

Literacy and cultural adaptations for cognitive behavioral therapy in a rural pain population

Melissa C Kuhajda, PhD,¹ Beverly E Thorn, PhD, ABPP,² Susan W Gaskins, MPH, DSN, ACRN,³ Melissa A Day, MA,² Chalanda M Cabbil, BA²

¹Department of Psychiatry and Behavioral Medicine, University of Alabama School of Medicine, Tuscaloosa Campus, P.O. Box 870326, Tuscaloosa, AL 35487-0326, USA

²Psychology Department, The University of Alabama, Tuscaloosa, AL, USA

³Capstone College of Nursing, The University of Alabama, Tuscaloosa, AL, USA

Correspondence to: M Kuhajda
mkuhajda@cchs.ua.edu

Cite this as: *TBM* 2011;1:216–223
doi: 10.1007/s13142-011-0026-2

Abstract

Low literacy and chronic pain have been identified as significant problems in the rural USA. Cognitive behavioral therapy (CBT) is a widely used efficacious psychosocial treatment for chronic pain; adaptations for low-literacy rural populations are lacking. This paper reports on preparatory steps implemented to address this deficit. Adapting an existing group, CBT patient workbook for rural adults with low literacy is described, and adaptations to reduce cognitive demand inherent in CBT are explained via cognitive load theory. Adhering to health literacy guidelines, the patient workbook readability was lowered to the fifth grade. Two key informant interviews and four focus groups provided the impetus for structural and procedural adaptations. Using health literacy guidelines and participant feedback, the patient workbook and treatment approach were adapted for implementation in low-literacy rural adult chronic pain populations, setting the stage for proceeding with a larger trial using the adapted materials.

Keywords

Chronic pain, Rural population, Health literacy, Low literacy, Group cognitive behavioral therapy, Key informant interviews, Focus groups

BACKGROUND

Numerous studies have demonstrated the link between limited literacy skills and poor health outcomes among adults in the USA [1, 2]. The Institute of Medicine's (IOM) definition of health literacy is “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” [1]. Health literacy is further defined as encompassing both patient literacy skills and healthcare providers' ability to convey health information at literacy levels appropriate to patients [1]. Recently, Kutner et al. [3] reported that one third of the US population is at the lowest levels of health literacy. Functional literacy focuses on how well adults use print materials in everyday tasks. In turn, functional health literacy is the measure of an adult's capacity to function in a highly complex healthcare system (e.g., reading

Implications

Practice: Specific guidelines for simplifying patient healthcare print materials and the methods for verbal delivery to low literacy patients are provided.

Policy: The Institute of Medicine calls for the creation of a more health literate environment; this research study demonstrates a direct application of this policy and should be disseminated as such.

Research: Psychosocial treatment outcome researchers need to focus on making appropriate adaptations for specific patient populations; this study outlines the adaptation of an evidence-based chronic pain CBT protocol for rural residents with chronic pain and low literacy.

prescription labels, filling out health insurance forms, and performing numeracy tasks associated with taking medications) [4]. Millions of Americans are lacking in these critical skills [5, 6].

Low literacy has been identified as a significant problem in the rural USA [5, 7, 8]. Jackson et al. [7] found that patients living in rural areas read on average 4.6 grade levels below their last grade completed with more than 58% reading at or below the 5th grade level. The above study, conducted in rural southeastern clinics serving indigent patients, examined and compared the reading levels of their patients with readability levels of medical brochures routinely provided within the clinics. Nearly all medical brochures were found to be written on a reading level far exceeding the average patient reading ability. This finding, and others, has fueled a national priority within the healthcare system for the simplification of written patient education materials [9, 10].

Although simplification of print materials improves patient comprehension [11], this strategy is not sufficient to overcome the barriers associated with limited literacy [12]. Additional strategies that incorporate cognitive load theory [13] principles into the presentation of treatment materials and delivery may broaden the constituency of individuals that can benefit from

health-related materials and education. Cognitive load theory promotes optimal conditions for learning by minimizing cognitive demand, while maximizing active processing of new information [11, 14, 15]. For example, Doak et al. [15] encourage teaching participants to break down large amounts of information into smaller groups of like items to help remember important health facts; fewer chunks of information are thereby competing for active processing. Additionally, Doak et al. [15] encourage teaching participants to associate new information into their existing body of knowledge (assimilation), and to present new information in a manner that will maximize participant involvement (interaction). Cognitive load theory has developed substantially since its inception in the 1980s and continues to be implemented by health literacy researchers and educators [11, 14, 15]. For example, adapted health education treatments and brief psychotherapies have been implemented in populations as diverse as depressed elderly patients [16], low-literacy patients with HIV [17], and low-literacy African-American patients with asthma [18].

Chronic pain is a major public health issue. Pain costs \$100 billion annually in lost workdays, medical expenses, and other benefits, and is the number one reason for adult disability [19]. Limited research suggests that a greater percentage of rural individuals report chronic pain than their urban counterparts [20]. In addition to rural residency as a risk factor for chronic pain, annual income of less than \$25,000 and no high school diploma have been associated with a greater likelihood of having disabling chronic pain [21].

A widely accepted psychosocial treatment for chronic pain is cognitive behavioral therapy (CBT). The aim of CBT is to improve patient functioning and lower pain-related distress, rather than to eliminate the pain or the cause of the pain. CBT is based on the conceptual model that thoughts and emotions are integral to a patient's coping behaviors and adaptation to a chronic painful condition. CBT is a structured interactive treatment that typically utilizes patient and therapist manuals, handouts, and worksheets. Based on multiple outcome measures, CBT is efficacious for a variety of chronic pain conditions [22–25]. It is important to note, however, that the available efficacy outcomes were not obtained with low-literacy populations; the effectiveness of CBT for these populations has not been established.

PURPOSE

The present study is part of a larger NIH-funded randomized controlled trial comparing the efficacy of group CBT versus group education for rural Alabama individuals with chronic pain. The priority population is adult individuals with chronic pain from federally qualified (low income) health clinics

in four rural Alabama counties located in the Black Belt of Alabama (originally named for its rich soil and later referring to the high proportion of African Americans in this population, descendants of freed slaves who remained on the land). Approximate racial/ethnic breakdown across these counties is 68% African American, 31% white, and 1% other. Approximately 25% of these adults did not graduate from high school, and about 30% of this population lives below the poverty level [10]. Treatment outcome research with this population is virtually nonexistent.

This study describes the process for adapting a group CBT patient workbook and approach for rural Alabama adults with low literacy and chronic pain. Careful attention to appropriate protocol adaptations of efficacy-tested treatments is a necessary and important part of research and treatment implementation in populations with specific needs or limitations, such as low literacy. Given that CBT relies on patient workbooks, cognitive exercises, and worksheets, it was critical to consider adaptations for print materials as well as the treatment approach to provide a fair test of the appropriateness of CBT for a low-literacy population. Such protocol adaptations have been found to improve patient comprehension in health-related matters [11, 12]. Furthermore, since the priority population is rural, with a relatively high proportion of African Americans and poverty-stricken people, culturally appropriate adaptations of the patient workbook and treatment approach were also considered based on key informant interviews and focus group participant feedback.

METHODS

Process of Adapting the Workbook

Adaptation of the group CBT patient workbook was conducted by the study investigators and graduate student assistants. The existing group CBT manual [25] is widely used in clinical research and practice, and there are published efficacy data using this specific manualized approach [26]. Extensive low literacy adaptations were made for all 10 treatment sessions, each containing weekly, step-by-step session guides to a CBT pain intervention for group leaders and members.

The initial adaptation of the patient workbook utilized the Plain Language Action and Information Network's (PLAIN's) [27] federal plain language guidelines and the guidelines of Doak et al. [15]. However, the primary source used to make adaptations was the National Cancer Institute's (NCI's) *Checklist of Key Principles of Effective Low-Literacy Print Materials* [28]. The NCI Checklist organizes effective communication principles into four major categories: (a) Content/Style, (b) Layout, (c) Visuals, and (d) Readability. *Content/Style* adaptations included providing a limited number of concepts per session, removing jargon, and simplifying terms. Addition-

ally, sentences were revised to be simple, direct, and written in the active voice. For example, Lazarus and Folkman's [29] Transactional Model of Stress was simplified to the "Stress-Judging-Coping Model of Pain." Beck's [30] concept of "intermediate beliefs" was shortened to "should beliefs." A Session 1 goal in the original workbook was "To reduce the frequency and seriousness of pain flare-ups, by learning to think differently about stressful situations" [25]. This goal was adapted to "You will learn how your thoughts, feelings, and behavior affect your pain." Regarding style adaptations, worksheet examples were selected to reflect concerns common to the priority population. For example, the adapted workbook's automatic thoughts worksheet used an example demonstrating concerns common to this population such as the phone being disconnected due to financial limitations. *Layout* adaptations included the use of simple headings in upper- and lowercase letters to highlight categories of information. To emphasize important segments of text, underlining or bolding was used instead of all capital letters. A sans-serif type style was used; the typeface was never less than 12 point and usually 14–16 point. Furthermore, the patient workbook contained more white space within the body of the text than is typically used in a high-literacy manual. *Visual* adaptations were made to the patient workbook by including simple illustrations. For example, to illustrate the connection between thoughts, emotions, and behavior, we included a simple diagram of a man with a negative "thought cloud" leading to an illustration of a negative emotion as well as a negative behavior. We also included clip-art throughout the manual to enhance the visual attractiveness of the text. To estimate the *readability* of our adapted materials, the Fry [31] formula was utilized. The Fry readability formula has been validated at both the primary and secondary grade levels and correlates highly with other readability formulas [32]. The readability level of the patient workbook was successfully lowered from the tenth to the fifth grade level [31], consistent with the recommended guidelines by the PLAIN [27] Language US Government directive and other health literacy experts [14, 15].

Table 1 provides a brief, step-by-step, procedural outline used in this study for the initial adaptations of the patient workbook. These guidelines represent a synthesis of current resources on adapting materials for appropriate literacy [9, 15, 27, 28, 33–40].

Process of Conducting Key Informant Interviews and Focus Groups

The adaptation process entailed several stages, including the initial one in which the original manual was revised using the above literacy research guidelines, a second stage in which key informants who had received prior treatment compared the original and adapted manuals and gave treatment approach suggestions, and a third

stage in which focus groups gave feedback about the penultimate revision and proposed treatment process. Following focus group feedback, final revisions were made and the larger trial using the adapted materials commenced. All interviews lasted approximately 90 min, were audiotaped, and transcribed verbatim. Participants in the interviews received \$25 compensation for time and travel costs. Approval for use of human participants was received from the University of Alabama Institutional Review Board.

Key informant interviews—In order to explore the appropriateness of the initial adaptations of the patient workbook, key informant interviews were conducted with two African-American individuals who had completed a previous clinical trial at the University of Alabama using the original (unadapted) patient workbook and cognitive behavioral treatment for chronic pain [25]. One of these individuals was 71 years old, had an eighth grade education, and was able to read at a fifth grade level (assessed by the WRAT-4 [41] reading/word decoding subtest). During the treatment program, this participant seemed to struggle with the cognitive concepts presented, although she finished the group and showed clinically significant treatment gains. The other individual was a 57-year-old retired bachelors-level social worker with a twelfth grade reading level and extensive experience working with rural Alabama citizens; this participant demonstrated no difficulty with the treatment and showed clinically significant treatment gains. We had an established therapeutic relationship with these individuals and had followed their progress for more than 2 years. These key informant interviews were meant to elicit preliminary feedback and ideas for further adaptations, to be evaluated thereafter by focus groups comprised of rural participants who had not undergone the cognitive behavioral treatment. The participants in the key informant interviews were able to compare the patient workbook that had been available to them during treatment to the proposed adaptations. We also wanted to get feedback about potential barriers and facilitators to treatment with our proposed target population. Comments from the key informant interviews were extracted and utilized for further refinement of the workbook.

Focus groups—After further simplification of the patient workbook based on key informant feedback, focus groups were conducted with rural community adults with chronic pain conditions. We did not expect that the focus group participants would all have low literacy. Similarly, we did not limit the members of the actual clinical trial to just those with low literacy. Although focus group participants' literacy level was not assessed, they were recruited from areas with similar SES demographics as the randomized controlled trial (RCT) study participants. Inclusion criteria for focus group participants were (a) 19 years of age

Table 1 | Guidelines for adapting a treatment workbook for a priority population

| Guideline | Definition |
|--|--|
| 1. Know the priority population | 1. Creating or modifying learning materials minimally requires an understanding of the culture, with at least a basic knowledge of its language, education system, religious institutions, healthcare, and economics. Ideally, a research team member should have first-hand experience with the priority population or may even share the same or similar cultural roots. |
| 2. Become familiar with the literature | 2. There is an abundance of literature, in print and online, on adapting health information for low-literate readers. The resources referenced in this paper are a good start. |
| 3. Have a firm understanding of the health information (e.g., treatment patient workbook, etc.) for which you intend to lower the literacy level | 3. A keen awareness of the concepts covered in each treatment session and the order in which each session appears in the workbook will decrease the time needed for adapting materials while increasing the work flow from one session to the next in a seamless manner. |
| 4. The literacy adaptation resources will not answer all questions that arise | 4. Once a fundamental level of working knowledge regarding basic literacy guidelines and a firm understanding of the treatment workbook are obtained, begin the process of adapting. |
| 5. Start with Session 1 and then proceed sequentially, session-by session. | 5. Simplify vocabulary and sentence structure, line-by-line. |
| 6. If session material is not already presented in 3 to 5 sentence sections with subheadings located close to text | 6. Revise to make it so. |
| 7. The final section of each session | 7. Should have a “Summary” subheading with 2 or 3 sentences that reiterate the major objectives in novel terms. |
| 8. Address issues related to Layout | 8. Use underlining or bolding to emphasize important segments of text (never use all caps). Use at least a 12-point font, sans-serif is preferred. |
| 9. Add graphics, such as pictures, charts, or illustrations | 9. To enhance understanding of related text. Make certain these are culturally-appropriate. |
| 10. Address issues related to Visuals | 10. Be consistent with the order in which key concepts and specific sections are presented in each session. After the first few sessions, readers should be able to anticipate session flow. Balance white space with words and pictures, graphs, charts, or illustrations. |

or older, (b) a chronic pain diagnosis, and (c) rural residency. Four focus groups were conducted in two rural Alabama Black Belt counties. Focus group size ranged from four to six participants, with mean age of 59 (range 45–78). Eight participants were African American, 10 were white, and 4 were males. Participants reported heterogeneous chronic pain conditions (e.g., arthritis, migraine headaches, and fibromyalgia) lasting from 5 to 45 years.

Potential participants were told that they would be asked to listen to our questions about our pain management groups and give their honest opinions in response to our questions. The written materials were given to the participants to evaluate in the context of the overall description of the groups, the procedural elements covered, the process in which they would be covered, and the format in which they would be covered. From

this, we solicited opinions and ideas from focus group participants to make the process (or materials) better and to identify potential barriers (so that we could work to remove them).

Prior to each focus group, copies of the adapted patient workbook were distributed to all consented participants. All major components of the CBT workbook were assessed, including session outlines, handouts, and homework worksheets. Moderators were study investigators experienced in conducting focus groups. A semistructured interview guide, consisting of open-ended questions, was developed and utilized to elicit feedback from study participants around two core areas of interest: (1) acceptability of the adapted workbook and treatment approach, and (2) perceived benefits and barriers to the proposed pain management groups. See Table 2 for focus group interview guide questions.

Table 2 | Focus group interview guide

| General topic questions | More specific probes |
|--|--|
| I. Tell us what you think about the workbook session outlines, handouts, worksheets, and homework learning activities? | Ia. Were they clear? Ib. Were they easily understood? Ic. What ideas do you have to improve the forms? |
| II. Describe any suggestions you have to improve the organization of the workbook material? | IIa. What about the weekly reviews of the prior week's session? IIb. What about the summary at the end of each session? |
| III. Tell us what you think about the program plan, such as the 90-minute group meetings, each week, for 10 weeks. | IIIa. Is this realistic? IIIb. What problems might occur? IIIc. What ideas do you have to make it more successful? |
| IV. Describe any benefits that you can identify with this program. | |
| V. Describe any barriers or problems that you can identify with this program. | |

The verbatim transcriptions of the focus groups were analyzed independently by three moderators using constant comparative analysis to identify common themes around the core areas of interest: acceptability and perceived benefits of treatment [42]. Moderators then met to compare identified themes; any discrepancies were discussed until consensus agreement was achieved.

Process of Adapting the Treatment Approach

Informed initially by key informant interviews and focus group feedback, the treatment approach was further simplified and enhanced by incorporating cognitive load theory guidelines set forth by several health literacy researchers [11, 12, 15]. Davis et al. [11] recommend doing some of the work for group members, especially when cognitive demands are high. However, the adapted treatment maintains the common CBT principle of intensive interactive skills training such that group members are learning collaboratively with the group leaders, as opposed to being passive recipients of content. For example, prior to each homework assignment, we planned to work through patient examples in session, using a flipchart to facilitate group interaction. This approach reduces the cognitive demand of the activity, facilitating group members' ability to complete homework between sessions [12]. Additional recommendations for reducing cognitive demand included eliminating distracters, using repetition, limiting the amount of information given, using "teach back" methods to confirm understanding, and teaching to goal to assure learning mastery [12]. Teach back methods were incorporated into pre- and postsession process checks to gauge group member understanding of the material. If session process checks revealed confusion or misunderstanding of the material, leaders would re-teach to the group member's satisfaction (teach to goal). Finally, we took the key illustrations retained for the final manual and

enlarged them into poster size laminated figures to reinforce the key concept of the session as we proceeded throughout the treatment.

RESULTS

Key informant interviews

Regarding our plans to recruit participants in Black Belt counties of Alabama, one key informant interviewee cautioned us *not* to advertise our program as a medication trial. Although this had been made clear in the informed consent document, we had not thought to emphasize it in order to minimize distrust. In the words of the interviewee, "And it's good that there is not any medication being give out, to ease suspicion...They gave the white people medicine, but they didn't give it to us... because of the incident that happened at Tuskegee, African American men, especially, are reluctant."

In order to retain participants, both key informants suggested that offering snacks during the meeting time would help bring participants into the groups: "...cause I found out even in my church we have a Bible study on Wednesday nights for our youth, and we found that if we feed them, they'll come. And sometime if you get into an area and you have this problem you might wanna say okay, we gonna have a little food, like, some finger stuff..." One participant suggested that it would be important to "build up" group members' self-esteem early in the group in order to retain them through treatment: "Okay, in the area of self-esteem, 'cause we have a lot of that in our race, especially women, their self-esteem is very low, because they have either been abused, or come from homes that love wasn't really there, and the reason why they're in the position they are in is because they did not have the foundation to build on, and it's like you don't ever want to do anything because someone's told you that you won't ever be anything."

Both key informants stressed the importance of having simplified the patient reading material in the adapted workbook: “I just think that they’re not gonna be willing to do a lot of reading. You gonna meet people that probably finished maybe the fifth or sixth grade and you have to think of their level of learning. They having pain, but their reading ability and their ability to comprehend a sentence...” Both key informants thought the format changes including bigger text and pictures to illustrate key concepts was a positive and necessary adaptation: “And this with the pictures and the big print, it’s just...if you see a picture, the first thing you do is you see a man and know he has a headache and he’s stressing out and he needs to stay...It’s catchy, and you know, help you get through reading it, the pictures there... you really see it.” Both interviewees noted that we had successfully simplified certain words and phrases in the patient workbook. For example, “Yeah, I see. It’s ‘feel, think, and act.’ It wasn’t...it was the ‘impact of emotions’...and this is clearing on what you have in the new information, and in the other, you had to think about more and guess what you really want. Is this what they want me to say: ‘Impact of emotions on behavior?’ But, ‘think, act...’ that is clearer.” One of the interviewees also pointed to other words in the adapted manual that were still in need of simplification: “... yeah, the ‘appraisal’ category. Yeah, that wording will kinda get lost.”

When asked specifically about which parts of the treatment had been difficult for them, the interviewee with limited education noted that the initial phase of the cognitive component of treatment was difficult to understand: “I think mine was, you remember when we had to, uh, point out our stresses, then we had to come up with the first thought what came into mind then the next, and I think I have a little bit of problem there for awhile till I caught on.” In an effort to help with the cognitive component of the treatment, in the adapted manual we included worksheets completed with example responses. One interviewee noted, “I like the examples!” The other said, “Good examples, ‘I cannot cope with my meds... What I maybe said’...”

Focus groups

Participants spoke at length about the necessity for keeping the approach and the workbook simple, although there was some discussion regarding whether too much simplification would be construed as condescending. One participant commented, “The way it’s worded, it kind of makes you feel like you’re kind of stupid and that’s why you’re – it seems to be written on a level that is insulting versus informative.” Others commented, though, that “I need it this simple!” In the end, there was general agreement that tailoring information to suit readers with different literacy demands was appropriate and valuable. Although focus group respondents noted that participants might get overwhelmed if given the whole booklet at one time,

several also noted that having the entire workbook “makes me want to keep reading,” and they were appreciative of being able to keep the workbook for their future use. It was acknowledged that the worksheets would facilitate understanding of the treatment material. For example, one participant noted, “As far as keeping track, I think it would be helpful because if you can track the stress, then you will know how to work with that in a way whereas you won’t let it stress you, you know, to a point where it is causing the pain to be more severe or whatever. I need one of these to take to work with me. I need to track it.” It was also acknowledged that the group approach would facilitate learning; “I think some of the time you may have some people that they may not understand. A lot of people can read it and understand, but a lot of people can learn it better from someone else.” Focus group members also acknowledged the importance of group leaders, and that it would be our job to keep the material informative and interactive; “It’s just like a child. You’ve got to keep it exciting, keeping their mind on it.”

There was moderate concern expressed about the learning activities (homework) to be completed at home. Some participants noted that finding time to write down information on a daily basis might be unrealistic. Along the same lines, a participant expressed his belief that reading the workbook materials was perhaps a bit more reasonable than actually putting pen to paper and writing answers to questions for homework; “Yeah...you get some that can read pretty good, but can’t write their thoughts very well...They can do that even less than they can read.” It was generally conceded that facilitating the homework process by doing parts of the worksheets during group sessions was a good idea. Giving concrete examples during the review of handouts was also thought to be helpful.

There was general agreement that the illustrations added interest, explanation, and reinforcement of the information. However, some of the clip art was viewed as adding “color to the page, but they don’t really add anything else besides fluff.” Other illustrations were considered more useful and “real-life.”

Although the main purpose for conducting focus groups was to investigate whether the workbook and treatment approach were appropriately adapted for implementation in low literacy adult chronic pain populations, other valuable information was obtained. For example, participants agreed that 90-min weekly sessions would be reasonable for most people. Evening meetings were recommended to allow working people to participate. Transportation was identified as a potential problem for some community members, even though the treatment would be offered in a primary health clinic in their area; “Well, in rural Alabama, transportation is one of the major issues, you know. People being able to get somewhere for ten weeks might be very difficult for some people.” It was acknowledged that compensation for travel provided by study investigators would help ameliorate this issue.

The majority of participants identified stress reduction as a perceived benefit of participating in the proposed group CBT treatment. One woman commented, “I know that stress is not good at all for the body...blood pressure goes up and muscles get tight...if we can manage stress...it will cause less pain...”

Participants commented on how the group process would provide much needed opportunity to connect and socialize with others who struggle with chronic pain. One participant talked about how useful it would be to “...discuss the ways we manage our different pains, and then we could be helpers one to another.”

Participants expressed motivation to participate in the group treatment, if for no other reason than to improve the quality of their lives. They described limitations in their ability to engage in pleasurable pursuits, to sleep, even to do simple daily living activities. One woman said, “I’ve got arthritis in both of my thumbs and in my ankles, and I can’t hardly zip my pants up or zip them down...” Another participant with severe carpal tunnel said, “I don’t sleep probably two or three hours a night. I have to sleep on my stomach – hand hanging to the floor...it hurts so bad.”

Based on the feedback from the focus groups, we made the following additional modifications to the workbook: (1) We removed much of the clip art and hired an artist who provided illustrations of more life-like individuals engaged in important procedural components of the treatment (e.g., participant engaged in relaxation) or portraying important cognitive processes that were part of the treatment (e.g., negative automatic thoughts and beliefs as extra “baggage” we carry around). (2) We attempted to remove some of the more informal language and phrases that might have been considered condescending, while maintaining the reading level of the workbook at the fifth grade level. (3) Rather than provide the entire treatment manual to the participants at the beginning of treatment, we provided a notebook with only the first session in it, and added each session sequentially thereafter.

CONCLUSIONS

Using several stages and two levels of feedback, the patient workbook and treatment approach were adapted for readability [31], content/style, layout/visuals, and delivery [28], such that both the literacy level and cognitive demand associated with the treatment were reduced. The feedback gleaned from the key informant interviews and focus groups suggested that the treatment, as adapted, was both acceptable and feasible with a low-literacy rural chronic pain population.

Our finding that, in general, focus group participants preferred the simplicity of the adapted

workbook is consistent with research evidence demonstrating that nearly all patients, not just those with limited literacy skills, prefer easy-to-read materials [11]. Participants' evaluative comments of the illustrations in the adapted CBT patient workbook are consistent with the guidance of Doak et al. [15] for making visuals responsive to the special needs of poor readers. The finding that focus group participants recognized the value in group leaders working collaboratively with group members and frequently repeating new concepts throughout group sessions is consistent with cognitive load theory's emphasis on minimizing cognitive demand to promote optimal learning conditions [11, 15].

The importance of simplifying print materials for patients with low literacy has been recognized at a national level. However, appropriate adaptations of psychosocial treatment approaches, including patient workbooks and the treatments themselves, has not been given adequate attention in the literature. In an effort to increase the external validity (i.e., generalizability) of efficacious treatments, Green and Glasgow [43] recommend that certain moderating variables be taken into account when deciding whether adaptations are necessary for previously established efficacious treatments. A major moderating variable in the present circumstance is the literacy level of our rural chronic pain population. This manuscript has provided specific details regarding the process of adapting an evidence-based chronic pain CBT protocol for a priority population: residents with chronic pain and low literacy. We argue that the careful process of implementing protocol adaptations of efficacy-tested programs are necessary to consider, not only when implementing research with a special population, but also when translating such interventions into any local practice situation with special moderating variables or other unique needs.

Simplifying print materials for patients with low literacy may initially seem a daunting task, especially to the novice. Nonetheless, its importance is likely to become more prominent with the promise of significant future healthcare changes. With various modifications being debated, one consistent theme emerging pertains to a transfer of responsibility for healthcare from the provider to the patient; patients will be increasingly expected to take a more active role in their healthcare. This shift will likely create a new appreciation and demand for appropriate health education resources, especially given the well-documented statistic that millions of US adults lack the literacy skills needed to understand and act on health information [40]. The IOM is clear in its call for the creation of a more health literate environment [1]. The present study detailed the process of utilizing literacy resources to adapt a widely employed psychosocial treatment for underserved, low-literacy patients with chronic pain.

Acknowledgments: This study was funded by the University of Alabama College of Community Health Sciences Research Advisory Committee, the National Institute of Nursing Research, and the National Institute of Mental Health.

- Selden, C., Zorn, M., Ratzan, S.C., Parker, R.M. Current bibliographies in medicine 2000-1: health literacy. Bethesda, MD: National Library of Medicine/National Institutes of Health, 2000. Available at <http://www.nlm.nih.gov/archive/20061214/pubs/cbm/hliteracy.html#100>. Accessibility verified May 17, 2010.
- Wolf, M. S., Davis, T. C., & Parker, R. M. (2007). Editorial: the emerging field of health literacy research. *American Journal of Health Behavior*, 31(Suppl 1), S3–S5.
- Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). *The health literacy of America's adults: results from the 2003 National Assessment of Adult Literacy*. Washington, DC: U.S. Department of Education.
- Youmans, S. L., & Schillinger, D. (2003). Functional health literacy and medication use: the pharmacist's role. *The Annals of Pharmacotherapy*, 37(11), 1726–1729.
- Kirsch, I. S., Jungeblut, A., Jenkins, L., & Kolstad, A. (1993). *Adult literacy in America: a first look at the results of the National Adult Literacy Survey*. Washington, DC: U.S. Department of Education.
- Rudd, R. E. (2007). Health literacy skills of U.S. adults. *American Journal of Health Behavior*, 31(Suppl 1), S8–S18.
- Jackson, R. H., Davis, T. C., Bairnsfather, L. E., George, R. B., Crouch, M. A., & Gault, H. (1991). Patient reading ability: an overlooked problem in health care. *Southern Medical Journal*, 84(10), 1172–1175.
- Jackson, R. H., Davis, T. C., Murphy, P., Bairnsfather, L. E., & George, R. B. (1994). Reading deficiencies in older patients. *The American Journal of the Medical Sciences*, 308(2), 79–82.
- Nielsen-Bohlman, L., Panzer, A., & Kindig, D. A. (Eds.). (2004). *Health literacy: a prescription to end confusion*. Washington, D.C.: Institute of Medicine of the National Academies Press.
- U.S. Census Bureau. Available at <http://www.census.gov/>. Accessibility verified February 28, 2009.
- Davis, T. C., Williams, M. V., Marin, E., Parker, R. M., & Glass, J. (2002). Health literacy and cancer communication. *CA: A Cancer Journal for Clinicians*, 52(3), 134–149.
- Wolf, M. S., Davis, T. C., Osborn, C. Y., Skripkauskas, S., Bennett, C. L., & Makoul, G. (2007). Literacy, self-efficacy, and HIV medication adherence. *Patient Education and Counseling*, 65(2), 253–260.
- Sweller, J. (1988). Cognitive load during problem solving: effects on learning. *Cognitive Science*, 12(2), 257–285.
- Osborne, H. (2005). *Health literacy from a to z: practical ways to communicate your health message*. Sudbury, MA: Jones and Bartlett Publishers, Inc.
- Doak, C. C., Doak, L. G., & Root, J. H. (1996). *Teaching patients with low literacy skills* (2nd ed.). Philadelphia: Lippincott Company.
- Gellis, Z. D., McClive-Reed, K. P., & Brown, E. L. (2009). Treatments for depression in older persons with dementia. *Annals of Long-Term Care: Clinical Care and Aging*, 17, 29–36.
- Kalichman, S., Cherry, J., & Cain, D. (2010). Nurse-delivered antiretroviral treatment adherence intervention for people with low literacy skills and living with HIV/AIDS. *The Journal of the Association of Nurses in AIDS Care*, 16(5), 3–15.
- Sobel, R. M., Paasche-Orlow, M. K., Waite, K. R., Rittner, S. S., Wilson, E. A. H., & Wolf, M. S. (2009). Asthma 1-2-3: a low literacy multimedia tool to educate African American adults about asthma. *Journal of Community Health*, 34(4), 321–327.
- American Chronic Pain Association: partners for understanding pain. Pittsburgh, PA. Available at <http://www.theacpa.org/partners/index.asp>. Accessibility verified June 12, 2009.
- Hoffman, P. K., Meier, B. P., & Council, J. R. (2002). A comparison of chronic pain between an urban and rural population. *Journal of Community Health Nursing*, 19(4), 213–224.
- Nguyen, M., Ugarte, C., Fuller, I., Haas, G., & Portney, R. (2005). Access to care for chronic pain: racial and ethnic differences. *The Journal of Pain*, 6(5), 301–314.
- Dixon, K. E., Keefe, F. J., Scipio, C. D., Perri, L. M., & Abernethy, A. P. (2007). Psychological interventions for arthritis pain management in adults: a meta-analysis. *Health Psychology*, 26, 241–250.
- Hoffman, B. M., Pappas, R. K., Chartkoff, D. K., & Kerns, R. D. (2007). Meta-analysis of psychological interventions for chronic low back pain. *Health Psychology*, 26(1), 1–9.
- Morley, S., Eccleston, C., & Williams, A. (1999). Systematic review and meta-analysis of randomized controlled trials of cognitive behavior therapy and behavior therapy for chronic pain in adults, excluding headache. *The Journal of Pain*, 80(1–2), 1–13.
- Thorn, B. E. (2004). *Cognitive therapy for chronic pain: a step-by-step approach*. New York: Guilford Publications.
- Thorn, B. E., Pence, L. B., Ward, L. C. et al. (2007). A randomized clinical trial of targeted cognitive behavioral treatment to reduce catastrophizing in chronic headache sufferers. *The Journal of Pain*, 8(12), 938–949.
- The Plain Language Action and Information Network (PLAIN). Federal Plain Language guidelines. Available at <http://www.plainlanguage.gov/howto/guidelines/bigdoc/TOC.cfm>. Accessibility verified March 5, 2009.
- National Cancer Institute (NCI). Clear & simple: developing effective print materials for low-literate readers. Available at <http://www.cancer.gov/cancerinformation/clearandsimple>. Accessibility verified August 8, 2010.
- Lazarus, R. S., & Folkman, S. (1994). *Stress, appraisal, and coping*. New York: Springer.
- Beck, J. S. (1995). *Cognitive therapy: basics and beyond*. New York: Guilford Press.
- Fry, E.B. A readability formula that saves time (1968). *J Read*, 11(7): 513–516, 575–578.
- Klare, G.R. Assessing readability (1974-75). *Read Res Q*, 10(1): 62-102.
- Harvard School of Public Health. National Center for the Study of Adult Learning and Literacy. Available at <http://www.hsph.harvard.edu/healthliteracy/>. Accessibility verified August 10, 2010.
- Health Literacy Consulting. Available at <http://www.healthliteracy.com/>. Accessibility verified August 10, 2010.
- Medline Plus. Available at <http://www.nlm.nih.gov/medlineplus/healthliteracy.html>. Accessibility verified August 10, 2010.
- U. S. Department of Health and Human Services—HRSA-Health Literacy. Available at <http://www.hrsa.gov/healthliteracy/>. Accessibility verified August 10, 2010.
- National Network of Libraries of Medicine—Health Literacy. Available at <http://nmlm.gov/outreach/consumer/hlthlit.html>. Accessibility verified August 10, 2010.
- Zarcadoolas, C., Pleasant, A., & Greer, D. S. (2006). *Advancing health literacy: a framework for understanding and action*. San Francisco, CA: Wiley.
- American Medical Association. (2005). *Understanding health literacy: implications for medicine and public health*. Schwarzberg, J.G., VanGeest, J.B., & Wang, C. (eds.). AMA Press.
- Nielsen-Bohlman, L., Panzer, A., & Kindig, D. A. (Eds.). (2006). *Health literacy: a prescription to end confusion*. Washington, D.C.: Institute of Medicine of the National Academies Press.
- Wilkinson, G. S., & Robertson, G. J. (2006). *Wide range achievement test—fourth edition*. Lutz, FL: Psychological Assessment Resources.
- Vaughn, S., Schumm, J. S., & Sinagub, J. M. (1996). *Focus group interviews in education and psychology*. Thousand Oaks, CA: Sage Publications.
- Green, L. W., & Glasgow, R. E. (2006). Evaluating the relevance, generalization, and applicability of research: issues in external validation and translation methodology. *Evaluation & the Health Professions*, 29(1), 126–153.