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Review article

Information and communication technologies for adherence to antiretroviral treatment in adults with HIV/AIDS

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ABSTRACT

Introduction: Information and communication technologies support interventions directed at the prevention of HIV transmission and patient monitoring by promoting improved accessibility and quality of care.
Objective: To evaluate the efficacy of information and communication technologies in the adherence to antiretroviral treatment in adults with HIV/AIDS.
Methodology: Systematic review conducted from March to May of 2015 in three databases—the Cumulative Index to Nursing and Allied Health Literature (CINAHL); the Latin-American and Caribbean Literature in Health Sciences (LILACS/BIREME) and SCOPUS; and the Cochrane library and the Medical Literature Analysis and Retrieval System Online portal (MEDLINE/PubMed). The sample consisted of nine randomized clinical trials based on the use of information and communication technologies for adherence to antiretroviral treatment in adults with HIV/AIDS.
Results: Three studies analysed the use of a short message service – SMS – two phone calls, two alarm devices, one web-enabled Hand-held device and one web electronic intervention. Improvements in the levels of adherence in the group subjected to the intervention were identified in seven studies. The phone was the type of information and communication technology with proven efficacy with respect to adherence. It was used to make calls, as well as to send alert messages and reminders about taking medications. Pagers were not considered to be effective regarding adherence to antiretroviral therapy.
Conclusion: The integrated use of information and communication technologies with standard care promotes increased access to care, strengthening the relationship between patients and health services, with the possibility of mitigating the difficulties experienced by people with HIV in achieving optimal levels of adherence to drug therapy.

1. Introduction

Information and communication technologies (ICTs) include any communication devices, including radio, television, cell phones, computers, network equipment (hardware), programs (software) and satellite systems, as well as the various services and applications for which they are used, such as video conferencing, online chatting and distance learning [1].

In health care, the use of ICT goes beyond the transmission of information as it supports self-care, behavioural changes, information exchanges among peers and emotional support, as well as providing benefits in tracking people with chronic diseases [2,3]. In the context of HIV/AIDS, ICTs have mediated interventions directed at preventing the transmission of the virus or monitoring patients by promoting improved accessibility and quality of care [4].

The influence of the advancements in the treatment of HIV/AIDS in the transition from acute to chronic disease is highlighted. Antiretroviral therapy (ART) has improved health, reduced opportunistic infections, and increased survival and improved quality of life in approximately 9.7 million people worldwide [5,6].

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Despite these benefits, the long-term use of ART implies challenges. The main difficulty faced by persons living with HIV is adherence (represented by ingesting at least 95% of tablets) due to the large numbers of pills and side effects and the high frequency of doses and/or tablets taken per day [7,8].

Failure of treatment adherence elicits individual (decreased CD4 T cells, viral resistance, risk behaviour, progression to AIDS and death) and collective losses (increased transmission of HIV and other sexually transmitted infections, higher treatment costs and hospitalizations) [6,9]. For these reasons, care tools aimed at continuous monitoring and counselling, as well as strategies for patient orientation/training, with a focus on achieving optimal levels of adherence to ART, are needed [5].

A theoretical review presented considerations regarding the use of information technology in the context of HIV, highlighting the possibility of a positive impact on the levels of satisfaction and patient safety, in addition to improvements in adherence to ART and care quality indicators. Moreover, the use of the Internet, digital media, information systems/monitoring and telephone provides information for the diagnosis and treatment of HIV, as well as opportunities for the electronic registration of data and increased access to information for both the patient and the multidisciplinary team [4].

A systematic review analysed 23 publications and 32 ongoing projects on the use of the telephone, Internet and social media in health care in the context of HIV treatment. There was emphasis on the use of technology in the following situations: primary prevention of HIV transmission, promotion of HIV testing, establishment of bonds and conservation care, support for starting ART, and promoting adherence to ART, as well as achieving increased viral suppression and preventing secondary infections. Although increasing attention has been devoted to the use of technology, it is necessary that other studies also analyse the efficacy of these care tools [10]. The term efficacy entails that an intervention produces the expected result under ideal circumstances [11].

Furthermore, reviews have considered the possibilities of the use of ICTs in the context of HIV/AIDS, but no systematic reviews about the efficacy of these technologies in treatment adherence in adults with HIV have been found. Therefore, the following research question was asked: "What is the efficacy of information and communication technologies in supporting HIV/AIDS antiretroviral treatment adherence in adults?" In this review, we considered the types of ICT that are mainly used to monitor people with HIV: computers, phones, software and pagers.

Analysis of the efficacy of ICT as a health care instrument can identify alternatives to supportive care for people living with HIV/AIDS, as well as the benefits and limitations of these alternatives. Analysis also highlights the possibility of sharing with practitioners and researchers the theoretical and practical assumptions for the replication of information and communication technologies with proven efficacy with respect to the adherence to antiretroviral treatment in adults with HIV/AIDS.

This study aimed to evaluate the efficacy of information and communication technologies with respect to adherence to antiretroviral treatment in adults with HIV/AIDS.

2. Methods

A systematic review was conducted according to the recommendations of the Cochrane Handbook for Systematic Reviews of Interventions [12]. A systematic review is a type of secondary study that enables the development of clinical guidelines for decision-making and facilitates the planning of clinical research in health care [13].

The research question was designed based on the PICO strategy, which stands for Patient (adults living with HIV), Intervention (using ICT) Comparison (standard care) and Outcomes (treatment) [14].

We performed intentional sampling from clinical trials based on the use of ICT for adherence to antiretroviral treatment by adults with HIV/AIDS, regardless of the publication year and language. We excluded repeat publications; those that did not answer the research question; case reports, experience reports and theoretical, qualitative or cross-sectional studies; review papers and clinical trial protocols, as well as clinical trials that have addressed the use of information and communication technologies in HIV prevention and rapid testing.

The electronic search was carried out by two reviewers simultaneously in three databases – the Cumulative Index to Nursing and Allied Health Literature (CINAHL); the Latin-American and Caribbean Literature in Health Sciences (LILACS/BIREME) and SCOPUS; and the Cochrane library and the Medical Literature Analysis and Retrieval System Online portal (MEDLINE/PubMed), accessed through the Portal CAPES (Higher Education Personnel Improvement Coordination).

The following controlled descriptors available in MeSH (Medical Subject Headings): Technology; HIV; Internet; Cell Phones; Software; Telemedicine; eHealth; Remote Sensing Technology; Clinical Trial were used. The crosses performed were [HIV and Technology], [Internet and HIV and Technology], [HIV and Technology and Cell Phone], [HIV and Technology and Software], [HIV and Nursing and Technology], [HIV and Telemedicine], [HIV and eHealth], and [Remote Sensing Technology and HIV]. The controlled descriptor Clinical Trial was included in all crosses.

After the search was completed on May 22, 2015, the articles were analysed by two authors, who read the titles and abstracts. Eligible studies were translated into the native language of the authors (Portuguese) and read in full.

Two reviewers assessed the quality of the clinical trials and the data independently. In case of doubt, there were meetings between the reviewers to reach consensus. To analyse the scope of the studies, the reviewers used a reference list.

From the crosses that were carried out, a total of 2517 studies were found in the investigated databases. From these studies, 91 replicates were removed. Analyses of the titles and abstracts yielded 65 pre-selected studies; however, 59 studies were excluded because they were not clinical trials, as described below: four case reports, five experience reports, 13 theoretical studies, nine qualitative studies, nine cross-sectional studies, four quasi-experimental studies, 12 review papers and three clinical trial protocols. Among the six selected articles, three were found in MEDLINE/PubMed, three were found in SCOPUS, and three were found using reverse search. Ultimately, the sample consisted of nine studies (Fig. 1).

Analysis of the quality of the studies was based on a quality scale described by Jadad et al. [15], in which the score ranges from 0 to 5 and is calculated from the following parameters: (1a) The study was random (using words such as 'random', "randomization")?; (1b) The method was appropriate?; (2a) The study was double blinded? (2b) The method was appropriate?; and (3) There were descriptions of losses and exclusions?

The studies were also analysed for allocation confidentiality and were classified as Category A—the allocation confidentiality process was adequate; Category B—the allocation confidentiality was not described, but it was stated in the text that the study was random; Category C—the allocation confidentiality was inadequate; and Category D—the study was not random [12].

Analysis of the studies was performed using a pre-defined instrument with the following information: author, year, country where the study was conducted, objective, proposed technology, number of participants, methods and results.