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A multi-modal intervention for Activating Patients at Risk for Osteoporosis (APROPOS): Rationale, design, and uptake of online study intervention material

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ABSTRACT

Objective: To develop an innovative and effective educational intervention to inform patients about the need for osteoporosis treatment and to determine factors associated with its online uptake.
Methods: Postmenopausal women with a prior fracture and not currently using osteoporosis therapy were eligible to be included in the Activating Patients at Risk for OsteoPOroSis (APROPOS). Four nominal groups with a total of 18 racially/ethnically diverse women identified osteoporosis treatment barriers. We used the Information, Motivation, Behavior Skills conceptual model to develop a direct-to-patient intervention to mitigate potentially modifiable barriers to osteoporosis therapy. The intervention included videos tailored by participants' race/ethnicity and their survey responses: ranked barriers to osteoporosis treatment, deduced barriers to treatment, readiness to behavior change, and osteoporosis treatment history. Videos consisted of "storytelling" narratives, based on osteoporosis patient experiences and portrayed by actresses of patient-identified race/ethnicity. We also delivered personalized brief phone calls followed by an interactive voice-response phone messages aimed to promote uptake of the videos.

Abbreviations: BMD, bone mineral density; GI, gastrointestinal; GLOW, Global Longitudinal Study of Osteoporosis in Women; HIV, human immunodeficiency virus; IMB, information, motivation, behavior; IVR, interactive voice-response; NG, nominal group; NHANES, National Health and Nutrition Examination Study; PAM, Patient Activation Measure; PAPM, Precaution Adoption Process Model; ONJ, osteonecrosis of the jaw.

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Results: To address the factors associated with online intervention uptake, we focused on participants assigned to the intervention arm (n = 1342). These participants were 92.9% Caucasian, with a mean (SD) age 74.9 (8.0) years and the majority (77.7%) had some college education. Preference for natural treatments was the barrier ranked #1 by most (n = 130; 27%), while concern about osteonecrosis of the jaw was the most frequently reported barrier (at any level; n = 322; 67%). Overall, 28.1% (n = 377) of participants in the intervention group accessed the videos online. After adjusting for relevant covariates, the participants who provided an email address had 6.07 (95% CI 4.53–8.14) higher adjusted odds of accessing their online videos compared to those who did not.
Conclusion: We developed and implemented a novel tailored multi-modal intervention to improve initiation of osteoporosis therapy. An email address provided on the survey was the most important factor independently associated with accessing the intervention online. The design and uptake of this intervention may have implications for future studies in osteoporosis or other chronic diseases.

1. Introduction

Osteoporosis contributes to more than 2 million fractures each year in the United States (U.S.) and is responsible for $19 billion costs annually [1]. Despite robust evidence supporting national guidelines for various medications to significantly reduce fracture risk among persons with prior fractures [2–7], only about 1 in 5 older women with a prior fracture receives osteoporosis evaluation and fewer than half of these women receive a prescription for osteoporosis therapy [8]. Even after receiving a prescription, only 60–70% of patients initiate osteoporosis treatment [9,10]. There is an urgent need for interventions aimed at increasing osteoporosis therapy initiation for patients at high fracture risk.

The majority of interventions used to improve uptake of osteoporosis treatment have targeted health care providers rather than patients [11–18]. The sparsity of patient activation interventions in the osteoporosis field is surprising given the reported successes of these methods in improving outcomes including improved patient knowledge [19–21], calcium intake [22], physical activity [23], and bone mineral density (BMD) testing [24]. Given the major societal trend for increased patient involvement in shared decision making [25,26], patient-based interventions are often more pragmatic and cost effective than more traditional provider-based interventions, though evidence of effectiveness is largely lacking [27].

From the patient perspective, the causes of non-initiation of osteoporosis therapy include concerns about medication side effects, costs, polypharmacy, and perceptions of limited efficacy [10,28–31]. According to the Information, Motivation and Behavioral Skills model (IMB) [32], when people are well-informed, motivated to act, and possess the skills and confidence to take action, they are more likely to initiate and maintain health-promoting behaviors that produce positive outcomes. The IMB model has been applied successfully to a variety of health behaviors, including changing risk behavior [32] and adherence to medications [33,34] for human immunodeficiency virus/acquired immunodeficiency syndrome and breast self-examination [35].

Internet-based communication technologies, with their advantageous cost effectiveness and ability to efficiently reach a large number of people [36], can help address the existing gap between guidelines and clinical practice for chronic conditions, such as osteoporosis. Online interventions can be tailored, are readily scalable and convenient, and are easily accessible to those with internet access, thus making them ideal venues for delivery of self-care and behavior-change programs for a large and rapidly growing segment of society that includes older adults [37]. This manuscript details formative qualitative work and the development and uptake of our online-delivered, individually-tailored, video-based, and multi-modal intervention within an ongoing cohort study of osteoporosis in older women.

2. Methods

We used the IMB model conceptual framework to develop a direct-to-patient, tailored intervention aimed at increasing the initiation of osteoporosis medications in women at high risk for fractures. We used qualitative methods to elicit information, motivation, and behavioral skills important to initiating osteoporosis treatment. Next, we designed a video-based, individually-tailored intervention to help mitigate potentially modifiable barriers to osteoporosis therapy. The intervention was delivered online and by DVD mailings to women aged 55 and older who had a history of fractures. We also conducted personalized phone calls followed by interactive voice-response (IVR) messages to promote intervention uptake.

2.1. Study population

The Global Longitudinal Study of Osteoporosis in Women (GLOW) cohort is an international prospective, longitudinal, observational study of women 55 years of age and older. Data on osteoporosis risk factors, treatment approaches, patient attitudes, beliefs and behaviors related to osteoporosis, and fracture outcomes have been collected for up to 5 years through annual patient questionnaires from 2005 to 2011. GLOW includes 60,393 women (28,170 in the US) recruited from 723 physicians (298 in the US) [38]. We sent survey materials to the subset of GLOW participants from the 7 GLOW U.S. sites (Birmingham, AL; Los Angeles, CA; Worcester, MA; New York, NY; Cincinnati, OH; Pittsburgh, PA; Seattle, WA) at high risk for future fracture as determined by: (1) reported history of a prior fracture after age 45 in previous GLOW surveys, and (2) no reported current use of osteoporosis medication with the exception of estrogen treatments. This sub-cohort of GLOW participants (n = 2684) formed the Activating Patients at Risk for OsteoPOroSis (APROPOS) study population. The APROPOS baseline survey was sent to 4928 GLOW participants who had a fracture history. We received 3226 completed surveys (64% response rate), of which 2684 met eligibility criteria. These women were randomized to receive intervention materials (intervention group, n = 1342) or usual care (no intervention and routine medical care per their existing health care providers, n = 1342). The intervention was developed as part of a randomized clinical trial (ClinicalTrials.gov identifier NCT01907269) and was provided free of charge to participants. This report focuses on the intervention development and factors associated with the uptake of our online intervention.