Abstract

Introduction: Perceived self-efficacy comprises the beliefs held by an individual about his or her ability to organize and execute the tasks required to achieve a desired result. Self-efficacy beliefs have been shown to predict subsequent work-related performance and may be transformed through experiences that convey a realistic sense of what is required to be successful in a given domain of functioning (mastery experiences). Many continuing medical education (CME) activities may be considered mastery experiences, and therefore, changes in perceived self-efficacy are viable measures of educational outcomes. Changes in perceived self-efficacy can be measured fairly easily.

Method: We evaluated changes in self-efficacy beliefs by administering a survey of 17 items related to dementia care to members of the primary-care track of a CME activity focused on dementia. Participants were assessed before and 30 days after participating in the activity. We added clinical vignettes to the post-activity assessment to evaluate clinical behavior. We also administered the efficacy items and the vignettes to a demographically-matched group of nonparticipants.

Results: Few demographic differences were found among the 3 groups (baseline, post, nonparticipants). We were able to measure increases in perceived self-efficacy among participants in all items, with statistically significant differences measured in 11 out of 17 items. Participants were more likely than nonparticipants to make correct management decisions in the clinical vignettes, with significant differences measured in 3 out of 9 items. Nonparticipants performed significantly better than participants on 1 item, which may reflect participation bias.

Conclusion: This 2-day course significantly transformed efficacy beliefs of primary-care participants related to dementia care. Participants were more likely than nonparticipants to make appropriate management decisions related to dementia care as assessed using a clinical vignette.

INTRODUCTION

In an earlier article we outlined the rationale for using the construct of perceived self-efficacy as the basis for evaluating the outcomes of selected educational interventions [1]. In this article we extend this work by reporting the evaluation of the educational outcomes of a 2-day CME activity focusing on the diagnosis and management of dementias that was conducted from the self-efficacy perspective. Though readers may wish to refer to the earlier article, a brief discussion of the construct of self-efficacy and its application in this context follows.

The construct of self-efficacy is central to social cognitive theory. Since it was first proposed by Bandura in the late 1970s [2], more than 10,000 studies have been conducted from this perspective, producing an estimated 1.67 articles per month in the peer-reviewed literature during 2004 alone [3]. Bandura defines self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” [4]. He goes on to explain that self-efficacy beliefs determine how people think, feel, and motivate themselves.

Self-efficacy beliefs have been proven to correlate with work-related performance in multiple settings including those of medical professionals [5-14]. Although Bandura identifies a number of sources of self-efficacy beliefs, including social modeling (observing others), social persuasion (confidence expressed by others in one’s abilities), and physical or emotional states (the perception by the individual that the experience of nervousness may indicate lack of ability), the most important source of self-efficacy beliefs, according to Bandura, is the so-called “mastery experience.” Mastery experiences convey to the learner sufficient information for the learner to form a realistic view of what is required to successfully complete a task. This may include the opportunity to develop and practice relevant skills and subskills, and may include concrete strategies for overcoming obstacles [15]. This is of interest to CME professionals because many CME activities provide sufficient elements of mastery to transform an indi-
individual's efficacy beliefs. Self-efficacy beliefs can be measured before and after interventions that provide mastery experiences using items that ask the respondent to indicate the degree to which he or she feels confident in his or her ability to perform relevant tasks. Though the measured change in efficacy beliefs is not a measure of current ability, it is a strong predictor of the efforts that the individual will undertake to gain and consolidate these skills. The transformation of efficacy beliefs affects motivation and behavior through a process that Bandura refers to as “reciprocal causation,” whereby an individual’s behavior interacts with and is determined by personal factors such as beliefs about ones capabilities (efficacy beliefs) and the environment, which may include external feedback about one’s capabilities gained through mastery experiences and through other sources. [4].

The purpose of this evaluation was to determine if participation in a 2-day course devoted to the diagnosis and management of dementia resulted in changes in self-efficacy beliefs related to dementia care. Participants were assessed at baseline and post-activity using self-efficacy items. Clinical vignettes were added to the post-activity assessment and responses were compared to a matched group of nonparticipants. Measures included differences in the baseline characteristics of the 3 groups, gains in perceived self-efficacy related to dementia-related clinical tasks, and whether participants are more likely than nonparticipants to make appropriate evidence-based management decisions posed by the clinical vignettes.

METHODS

Our evaluation assessed the educational outcomes of the Fifth Annual Dementia Congress. The Dementia Congress is an annual multidisciplinary meeting devoted to the diagnosis and management of dementia, which also provides an overview and analysis of various avenues of ongoing research related to diagnosis and treatment. The CME activity was held November 3-5, 2006, in Lake Buena Vista, Florida. The activity attracted more than 700 participants and was certified for 14.25 AMA PRA Category 1 Credits™. The Congress addressed 3 target audiences: primary-care practitioners (including primary-care physicians, primary-care nurse practitioners, and primary-care physician assistants), neurologists, and psychiatrists. All 3 groups, or tracks, met in plenary sessions that addressed major themes before separating into workshop tracks targeted to the needs of each specialty. This evaluation focuses on the primary-care track.

Our evaluation featured a longitudinal, matched-control design, and included 3 groups: (1) a baseline group, (2) a post-activity group, and (3) a control group of demographically matched nonparticipants. The control group was matched to the participants according to the following 7 demographic characteristics: degree, primary specialty, average number of patients seen per day, number of years in practice, practice setting, practice type, and academic affiliation. Nonparticipants (n = 97) were solicited from a commercially available database, and a modest incentive was offered to encourage participation.

The baseline group consisted of all participants who had preregistered for the primary-care track of the dementia congress (n = 80). The baseline group received a survey consisting of efficacy items. The post group consisted of participants who had responded to the pre-survey and attended the course (n = 51, response rate 52%). They were surveyed approximately 30 days after the Congress and received the efficacy items and clinical vignettes. The nonparticipants were also surveyed during the same time period and received both the efficacy items and the vignettes.

Questionnaire Design and Delivery

We developed a series of 17 efficacy items exploring several domains related to dementia care arranged in increasing level of task-related difficulty, according to the procedure recommended by Bandura [16]. However, we used a 7-point Likert scale rather than the 0-10 point scale. Likert scales with a smaller range have demonstrated response patterns similar to a 10-point scale [17]. Self-efficacy items explored clinical tasks related to diagnosing and managing patients who suffer from dementia including symptom recognition, screening, selection use and interpretation of screening tools, use and interpretation of imaging exams, selecting among therapeutic options, evaluating treatment, and management of behavioral issues. The members of the baseline group were asked to respond to the efficacy items rating confidence in their ability to perform the task on a scale ranging from 1 (not at all confident) to 7 (highly confident). Approximately 30 days after the activity, the participants were again asked to rate their confidence related to performing the tasks outlined in the 17 items. In addition, this post group received a series of 3 clinical vignettes posing diagnostic and management problems ranging from the recognition and evaluation of early symptoms to the management of behavioral issues in a patient with advanced disease. The use of clinical vignettes as a proxy for performance is supported by 2 validation studies that used open-ended responses to management choices posed by vignettes as compared to the gold standard measures of chart abstraction and standardized patients. Although this evaluation used closed- rather than open-ended items, this procedure is currently widely used in educational outcomes evaluations. The use of closed-ended items was a practical choice that makes data analysis much easier, but presents a threat to validity, as noted by the authors of the validation studies [18,19]. The survey was conducted using a web-based application. All participants received an e-mail invitation with a link to the study survey. E-mail addresses for the baseline participants were obtained from their preregistration
to the Congress. For the follow-up, identified Congress attendees were sent a similar invitation including a link to the survey. All nonrespondents were sent reminders 1 week and 10 days after the initial invitation.

**Data Analysis**

All data were analyzed using SPSS 14.0 (SPSS Inc., Chicago, IL, USA) and significance was set at an alpha level of 0.05. To assess efficacy items, 2-tailed paired t-tests were used to compare the means between 3 groups. Since the means used categorical responses, we used chi-square tests. Answers to clinical vignettes were dichotomized to correct and incorrect responses.

The primary analysis focused on demographics, self-efficacy items, and the management items posed by the clinical vignettes. Descriptive frequencies were generated for each survey item. There were 7 demographic questions including participants’ degree, primary specialty, years in practice, practice location, practice setting, academic affiliation, number of patients treated per day, and number of patients with dementia-related issues treated per day. Primary specialty included Family Practice, General Practice, Internal Medicine, Psychiatry/Psychology, Neurology, and other. Years in practice was a categorical variable including (1) less than 5 years, (2) 6 to 10 years, (3) 11 to 15 years, (4) 16 to 20 years, and (5) more than 21 years. Practice location was a 3-category variable including (1) urban, (2) rural, and (3) suburban. Practice setting included 3 categories as well: (1) solo practice, (2) group practice, and (3) hospital-based practice. Finally, academic affiliation was a dichotomous variable (ie, Yes or No).

Participants whose degree was not MD, Physician Assistant (PA), or Nurse Practitioner (NP) were dropped due to low numbers and overall insignificance to this analysis. Additionally, participants whose primary specialty was not primary care (ie, Family Practice, General Practice, Internal Medicine) were not included in the analysis because we wanted to evaluate the primary-care track of the Congress.

**RESULTS**

The response rate for the post survey group was 52%. More than one-third of participants in all the groups were MD/DOs, and a majority of the respondents identified their specialty as Internal Medicine or Family Medicine. All participants treated more than 20 patients per day. Nonparticipants reported seeing a significantly lower percentage of patients with dementia-related issues daily (2.7% versus 4.3% P < .05). Aside from number of patients with dementia-related conditions, there were no other significant differences among the 3 groups (Table 1).

**Efficacy Items**

Measures of perceived self-efficacy for the baseline group and the nonparticipant group were similar. We measured numerical gains in perceived self-efficacy for all of the efficacy items post-activity. Of the 17 self-efficacy items, 11 were statistically significant (Figure 1).

**Clinical Vignettes**

Participants were more likely than nonparticipants to make appropriate management choices in 5 of the
9 management items posed by the clinical vignettes. Three of these were statistically significant and related to appropriate use of pharmacotherapy (Figure 2). Nonparticipants were more likely than participants to make appropriate management choices in 2 items, 1 of which was significant.

### DISCUSSION

We observed numerical gains in perceived self-efficacy for all post-activity items and noted statistical significance in 11 of the items. The clinical vignette responses demonstrate that participants who show substantial gains in perceived self-efficacy are more likely than non-
participants to make appropriate evidence-based management decisions regarding the use of pharmacotherapy in patients with dementia in the context of a clinical vignette. This finding provides some reassurance that measures of perceived self-efficacy may provide a useful and cost-effective way of measuring the educational outcomes for selected activities.

Nonparticipants were significantly more likely than participants to make the correct assessment on 1 item. Specifically, this question concerned a patient presenting with forgetfulness consistent with normal aging. An approximately equal number of participants and nonparticipants would have made a diagnosis of mild cognitive impairment, but participants were far more likely to consider other causes for the patient’s symptom such as generalized anxiety disorder or vascular cognitive impairment (Figure 3). This result may reflect a participation bias, whereby participants in an in-depth program on dementia may pay more attention to subtle changes in cognitive status and be more willing to consider less-common causes of cognitive changes.

**Limitations**

Although correlation between measures of self-efficacy and subsequent work-related performance is a consistent finding in multiple meta-analytic investigations [5-13], the reader is cautioned that correlation does not establish causation. Other limitations include the significant difference in the number of patients with dementia that we found between our participant and our nonparticipant...
groups. Readers are also cautioned that learning and the incorporation of new skills into practice is a complex process. Although the construct of perceived self-efficacy yields important insights into the internal processes that motivate learning and change, other perspectives are also required to explain this process.

CONCLUSIONS

This evaluation demonstrates the value that measures of perceived self-efficacy may have as a method of measuring the outcomes of selected educational activities. More rigorous studies that are designed to measure the predictive power of perceived self-efficacy against gold standard measures of physician performance such as chart review will increase our confidence. However, the current body of knowledge combined with cost-effectiveness and ease of collecting self-efficacy data make it an attractive option in an evaluation setting.

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