health On the Net Foundation* which aims to promote and guide the deployment of useful and reliable online health information and its appropriate and efficient use (HON, 2010). Even though this accreditation and standard is relatively new, it allows the individuals searching for online health information instant access and protection from inaccurate or false information. By providing consumers or the elderly the proper tools and information about health information and their own personal health records, many of these same individuals will change their health behaviors to that of a more positive one, or a health promotion and wellness model. Even though there are barriers associated with using technology in changing ones health behaviors as shown above; by working with stakeholders and application/ web developers, many of these hurdles can be overcome (Squire & Preece, 1996). Moreover, with technology advancing faster than anything else currently in development, the costs of owning a personal computer are decreasing while having access to the internet is increasing rapidly. Through the use of technology, particularly the Internet and PHRs, the number of individuals going to visit family physicians will decline. As more elderly individuals become healthier and act healthier from changing their lifestyles; many elderly individuals will think twice (or check twice) prior to seeing a physician. In doing so, this will ultimately decrease the number of individuals having to see a physician for all their information needs, thus allowing physicians more time in seeing more severely injured or ill individuals.

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