

Bridging the ICT Revolution and Communication Inequality: Lessons for Cancer Survivors

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Abstract

The rapid development of information and communication technologies (ICTs) offers new opportunities for providing health information to patients. In this study, we examined the contrasting effects that communication innovation through ICTs can bring in the care of patients with chronic diseases and the health promotion of medical consumers. We also discussed how disparities in information technology usage, based on socioeconomic status, affect the information gap and health inequalities among medical consumers. ICTs have democratized health information, but the information gap persists and can deepen health inequality. Communication inequality manifests in access to technology, information processing, attention to health information, information seeking, and health outcomes. Significant differences in health communication behaviors exist according to social class. Social disparities in technology access and usage contribute to the information gap, which ultimately leads to different health levels. Communication innovation through ICT has both positive and negative effects on managing chronic diseases. Positively, it democratizes information generation and consumption, enabling patients to interact with healthcare providers and peers for support and advice. Negatively, an abundance of medical information can cause cognitive overload. To maximize benefits and minimize adverse effects, efforts should focus on promoting ICTs in healthcare, enhancing patients' decision-making abilities, and addressing communication inequality. Healthcare institutions must provide consistent, high-quality information, and governments should support underserved populations' access to information, ensuring that ICTs contribute to improved health outcomes.

Keywords: ICT Revolution- communication inequality- cancer survivors

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Introduction

Today, the rapid development of information and communication technologies (ICTs) offers new opportunities for providing health information to patients. For example, cancer patients undergo a series of continuous processes from diagnosis to treatment and subsequent management. In terms of cancer control, ICTs can play various roles throughout the survival period, including prevention, detection, diagnosis, treatment, and end-of-life care (Viswanath et al., 2012). In other words, when dealing with a disease, it is essential for patients and healthcare providers to actively manage the condition to prevent recurrence and minimize post-treatment complications. ICTs can significantly contribute to these efforts by both patients and medical consumers. In this paper, we aim to address the following topics. First, we examine the contrasting effects that communication innovation through ICTs can bring in the care of patients with chronic diseases and the health promotion of medical consumers. Second, we discuss how disparities in information technology usage, based on socioeconomic status, may impact the

information gap and health inequalities among medical consumers.

Social and Communication Inequality

It is well known that there are differences in the burden of disease according to race, region, and socioeconomic status (SES) (Viswanath et al., 2012). Looking at trends in the United States over the past decade, despite steady declines in the incidence and mortality of chronic diseases, benefits have been uneven across race and SES (Eheman et al., 2012). Similar to the epidemiological characteristics of chronic diseases in developed countries like the United States, discussions about this health gap have begun in Korea (Khang & Kim, 2006; Park et al., 2010; Jung-Choi et al., 2011). In other words, low-income and uneducated individuals do not fully benefit from smoking cessation programs, early screening, and advancements in treatment technologies, leading to an increased interest in extending their healthy lifespans (Park et al., 2010; Viswanath et al., 2012).

Disparities in disease incidence and mortality driven

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by social determinants are referred to as health disparities (Viswanath et al., 2012). Health inequality is caused by hierarchical and structural differences that manifest as individual choices, such as smoking or obesity, as well as healthcare usage and health screening behavior (Institute of Medicine, 1999, 2003a, 2003b; Viswanath et al., 2012). For example, Black individuals are more likely to be diagnosed with smoking-related diseases (Foulds et al., 2010; ACS, 2009) and low-income groups are more likely to be obese (Colditz et al., 2012). Therefore, their morbidity and mortality rates are likely to improve the most slowly or stagnate. Recent studies have also suggested that when these unfavorable attributes are combined, the disease burden of the corresponding group is much higher (Williams et al., 2012). For instance, Black women with low education have a high probability of smoking and obesity, making them the most vulnerable to cancer due to the intersection of these three unfavorable characteristics. However, a bigger problem is that such health inequality is highly likely to be exacerbated in an information and communication innovation society. Therefore, we need to first examine the benefits and changes of how ICTs have democratized health information, and discuss in depth why the information gap exists despite these environmental changes and how it can deepen health inequality.

The incredible innovation of ICTs has indeed made many advances possible on a global scale and is also bringing about dramatic changes in the healthcare environment. But what if health inequality between social classes leads to information inequality? We need to understand and diagnose such phenomena and problems, and utilize ICTs to overcome them.

In fact, not many studies have been conducted on the mechanisms by which various types of inequality operate in a complex way (Viswanath & Ackerson, 2011). For example, health communication researchers thought that through the development and penetration of ICTs into everyday life, all population groups would be able to enjoy the benefits equally. However, there are differences within populations in their ability to access and interpret information, as well as differences between social classes in generating, manipulating, and disseminating information (McCloud et al., 2013). Communication inequality manifests itself primarily in five dimensions: (i) access to and use of information and communication technologies and media, (ii) information processing, (iii) attention to health information, (iv) information seeking, and (v) health outcomes. The effect of communication on people (Viswanath et al., 2012). In fact, NCI's HINTS data have reported significant differences in health communication behaviors according to social class (Viswanath & Ackerson, 2011; Viswanath, 2006; Blake et al., 2011). Therefore, communication inequality is likely to be a mediating factor that allows the various effects of ICTs to impact health inequality. For example, there are considerable social disparities in smartphone usage, Internet access, and broadband subscription (Yu, 2002; Chen & Wellman, 2004). People with low incomes and limited access to health information are more likely to have poorer health than other groups (Jung et al., 2013). As a result, it is challenging to envision that the development

of ICTs will immediately bring the democratization of information equally to all people. In reality, only a few classes have free access to vast amounts of health information through various methods and tools. Moreover, while telecommunications operators reduce benefits for low-volume users, who are typically low-income groups, they extend benefits to some high-volume users. This information gap will further deepen the disparity in access to health information between chronic patients and medical consumers, as well as the gap in their ability to manage their own health, ultimately leading to different levels of health.

Key messages of the ICT revolution

The three characteristics of communication innovation through ICT include the integration of information, the shift in the subject of information creation, and the diversification of information delivery platforms. The term "data deluge" originates from the fact that ordinary individuals freely create information, which is rapidly disseminated through various media. This change has given rise to "homo informaticus" (information-using man). Individuals have developed the ability to comprehend, utilize, and disseminate information while living amidst vast amounts of information daily. The main features of the ICT revolution are as follows.

First, the development of ICTs generates meta-information and new services through the integration of large-scale data. According to *The Economist*, the amount of information generated by humanity in 2010 reached 1,200 exabytes (*The Economist*, 2010), and one exabyte is equivalent to 150 million books owned by the Library of Congress, which is 100,000 times the size (Ashenfelder & Transferring, 2011). A key factor in the background of such large-scale information generation is that the integration of information produces new information or insights. For example, in public health, aggregated digital data facilitates patient-provider communications and increases customized treatment, ultimately improving the quality of medical services (Viswanath et al., 2012).

Second, with the rapid increase of channels through which information can be accessed and exchanged, the number of information communication tools used by consumers has also grown. For instance, 9 out of 10 adult Americans have a cell phone, and over half have a work or portable computer (Zickuhr & Smith, 2012). South Korea's high-speed wireless internet penetration rate ranks first among 34 OECD countries (OECD, 2012), and mobile phone, smartphone, and IPTV penetration rates have also risen rapidly in the past five years. In particular, as of 2012, the smartphone penetration rate is 58.5%, the highest globally (Korea Communications Commission, 2011). Many adults now possess more than one ICT tool, and ICTs have deeply permeated their daily lives, making adaptation to ICTs essential (Viswanath et al., 2012). ICTs have enabled people to access and consume information whenever and wherever they want, transforming them into active producers and exchangers of information.

Third, while the traditional subjects of information creation were media, today's subjects are active consumers

in the private sphere. ICTs have suggested the possibility that patients, who were previously a large group of information recipients, can actively change according to common interests and information needs by increasing individuals' information accessibility and ability to use information. Observing the trends in the use of mass media in the United States, this change has been especially noticeable online (Viswanath et al., 2012). In 2010-2011, the online audience grew five times that of public television and 12 times that of local broadcasting, while the number of readers of traditional media, such as newspapers and magazines, continued to decline (Korea Communications Commission, 2011). In other words, individuals who own digital media are becoming accustomed to interactive communication and are opening a new chapter in the exchange and dissemination of information while voicing their opinions.

Some limitations

Previous studies and writings have largely focused on communication innovation and the abundance of diverse information provided by new media, but they have not adequately addressed the acceptability of information or the quality of information.

First, regarding the acceptability of information, many people do not fully understand health information (Kontos and Viswanath, 2011) and often struggle to make informed medical decisions (Reyna et al., 2011; Han et al., 2009; Klein and Stefanek, 2007). This issue is more pronounced among cancer survivors with lower incomes and people of color with lower education levels (Kontos and Viswanath, 2011). To reduce health inequalities, it is essential to consider how information is provided rather than just focusing on the quantity of information (Armstrong et al., 2002; Garcia-Retamero and Galesic, 2010). For instance, providing health information in a narrative format can help reduce communication inequality because low-income groups often have difficulty understanding information using figures or statistics (Kreuter et al., 2007).

Second, regarding the quality of information, it is common for various sources to provide contradictory information on specific health issues (Viswanath et al., 2013). According to the communication inequality perspective, there is a difference in the ability to handle contradictory health information between social classes when exposed. For example, less educated people are more confused than more educated people about contradictory recommendations about the benefits and risks of fish, wine, and coffee consumption (Nagler, 2013). Controversy over contradictory information is increasing, not only in nutritional recommendations but also in relation to cancer information.

Future communication innovations need to be directed towards cultivating and facilitating informed or shared decision-making capabilities across all social strata. Lower socioeconomic groups are less likely to actively seek information outside healthcare institutions than higher socioeconomic groups (Ramanadhan and Viswanath, 2006). However, healthcare consumers' active search for information has a positive correlation with

their HRQOL through informed decision-making and health promotion practices (Nagler et al., 2010; Rutten et al., 2005). If the benefits of ICTs can be used to reduce communication inequality, reducing health inequality can also be expected. For example, a recent study reported that compared to other media, the difference in the degree of use of social media between races was small, and the interest of the low-income class was very high (Kontos et al., 2010). Similarly, Blacks and Latinos are more likely to use smartphones than higher social classes (Fox, 2012; Zickuhr and Smith, 2012). Therefore, it is necessary to activate social media platforms such as "Patient Like Me" so that patients from lower social classes can find medical information more easily and gain sufficient social support. In the case of South Korea, utilizing the well-equipped high-speed internet network to activate online patient communities will more efficiently satisfy the information needs of medical consumers. It is essential to build an integrated supportive patient care system that utilizes the advantages of communication innovation across the disease continuum by alleviating communication inequality among patients with chronic diseases in various social classes.

Lessons learned

In summary, communication innovation can result in both positive and negative outcomes in managing patients with chronic diseases. On the negative side, the abundance of medical information can cause cognitive overload in patients, making it difficult for them to process and understand the information (Arora et al., 2008). On the positive side, communication innovations lead to the democratization of information generation and consumption (Viswanath and Ackerson, 2011), enabling people with chronic illnesses to interact with healthcare providers and other survivors through social media and blogs. These developments have increased opportunities for sharing experiences, fostering a grassroots participatory model (Viswanath et al., 2012). In South Korea, a wealth of online information is changing how patients relate to and interact with healthcare providers (NCC, 2011). Peer-to-peer healthcare, which involves sharing health information obtained from caregivers or peers, plays a mediating role between patients and medical providers. Patients with chronic diseases like cancer participate in online health information exchanges more frequently than those without chronic diseases (Viswanath et al., 2012). Patients show better health outcomes when they actively exchange health information online, seek and provide advice, and give and receive social support (Wicks et al., 2010).

To maximize the benefits of ICTs in managing chronic diseases, it is essential to support patients in adopting a grassroots participation model. Such an information communication environment is crucial for enhancing patients' decision-making capabilities related to chronic disease treatment and addressing the information needs of medical consumers with a high probability of developing diseases (Hiatt & Rimer, 1999; Viswanath, 2005). Efforts should focus on understanding ICTs in terms of

medical information management, nurturing medical consumers who can utilize them, promoting the use of ICTs in the healthcare industry, and building a desirable doctor-patient relationship by enhancing patients' ability to make medical decisions. Policies should be developed to ensure ICTs can be used as democratic tools to resolve health inequality by reducing the communication inequality they can cause.

The development of ICTs can facilitate participatory decision-making in disease detection, diagnosis, and treatment by increasing the access and utilization of information necessary for cancer prevention, and help chronic disease patients monitor their own lifestyles. In terms of health communication, ICTs can help improve patients' health-related quality of life (Jung et al., 2013). However, it is crucial to use ICTs carefully in chronic disease management to prevent exacerbating communication inequality (Viswanath & Ackerson, 2011). Healthcare institutions must provide consistent, high-quality information, and governments must help underserved populations access information. Strengthening partnerships with online patient communities or community-based organizations is necessary to activate advocacy and facilitate information exchange among patients. By maximizing the positive effects of ICTs and minimizing their adverse effects, communication innovations are expected to contribute significantly to prolonging health and reducing the incidence of chronic diseases globally, in a cost-effective and powerful manner.

Future challenges

Cancer survivors often experience communication inequalities in medical settings. This paper examined how advances in ICT can help alleviate these inequalities and provide a new perspective on the role of digital tools in health communication. Communication inequality, defined as differences in an individual's ability to obtain, process, and understand health information and services, has a significant impact on cancer survivors (Viswanath, 2005; Viswanath et al., 2007). The proliferation of ICT in recent years has the potential to significantly reduce these inequalities, with applications such as telemedicine, electronic health record (HER), mobile health apps, online support groups and artificial intelligence showing promise.

First, telemedicine, the remote delivery of medical services, has revolutionized the connection between patients and caregivers. Cancer survivors or people with reduced mobility in rural areas can now consult with healthcare professionals at home (Smith et al., 2020). This technology facilitates more regular communication between patient and physician, improving health outcomes and patient satisfaction (Kruse et al., 2017). Second, EHR provides an effective means of streamlining communication and ensuring information accuracy. EHR provides a comprehensive patient history, facilitates coordination among health care providers, and enhances patient engagement in health care (Menachemi and Collum, 2011). In the context of cancer survivors,

EHRs can effectively manage complex and often multidisciplinary care records, increasing transparency and reducing the potential for communication gaps (Campanella et al., 2016). Third, mobile health apps provide personalized tools for cancer survivors to manage their health. These apps enable symptom tracking, medication reminders, and provide access to information resources to help cancer survivors manage their health and communicate more effectively with their healthcare providers (Matthew-Maich et al., 2016). Fourth, online support groups provide a platform for cancer survivors to communicate and share experiences. It not only provides emotional support, but also serves as a valuable resource for information exchange (Setoyama et al., 2011). These networks help bridge communication gaps and alleviate feelings of isolation often experienced by cancer survivors (Coulson, 2005). Fifth, artificial intelligence (AI) tools can help with predictive analytics, symptom management, and decision-making. Enhancing interactions between cancer survivors and healthcare providers to provide personalized recommendations (Topol, 2019). AI chatbots can effectively address the communication needs of cancer survivors by providing reliable health information around the clock (Laranjo et al., 2018). Ultimately, ICT has significant potential to address communication inequalities among cancer survivors. Successful integration of these technologies into healthcare systems requires overcoming challenges such as digital literacy, privacy and security concerns. Future research should focus on exploring the potential of ICT to address these issues, reduce communication inequality, and improve health outcomes for cancer survivors.

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