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Title: Internet Usage, Proficiency, Use of Internet/Smart Devices to Manage Health Among Enrollees in Cardiac Rehabilitation Program

Track: Cardiovascular Rehabilitation & Clinical Cardiology

Authors: Arun Kanmanthareddy, MD, MS; Abdulghani Saadi, MD, FACP; Karen Hardy, BSN, FAACVPR; Mark A. Williams, PhD, MAACVPR; Venkata Alla, MD.

Institutes: 1. Creighton University School of Medicine, Omaha, NE, USA. 2. CHI Health Creighton University Medical Center Bergan Mercy, Omaha, NE, USA.

Introduction: There is a large array of health-related resources available on the internet. This includes information on disease conditions, medications, reviews of providers, and access to personal data via patient portals, among others. However, previous reports have suggested that there are barriers to utilization of these resources, and in particular, “older” patients, who constitute a large proportion of those with cardiovascular diseases, rely on more traditional means of receiving health-related information.

Purpose: The purposes of this study were to 1) identify the extent of internet-based, health-related resource utilization in patients of varying ages, who were currently participating in cardiac rehabilitation; 2) identify the levels of patient proficiency in obtaining internet-based, health-related information resources; and 3) identify and examine the barriers to the adoption of technology by cardiac rehabilitation participants.

Design: Cross-sectional descriptive analysis.

Methods: Participants in this study were enrolled in one of four CHI Health, AACVRP-certified, hospital-based Phase 2 or 3 cardiac rehabilitation programs in Omaha, Nebraska, They were recruited, over a period of six months in 2016 and 2017, to participate in a survey of 28 questions. The indications for cardiac rehabilitation were: myocardial infarction, coronary artery bypass surgery, stable angina pectoris, heart valve repair or replacement, coronary angioplasty or coronary stent, heart or heart-lung transplant, or stable chronic heart failure. The survey was administered in the English language and was completely voluntary. The results are reported aggregately using descriptive statistics. Chi-square analysis was used to compare categorical variables and linear correlation between variables was assessed using Pearson correlation coefficient. A p-value <0.05 was used to define statistical significance. All data analyses were performed using STATA14 statistical package (College Station, TX).

Results: There were 169 survey respondents (~45% of eligible patients). Mean age of participants was 71.1 ±10.3 years, 66.8% of the participants were male, 11.6% were minorities (primarily African American and Hispanic), 50.9% had a college degree or above, and 53.2% reported an average household income of 40 thousand dollars or more annually. Device ownership (cellphone, tablet, or personal computer) in this population was 87.4%, 37.7% of subjects owned three devices, and 12.6% owned no devices at all. Although about half of respondents (53.1%) owned a smartphone, the personal computer was the preferred device to connect to the internet among respondents at 36.9%. Approximately two thirds of survey participants (69.3%) were daily users with an average internet time of 2.04±1.6 hours. Although 49.3% of participants used the internet for general purposes such as emailing, paying bills, shopping, and social media, only 28.8% used the internet for health-related purposes. Among these (28.8%), 31.1% reported looking at online-reviews of their doctors, 47.7% reported using the patient portal to review their electronic heath record, and 28.6% reported cross-checking or verifying information provided by their providers. Furthermore, 51.1% reported that the online search for their medical conditions was either difficult or they had never tried to find it. Utilization of other information
technologies was also low; 25.2% watched health-related videos online, 31.0% used mobile health applications, 15.7% used wearable devices, and 2.7% used fitness exercise tools. In terms of barriers to utilization, surprisingly, 75.6% of participants perceived no barriers to using the internet. Only 5.0% reported that they did not have internet, 3.2% said they could not afford the internet, and 16.3% said they either found the internet to be difficult to operate or preferred not to use it.

The mean usage time was not significantly different in participants who were <65 years (2.46 hrs/day) and ≥65 years (1.8 hrs/day, p=0.117). However, age had a weak negative correlation with usage time (Pearson's r = -0.16, p=0.084). Further, reported barriers to internet usage were not different between groups (<65 years: 24.3% vs ≥65 years: 28.3%, p=0.63). Participants who had college education or above had a higher mean usage time of 2.3hrs/day vs. 1.6hrs/day (p=0.022). In participants without college education, 62.2% perceived barriers to internet usage compared to only 37.7% of participants with a college degree (p=0.024). In participants with income below $40K, a higher percentage of patients had reported to have barriers to internet usage compared to those with income >$ 40k (38.8% vs 16.7%, p=0.007).

**Conclusions:** In this cohort of primarily older cardiac rehabilitation participants, we provide information on health information utilization. There is low level utilization of healthcare resources in this group when compared to similar groups (Pew Research Center and US Census data). Lack of college education and income below $40k were associated with low levels of internet usage among our study participants. Further studies are needed to better understand our findings regarding patient barriers and evaluating the role of health education and internet-based, health-related information resources which are geared towards better utilization.