Short communication

Patient adoption of an internet based diabetes medication tool to improve adherence: A pilot study

Scott A. Davis, MA[a,*], Delesha Carpenter, PhD MSPH[a], Doyle M. Cummings, PharmD[b],
Charles Lee, MD[c], Susan J. Blalock, PhD[a], Jennifer Elissa Scott, BA[d],
Lisa Rodebaugh, BSN RN[b], Stefanie P. Ferreri, PharmD[e], Betsy Sleath, PhD[a,f]

[a] Division of Pharmaceutical Outcomes and Policy, UNC Eshelman School of Pharmacy, Chapel Hill, USA
[b] Department of Family Medicine and Public Health, Brody School of Medicine, East Carolina University, Greenville, USA
[c] Polyglot Systems, Inc., Morrisville, USA
[d] Consortium for Implementation Science, Department of Health Policy & Management, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, USA
[e] Division of Practice Advancement and Clinical Education, UNC Eshelman School of Pharmacy, Chapel Hill, USA
[f] Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, USA

A B S T R A C T

Objective: To investigate the effect of a video intervention, Managing Your Diabetes Medicines, on patient self-efficacy, problems with using medication, and medication adherence in a rural, mostly African American population.
Methods: Patients selected their problem areas in medication use and watched one of nine 2-min videos with a research assistant at a clinic or pharmacy and were given an access code to watch all the videos at their convenience. Outcomes were measured at baseline and 3-month follow-up.
Results: Fifty-one patients were enrolled; 84% were African American and 80% were female (mean age: 54 years). Seventy-three percent watched at least one module after the initial visit. Improved self-efficacy was associated with a decrease in concerns about medications ($r = -0.64$). Low literate patients experienced greater improvement in self-efficacy than more literate patients ($t = 2.54$, $p = 0.02$). Patients' mean number of problems declined from 6.14 to 5.03. The number of patients with high or medium adherence rose from 33% at baseline to 43% at 3-month follow-up.
Conclusions: A practical, customized video intervention may help improve patient self-efficacy, reduce problems with medication use, and improve medication adherence in diabetes patients.
Practice implications: Providers should consider implementing technology-based interventions in the clinic to address common problems that patients have with self-management.

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1. Introduction

Diabetes affects 25.8 million Americans [1], and disproportionately affects African Americans, who are less likely to adhere to their medications, and thus control their diabetes, than White patients [2–5]. Because poor medication understanding and low adherence are common [6,7], medication management is a critical self-management skill for patients with diabetes [8].

Providers often lack adequate time to educate and motivate patients to take their diabetes medications [9]. Moreover,

restrictions on insurance coverage for diabetes self-management education [10] and lack of access to health care necessitate that self-management interventions expand to non-clinical settings. Therefore, we developed a video-based intervention called Managing Your Diabetes Medicines (MYDM) using the "Information-Motivation-Behavioral Skills Model" (IMB; Fig. 1) that posits that a better informed, more motivated patient with requisite behavior skills is more likely to initiate and maintain health-promoting behaviors, like taking medications [11], as studies of the IMB model show [12,13].

Videos can be delivered online using smartphones. Among smartphone users, minorities, those with no college experience, and lower-income users report that their phone is their main source of Internet access [14], with African Americans using mobile phones for a wider range of activities than Whites [15,16]. The

* Corresponding author at: University of North Carolina at Chapel Hill, 022 Beard Hall, Chapel Hill, NC 27599, USA.
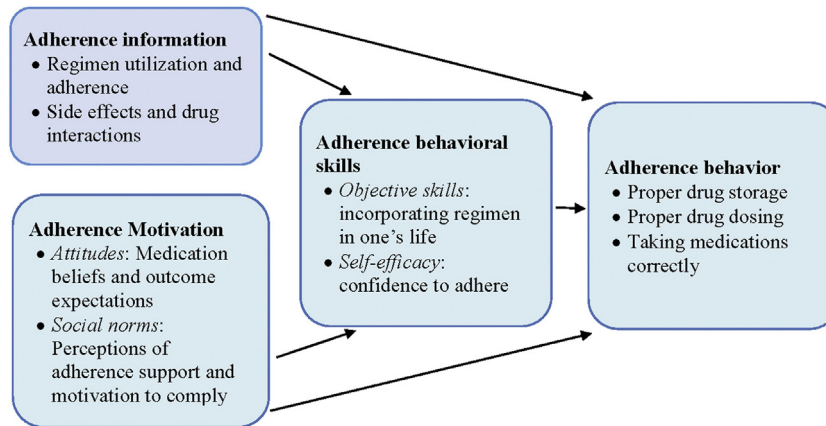E-mail address: sdavis81@email.unc.edu (S.A. Davis).

Fig. 1. Information-Motivation-Behavioral Skills Model.

present intervention was designed to be culturally-informed to maximize usability among limited literacy African American and White patients who are at-risk for poorer health outcomes than more literate patients [17,18].

The purpose of this pilot study was to: (1) gather input from White and African American patients with diabetes who are having difficulty adhering to their medicines about how to modify and improve our intervention, and (2) evaluate whether patient exposure to the intervention is associated with an increase in patient medication self-efficacy, a decrease in the number of reported problems in using diabetes medicines, and an increase in self-reported adherence to diabetes medications at 3 months.

2. Methods

2.1. Procedure

Patients were recruited at a family medicine clinic and a pharmacy in eastern North Carolina. Patients were eligible for the study if they were: (a) age 18 or older, (b) diagnosed with type 2 diabetes, (c) taking at least one oral and/or injectable medication (s) for diabetes, (d) English-speaking, (e) non-adherent to their diabetes medicines on a Visual Analog Scale (VAS) [19], and (f) African American or White. Approval was obtained from the University of North Carolina and the East Carolina University Institutional Review Boards.

First, patients were recruited to pilot test a newly developed diabetes self-efficacy scale [20] and the video intervention modules. Each of the 9 modules (Table 1) was about two minutes long and discussed strategies for dealing with a specific diabetes-related issue.

Next, a new group of patients read through a list of nine problems in using diabetes medications and selected the problems that were most important to them. The list of problems was based on empirical studies as well as medication-related skills that could be enhanced to improve patients' diabetes medication self-efficacy and adherence, according to the IMB framework. Patients only had to rank the problems they had experienced, so they did not have to rank all nine problems. The computer then listed all problem areas the patient had identified, and patients were then asked to prioritize in what order they wanted to watch the videos. The patients watched the first video module prioritized on their list during the visit. Participants were then given access codes to a secure website so that they could watch the rest of the internet-based video modules from home or work via an Internet-capable device.

The research assistant called the patient at 1 week to assess their progress and at 4 and 8 weeks to ask what changes they made after watching the videos.

The research assistant conducted a follow-up interview 3 months after the baseline visit. The team also used the access codes to electronically track how often patients accessed the online modules.

2.2. Measurement

Patients were asked to evaluate the degree to which 14 potential problems or concerns in using diabetes medications affected them ("none", "a little", or "a lot"). We recoded each of these into dichotomous variables (none versus a little or a lot).

Patients completed a 19-item diabetes medication self-efficacy scale [20]. Responses included: not at all confident (1), somewhat confident (2), and very confident (3). Scores ranged from 19 (lower self-efficacy) to 57 (higher self-efficacy) ($\alpha = 0.87$).

Other measures included Morisky's 8-item measure of self-reported medication adherence [21], the 4-item concerns and

Table 1
Number of times that patients watched each module (N = 51).

Module	Percent (n) who watched module	Mean (Range) number of times watched
"It's hard for me to pay for my diabetes medicine."	51% (26)	1.3 (1–3)
"It's hard for me to pay for my glucose monitoring supplies."	45% (23)	1.4 (1–7)
"I'm worried about my blood sugar going too low."	49% (25)	1.5 (1–5)
"I'm worried about side effects from my diabetes medicine."	53% (27)	1.6 (1–4)
"I'm worried about health problems from diabetes. Will medicine really help me?"	75% (38)	1.9 (1–5)
"It's hard to manage my diabetes."	29% (15)	1.1 (1–2)
"It's hard for me to fit taking my diabetes medicine into daily routine."	28% (14)	1.4 (1–3)
"It's hard (or I'm afraid) to give myself a shot."	29% (15)	1.1 (1–2)
"It's hard for me to get my medicines from the pharmacy."	24% (12)	1.1 (1–2)
Watched any module(s) after first meeting	73% (37)	Not applicable
Total number of modules watched	Not applicable	3.7 (1–8)