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Review

Uses of information and communication technologies in HIV self-management: A systematic review of global literature

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ABSTRACT

Information and Communication Technology (ICT) has been applied increasingly in supporting human immunodeficiency virus (HIV) prevention and treatment. The technological advances have extended to the field of HIV self-management. The objectives of this paper are to examine the design and use of ICTs in HIV self-management programs, to identify the knowledge gaps in existing practice, and to provide recommendations for future research and program development. A systematic review was conducted to search all English literature published prior to August 2016 in six electronic databases. The inclusion criteria also included either quantitative or qualitative assessments of HIV self-management programs that utilized at least one ICT platform in the program protocol. The search identified six studies conducted in Australia and the United States. The studies were diverse in sample size and enrollment criteria of study population. The major functionalities of ICT platforms (mobile phones and websites) included delivering information modules, sending medication reminders, supporting self-monitoring for medical adherence and risk behavior reduction, enhancing communication among participants, and providing easy access to HIV self-management information. The major challenges faced by self-management programs utilizing ICTs were lack of interaction and concern of privacy. The HIV self-management programs that employed ICT platforms were limited in number and geographic coverage. Most of the programs were also tested at an initial stage with small size samples and minimum technical innovation. The lack of explicit guiding theories and models on information behavior or technology use was observed in all studies. Use of ICTs in HIV self-management interventions is an emerging field. Future research would benefit from paying more attention to technical innovation and interactive features in applying ICT platform in self-management programs. The ICTs platforms, with increasing innovation in connecting people and places, can serve as a powerful tool to reduce the disparities in health care and health promotion. Future research is also needed to explore the feasibility of applying ICT platforms in self-management programs that serving populations from diverse socioeconomic background and in resource-poor settings.

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1. Introduction

The use of Information and Communication Technologies (ICTs) has grown rapidly and are increasingly incorporated into chronic disease self-management (Lorig, Ritter, Laurent, & Plant, 2006; Van der Meer et al., 2007), including HIV prevention and treatment efforts (Noar & Willoughby, 2012; Catalani, Philbrick, Fraser, Mechael, Israelski, 2013; Sullivan, Grey, & Rosser, 2013; Muessig, Nekkanti, Bauermeister, Bull, & Hightow-Weidman, 2015). ICT is an extended synonym for information technology, but having the stress on the role of unified communication and the integration of computer-based technologies (computer, software) and digital communication applications (social media, short messages). The nature of ICT breaks the geographic borders and provides people living with chronic disease with increasing access as well as remote support (Stellefson et al., 2013; While and Dewsbury, 2011). In the context of the HIV epidemic, ICTs have facilitated the interventions in reducing the virus transmission and in improving the quality of care (Chiasson, Hirshfield, & Rietmeijer, 2010).

Medical advancement in the treatment of AIDS has significantly reduced the mortality associated with the disease and extended the patients' life expectancy. The fact that AIDS is shifting from an acute disease to a chronic illness poses new challenges to the patients regarding lifetime changes in physical health, psychological functioning, social relationship, and health information seeking and use (Swendeman, Ingram, & Rotheram-Borus, 2009). Similar to other chronic diseases, AIDS can last for a long time with uncertainty and can be very intrusive to the patients' everyday life. The disease shares the common challenges with other chronic illnesses, such as detecting symptoms, finding effective treatment, managing regimens, and dealing with the psychological consequences of the illnesses. People living with HIV are required to keep a high degree of medical adherence. During the course of treatment, they may face stigma and discrimination, experience side effects from medication, and need psychological adjustment. Therefore, it is crucial to help HIV patients develop self-management skills and strategies to maximize the therapeutic benefits during the treatment continuum.

Self-management is defined as "the ability of the individual, in conjunction with family, community, and healthcare professionals, to manage symptoms, treatments, lifestyle changes, and psychosocial, cultural, and spiritual consequences of health conditions" (Richard & Shea, 2011, p.261). Self-management is specifically applied in the context of daily management over the course of a chronic illness (Grady & Gough, 2014). From a broad perspective, efficacious self-management requires patients to manage the symptoms and the consequences of living with the chronic illness by monitoring and managing their physical condition as well as any cognitive, behavioral, and emotional changes (Barlow, Wright, Sheasby, Turner, & Hainsworth, 2002). Existing studies also indicated that the primary objective of self-management is to encourage patients to assume an active role in care and decision making in disease management (Swendeman et al., 2009). Self-management processes are depicted in different ways in the literature based on the context of research and practice. Although the mechanisms of self-management have not been fully specified, recent studies identified some key components that an efficacious self-management program may encompass. These components include completing health promotion or maintenance tasks (such as maintaining medical adherence), strengthening personal skills and abilities (such as self-monitoring), and enhancing communication with health care providers, friends, family, and partners (Lorig & Holman, 2003; Grey, Knafl, & McCorkle, 2006; Ryan and Sawin, 2009; Samson & Siam, 2008; Schulman-Green et al., 2012). HIV self-management programs provide a means to improve adherence to care through patient empowerment and time sensitive intervention (Bal et al., 2016). It may also serve as an approach to help health care facilities to optimize their resources to better meet patients' needs.

Considering the nature of the HIV epidemic and its consequences, a disease-specific approach to self-management may benefit both health service delivery and research. It is also important to identify the support and services needed by people living with HIV, so that the interventions could be customized and implemented effectively. Various literature reviews indicate a growing trend of integrating ICTs into HIV intervention programs (Buhi et al., 2013; Kempf, Huang, Savage, & Safren, 2015; Muessig et al., 2015; Taggart, Grewe, Conserve, Gliwa, & Roman Isler, 2015; Tufts et al., 2015). However, the existing reviews have either targeted a specific HIV related issue (e.g., mental health), the use of a single ICT platform (e.g., mobile phone), or focused on a specific population (e.g., African American women). No systematic review is available to synthesize the literature on the applications of ICT platforms in HIV self-management programs. To bridge this research gap, the purposes of this study were to: 1) review the study design of self-management programs utilizing ICT platforms within the HIV epidemic context, summarize the preliminary evidence of the effectiveness of different approaches; 2) examine the benefits and challenges of implementing ICTs in self-management interventions, and 3) identify the knowledge gaps in the field and provide recommendations to future research and intervention development efforts regarding appropriate design and use of ICTs in HIV self-management programs.

2. Methodology

2.1. Data source

This review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as guidelines (BMJ, 2009). The literature search was conducted among the following six electronic databases: Academic Search Complete, CINAHL Complete, MEDLINE (EBSCO) with Full Text databases, PsycINFO, PubMed-Medline, and Web of Science Core Collection.

To capture relevant studies, the searches were performed using the following algorithm: (HIV OR "human immunodeficiency virus"