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A Forgiveness Intervention for Women With Fibromyalgia Who Were Abused in Childhood: A Pilot Study

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This pilot study compared the efficacy of a forgiveness intervention with a fibromyalgia (FM) health intervention on women with FM who have experienced emotional, physical, or sexual abuse, and emotional or physical neglect, in childhood by one of their parents. Eleven women with FM between the ages of 21 and 68 were randomized to the forgiveness intervention ($n = 5$) or the FM health intervention ($n = 6$), and completed the once-weekly individualized program for 24 weeks. The participants completed measures assessing forgiveness, overall FM health, depression, anger, anxiety, self-esteem, and coping strategies at the pretest, the posttest, and the 12-week follow-up test. They also completed the forgiveness intervention and FM health intervention final tests at the posttest, which assessed their knowledge on forgiveness and FM health. The forgiveness intervention participants had greater improvements in forgiveness ($p < .001$) and overall FM health ($p = .046$) from the pretest to the posttest, and in forgiveness ($p = .018$) and state anger ($p = .027$) from the pretest to the follow-up test than the FM health intervention participants. Moreover, the forgiveness intervention participants scored higher on the forgiveness final test than the FM health intervention participants ($p < .001$), and the FM health intervention participants scored higher on the FM health final test than the forgiveness intervention participants ($p < .001$). The results indicate that the forgiveness intervention was potentially helpful in improving forgiveness and overall FM health, and in decreasing state anger of this particular sample of women with FM.

Keywords: forgiveness, fibromyalgia, childhood abuse, anger, anxiety

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Fibromyalgia (FM) is a chronic musculoskeletal, widespread pain syndrome involving the sensitization of the central nervous system pain-processing pathways (Staud, 2007). The major diagnostic criteria for FM are widespread pain lasting for at least 3 months, and at least 11 of 18 tender points when palpated with about 4 kg per unit area of force (Wolfe et al., 2010). Diagnosing and treating FM may be difficult because of unclear etiology, multifaceted symptoms, and overlap with other chronic pain conditions (Mease, 2005). Some people with FM become disabled to the point of ceasing employment or relying on disability pensions (Mease, 2005). This may be a significant problem for those affected by FM as well as societies worldwide.

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One of the theories of the pathogenesis of FM is that childhood abuse or trauma may alter the hypothalamic-pituitary-adrenal (HPA) and autonomic nervous system (ANS) response to stressors, leading to the development of FM (Arnold, 2010). The altered HPA axis may result in the dysfunction of peripheral and spinal dorsal horn neurons, excitatory amino acids, and central neuropeptides, which, in return, can lead to abnormal nociceptive input to the brain when there is no actual pain, resulting in FM (Bradley et al., 2000). In fact, the prevalence of childhood abuse in people with FM ranges from 21% to 53% (Olivieri, Solitar, & Dubois, 2012), overall higher than 14.2% to 32.3% in the general population in the United States (Briere & Elliott, 2003).

Childhood abuse and neglect, and the resulting abnormal stress reactivity, also may lead to anger, anxiety, posttraumatic stress disorder (PTSD), depression, and low self-esteem in adulthood (Jelic Tuscic, Flander, & Mateskovic, 2013; van Harmelen et al., 2010). Similarly, many abused people with FM have anxiety, depression, and PTSD (Thieme, Turk, & Flor, 2004), and the FM symptoms and these psychiatric disorders are substantially similar in neuroendocrine abnormalities (McLean & Clauw, 2005). Lumley, Cohen, Stout, and Neely's (2008) research is the only study that conducted an emotional exposure-based treatment with 10 abused women with FM, showing the participants' improvements on FM impact, stress symptoms, emotional distress, and disability. However, this study did not have a control group, so it is unclear whether the treatment was efficacious on the women with FM compared with other treatments.

In this respect, it was important to do an experimental pilot study that includes a control group to test the efficacy of an intervention on people with FM who retrospectively self-report childhood abuse. If FM symptoms are associated with anger, resentment, and stress related to childhood abuse and neglect, then one may postulate that reducing anger and stress, by way of forgiving the parents who had abused them, may have some influence on the neurophysiological process of FM. We focused on childhood abuse by parents because most of the literature on child abuse stated that abuse by parents or caregivers living in the same household may lead to abnormal brain development and stress reactivity (see, e.g., Honshyar, Gold, & DeVries, 2013). Most of the literature on FM or child abuse did not discuss abuse perpetuated by other authority or parental figures, such as teachers, coaches, or mentors. Therefore, it was important that we limit our investigation to parental abuse, as informed by the literature.

The definition of forgiveness involves overcoming resentment and withholding retaliation in the context of injustice (Worthington, 2005) and responding to an offender with benevolence (Enright & Fitzgibbons, 2000). This definition is consistent with that of forgiveness discoursed in religious and spiritual contexts such as in Christianity, Judaism, Islam, Buddhism, and Hinduism (Enright & Fitzgibbons, 2000). Forgiveness is different from pardoning, absolving, tolerating, accepting an apology, or reconciliation (Enright, 2012). The parent–child relationship and parenting can be seen as sacred or spiritual (Pargament & Mahoney, 2005). When a desecration of that parenting occurs by abusing one's child, the grown child's forgiveness of the abusing parents can expand forgiveness to a spiritual dimension, which can positively affect the grown child's physical and mental health (see Mahoney, Rye, & Pargament, 2005).

More specifically, Witvliet and McCullough (2007) hypothesized that forgiveness can reduce hostility, stress, negative coping behaviors, rumination, and suppression, and promote reappraisal and positive emotions, leading to enhanced mental and physical health. Worthington and Scherer (2004) have noted that chronic unforgiveness may negatively affect the immune system at the cellular and neuroendocrine level (involving the HPA axis) and affect the central nervous system (CNS) processes. Worthington, Witvliet, Lerner, and Scherer (2005) argued that cortisol, adrenaline production, and potential cellular deregulation of cytokine balance can all negatively affect the immune system. Further, Worthington and Scherer (2004) stated that forgiveness may reduce secreted cortisol and HPA reactivity, release antibodies, and positively affect the CNS processes involved with two motivational systems—the behavioral activation system regulating positive and negative emotions, and the behavioral inhibition system controlling anxiety symptoms. These arguments appear to correspond to the FM theory regarding the HPA dysfunction observed in abused people with

FM, characterized by abnormal cortisol levels and ANS function. In this respect, forgiving the wrongdoer may improve an impaired immune system and the CNS by improving the function of an altered neuroendocrine system.

Hence, the purpose of this pilot study was to investigate the efficacy of a forgiveness intervention based on Enright's (2001) process model of forgiveness (see Table 1 of the online supplemental materials) on women with FM who were abused in childhood by their biological parents, in comparison with an FM health intervention. This pilot study focused on women because approximately 80% to 90% of patients with FM are women (Kosek, 2012). The forgiveness intervention based on Enright's process model of forgiveness has been found to be more efficacious in clients residing at a drug rehabilitation center (Lin, Mack, Enright, Krahn, & Baskin, 2004), spousal emotional abuse survivors (Reed & Enright, 2006), and individuals with coronary artery disease (Waltman et al., 2009), compared with alternative treatments such as drug and alcohol treatment (Lin et al., 2004), dealing with anger validation, healthy assertiveness, and interpersonal relationship skills (Reed & Enright, 2006), and a support program dealing with heart disease-related life concerns (Waltman et al., 2009).

We implemented the FM health intervention as the alternative program because research advocated the beneficial effects of supporting people with FM regarding their practicing healthy lifestyles, such as exercise (García-Martínez, De Paz, & Márquez, 2012), a nutritious diet (Arranz, Canela, & Rafecas, 2010), and sleep and stress management (Badr & Salloum, 2008; Staud, 2006). On the basis of the forgiveness research that showed the greater efficacy of forgiveness intervention relative to alternative treatments, the primary hypothesis was that participants who completed the forgiveness intervention, compared with participants who completed the FM health intervention, would demonstrate greater improvements in forgiveness, overall FM health, self-esteem, and reinterpreting pain sensations, and greater reductions in depression, anxiety, anger, and catastrophizing. The second hypothesis was that the forgiveness intervention participants, in comparison with the FM health intervention participants, would score higher on the forgiveness intervention final test; the FM health intervention participants, in comparison with the forgiveness intervention participants, would score higher on the FM health intervention final test. These final tests were important outcome variables because the participants' scores indicate a degree to which they understood the content that they have learned. Moreover, differences in the groups' scores may indicate that the test questions were specific to each intervention.

Method

Participant Characteristics

Participants were 11 English-speaking women diagnosed with FM for 1 to 20 years ($M = 8.91$, $SD = 7.19$), and their ages ranged from 21 to 68 years ($M = 43.55$, $SD = 17.03$). Ten participants provided their physician's letters and/or medical records verifying their FM diagnosis. One FM health intervention participant did not provide the letter, so the intervener determined that she had FM on the basis of her medications for FM prescribed by her physician. Table 2 of the online supplemental materials shows the demographic characteristics comparing the forgiveness and FM health intervention participants. Five (45.5%) were Protestant, two (18.2%) were Unitarian Universalist, one (9.1%) was Jewish, and three (27.3%) were agnostic. The participants' inclusion criteria were a score of 240 or below on the Enright Forgiveness Inventory (EFI), which indicates low levels of forgiveness (Enright & Rique, 2004), and a score of 13 or above on the Beck Depression Inventory-II (BDI-II), because a score range of 0 to 13 indicates none or minimal depression (Beck, Steer, & Brown, 1996).

The criterion for childhood abuse was that participants should pass the cutoff points of moderate to severe level in at least one of the five types of abuse (emotional, physical, and sexual) and neglect (emotional and physical) specified in the Childhood Trauma Questionnaire (CTQ) manual (Bernstein & Fink, 1997). According to the CTQ cutoff scores, 11 (100%) participants experienced emotional abuse, eight (72.7%) experienced physical abuse, seven (63.6%) suffered sexual abuse, 11 (100%) suffered emotional neglect, and seven (63.6%) experienced physical neglect. The major abusive events that the participants reported included abandonment at the age of 12 and growing up

with her uncle and aunt; abandonment at the age of 14 and growing up in foster homes; beating with a belt, hard objects, or hands; choking; slapping; kicking; rape; molestation; threatening; ridiculing; humiliating; belittling; bullying; yelling; accusing; and having to clean her house everyday as a child.

Sampling Procedures

This pilot study was approved by the Health Sciences Institutional Review Boards (HS-IRB) at a university, and was conducted in compliance with the HS-IRB and met the APA ethical standards. Participants were all volunteers recruited from the local community via newspaper advertisements, flyers, and mass e-mails. The recruitment documents stated that researchers are looking for women diagnosed with FM who have experienced some type of childhood maltreatment in their family, and the research study assesses two 24-week intervention programs: one on social difficulties within the family relationships and the other on FM health. Recruitment and screening took about 5 months and the interventions started within 1 to 4 weeks after the participants completed the pretest, which took 3 weeks for all participants to complete.

Approximately 50 women gave oral consent over the phone for a phone screening, which consisted of asking whether participants were abused as a child by one of their parents and whether they had an FM diagnosis or symptoms of FM for at least 1 year. Twenty-one women did not pass the phone screening because they were not abused, or did not or could not get an FM diagnosis from a physician, or did not send a diagnosis verification letter, or could not commit to participate in a 24-week intervention because they lived too far away (2- to 4-hr car drive). Twenty-nine women passed the phone screening and came individually for the screening, conducted in a clinical and translational research core (CTRC) at a university. After obtaining written informed consent from each participant, the intervener administered the screening measures, the CTQ, the EFI, and the BDI-II to each participant. The CTQ, the EFI, and the BDI-II were mixed in a random order (without looking at the measures) to prevent the order effects. The scores of the EFI and the BDI-II that the participants achieved at the screening were also used as the pretest scores. The data and safety monitoring board (a psychiatrist and a licensed clinical psychologist who were not a part of the pilot study but were part of an external group), monitored participant safety during the pilot study.

Sample Size and Power

Freedman and Enright's (1996) study of 12 female incest survivors reported a Cohen's *d* of 2.16 (Baskin & Enright, 2004) for gains in forgiveness scores in the forgiveness group ($n = 6$). Coyle and Enright's (1997) study of 10 men achieved a *d* of 1.20 in gains in forgiveness scores for the forgiveness group ($n = 5$). Reed and Enright's (2006) study of 20 women achieved a *d* of 1.79 in gains in forgiveness scores for the forgiveness group ($n = 10$). Thus, the minimum projected within-forgiveness group effect size (ES) of 1.20, alpha (α) = .05, and power of .80 indicating an acceptable Type II error probability would need a sample size of 24. This pilot study had 11 participants because of attrition. The ES required for $n = 11$, $\alpha = .05$, and power of .80 is 1.63. The resulting ES for the posttest was well above 1.63 and is reported in the Results section.

Measures

Method of data collection. After the intervener screened participants, a trained graduate student research assistant, not involved in either intervention, conducted the pretest and the posttest at the CTRC, mixing the measures randomly and administering to each participant individually. For the 12-week follow-up test, the research assistant visited 10 participants individually to administer the test, again mixing the measures in random order. One participant moved out of state during the follow-up period. Thus, she completed the follow-up measures mailed to her with the research assistant helping over the phone and then mailed back the measures right away to the intervener. During the intervention, the intervener administered the Fibromyalgia Impact Questionnaire every 4 weeks to each participant during the session to examine their overall FM health. All the measures used in this pilot study are included in this report.

Screening measures. These included (a) a childhood abuse narrative measure (e.g.,

"Please write a story about how you were treated and in what way you thought it was unfair and hurtful."); (b) a 12-item psychological screening questionnaire assessing physical medical problems or mental, cognitive, or behavioral disorders that would render them ineligible for the pilot study (e.g., "Are you currently in treatment for any medical conditions other than FM?"); and (c) a 11-item demographic questionnaire.

Childhood Trauma Questionnaire (CTQ). This 28-item self-report inventory with a 5-point Likert scale contains five subscales (five items each) for identifying a history of abuse (emotional, physical, and sexual) and neglect (emotional and physical). An example of an item is "People in my family hit me so hard that it left me with bruises or marks." Each subscale score ranges from 5 to 25, with higher scores indicating a higher degree of abuse or neglect. Cronbach's alphas computed for normative samples with FM are as follows: Emotional Abuse = .94, Physical Abuse = .92, Sexual Abuse = .96, Emotional Neglect = .93, and Physical Neglect = .83 (Bernstein & Fink, 1997). The CTQ has strong validity, including predictive validity for a course of treatment, and its cut scores showed high sensitivity and specificity (Bernstein & Fink, 1997). Cronbach's alpha in this pilot study for the five subscales combined was .89.

Enright Forgiveness Inventory (EFI). This is a 60-item self-report inventory with a 6-point Likert scale and is divided into six subscales (10 items each): Positive and Negative Affect, Positive and Negative Behavior, and Positive and Negative Cognition. An example of an item is "I feel warm toward him/her." The range of scores is from 60 to 360, with higher scores indicating higher levels of forgiveness. At the end of the scale, there is a one-item validity question that asks, "To what extent have you forgiven the person you rated on the Attitude Scale?" Responses are from 1 to 5, with 1 (*not at all*), 3 (*in progress*), and 5 (*complete forgiveness*). The scale has strong construct validity, and Cronbach's alpha is .98 for adults (Enright & Rique, 2004). Cronbach's alpha in this pilot study was .94 for the entire scale.

Fibromyalgia Impact Questionnaire (FIQ). This is a 20-item self-report measure assessing overall FM health, including physical ability to perform daily tasks, work difficulty, pain, fatigue, morning tiredness, stiffness, anxiety, and depression. Scores range from 0 to 100, with a higher score indicating a worsening of overall FM health. Cronbach's alpha in this pilot study was .84. Test–retest reliability for each item ranged from .56 to .95, and construct validity is robust (Burckhardt, Clark, & Bennett, 1991).

Beck Depression Inventory-II (BDI-II). This is a well-known 21-item self-report instrument designed to measure the severity of depression in adults and adolescents. It is rated on a 4-point scale ranging from 0 (e.g., *I do not feel sad*) to 3 (e.g., *I am so sad or unhappy that I can't stand it*). Total scores range from 0 to 63, with higher scores indicating higher levels of depression. Cronbach's alpha is .92 for outpatients, and construct validity is strong (Beck et al., 1996). Cronbach's alpha in this pilot study was .88.

State Trait Anger Expression Inventory-II (STAXI-II). We used two self-report subscales (15-item State Anger and 10-item Trait Anger). Total scores range from 15 to 60 (state anger), and from 10 to 40 (trait anger), with higher scores indicating higher levels of state and trait anger. Cronbach's alphas for women are .92 (state) and .84 (trait), and validity is evidenced (Spielberger, 1999). In this pilot study, Cronbach's alphas were .93 (state anger) and .81 (trait anger).

State Trait Anxiety Inventory (STAI). This is a self-report scale consisting of two subscales (State and Trait) with 20 items each. Total scores range from 20 to 80 for each subscale, with higher scores indicating higher levels of state and trait anxiety. Cronbach's alphas are .93 (state) and .91 (trait) for women, and construct validity is reported (Spielberger, Gorsuch, Luchene, Vagg, & Jacobs, 1983). Cronbach's alphas in this pilot study were .86 (state) and .91 (trait).

Coopersmith Self-Esteem Inventory Adult Form (CSEI). This is a self-report scale with 25 true–false statements. It assesses evaluative attitudes and beliefs toward the self in four domains: general self, social self, self and family, and self and peers. Examples of two items are "I find it very hard to talk in front of a group" and "I give in very easily." Scores range from 0 to 100, with higher scores indicating higher self-esteem. Cronbach's alpha is .83 for women, and construct validity is evidenced

(Coopersmith, 2002). In this pilot study, Cronbach's alpha was .89.

Coping Strategies Questionnaire (CSQ). The six-item Catastrophizing and the six-item Reinterpreting Pain Sensations (RPS) subscales were used to assess coping with pain. The RPS evaluates how the person interprets pain sensation differently from what it really is (i.e., "I don't think of it as pain but rather as a dull or warm feeling"). The 7-point responses are rated from 0 (*never do that*) to 6 (*always do that*). Each subscale score ranges from 0 to 6, with higher scores indicating higher levels of catastrophizing and RPS. It is good to have higher scores in RPS because it is a positive coping strategy for pain. Cronbach's alphas are .78 (catastrophizing) and .85 (RPS), and construct validity is demonstrated (Rosenstiel & Keefe, 1983). Cronbach's alphas in this pilot study were .86 (catastrophizing) and .84 (RPS).

Forgiveness Intervention Final Test. This test (developed by the first author) consists of 30 multiple-choice items selected from the 23 weekly forgiveness quizzes that the forgiveness group completed. It assesses forgiveness knowledge, skills, and application. Total scores can range from 0 to 30, with higher scores indicating a higher knowledge of forgiveness. An example of an item is

1. According to Ch. 2, which of the following *is* the ultimate goal of the forgiveness process?

a. accepting what happened and moving on

b. ceasing to be angry

c. experiencing positive feelings and thoughts toward the offender

d. focusing to make oneself feel good

Fibromyalgia Health Intervention Final Test. This test, developed by the first author, comprises 30 multiple-choice items chosen from the 23 weekly FM health quizzes that the FM health group finished. It assesses FM health knowledge, skills, and application. Total scores range from 0 to 30, with higher scores indicating a higher knowledge of FM health. An example of an item is

1. According to Rawlings (2008), which of the following *correctly* describes tryptophan?

a. Tryptophan is a raw material for manufacturing serotonin.

b. Tryptophan exacerbates chronic pain and sleep difficulties associated with FM.

c. Animal proteins are reported to raise brain tryptophan levels.

d. Whole grains, vegetables, and fruits reduce tryptophan levels.

Research Design

After the pretest, the intervener generated the random assignment sequence and enrolled and assigned 16 participants, using a table of random numbers, to a forgiveness or an FM health intervention. The random assignment sequence was concealed until the participants were assigned to the programs. The participants did not know that they were in the experimental or the alternative condition. The forgiveness group did not know that it was a forgiveness program until they were randomly assigned to the experimental condition. The FM health group did not know that the other program was a forgiveness intervention until the end of the pilot study and were told that it was a relationship program, as stated in the recruitment flyer and the consent form. The forgiveness group knew that the other program was the FM health intervention, as stated in the recruitment flyer and the consent form. The intervener informed the FM health group after the follow-up test that the other program was a forgiveness intervention and the treatment manual was Enright's (2001) book, *Forgiveness Is a Choice*.

Forgiveness and Fibromyalgia Health Intervention Procedure

Both the forgiveness and FM health group participants engaged in 24 individualized sessions, meeting with the same intervener, that were held once weekly for 1 hr at the CTRC. The intervener was the first author, and the forgiveness and FM health interventions were delivered under the supervision of a doctoral-level licensed psychologist. The intervener has extensive knowledge in the forgiveness process model and FM. Because each participant was randomly assigned to the conditions and engaged in the programs independently, the individual was the smallest unit of analysis (see Appendix for more information on the forgiveness intervention).

The FM health intervention participants used a 10-page syllabus; a 290-page manual consisting of 32 book chapters selected from 15 books (an example is Rawlings, 2008), three journal articles, and one online resource; and one- to four-page handouts with the learning objectives and summary for each session—all developed by the first author. The books, written by physicians and FM researchers, were consistent with the standard medical advice and were the practical guidelines recommended as the best treatment for people with FM. The FM health intervention was created as an alternative program for this pilot study that is as rigorous as the forgiveness intervention, not as a placebo program, because there is currently no existing state-of-the-art treatment that has been proven to cure FM (see Mease, 2005). Aerobic exercises and pain management interventions were shown to decrease depression and anxiety in people with FM (Gauffin et al., 2013; Mist, Firestone, & Jones, 2013), which indicates that the elements of the FM health intervention could be comparable with the psychosocial elements of the forgiveness intervention and may generate comparable psychosocial outcomes. It is likely that both the forgiveness and FM health group had equal materials in terms of their cognitive complexity, because the intervener tried to obtain easy readings for both programs.

The FM health group took four multiple-choice item quizzes weekly to test their understanding of the readings. The FM health intervention included the physiology of sleep and sleep management, a healthy diet and nutrition, relaxation and breathing techniques, pain and flare-up management, dealing with cognitive difficulty, strategies to simplify their lives and set limits, theories and benefits of exercises, and practicing walking, stretching, back exercises, and range of motion exercises. Moreover, the intervener provided the participants with the sleep, food, and exercise diaries in which the participants recorded sleep times daily beginning from the fourth week, food consumptions daily from the eighth week, and exercises that they did from the 20th week, all until the 24th week, to improve their sleep hygiene, nutrition, and energy. The intervener reviewed all of their diaries and offered feedback to each participant in the sessions.

Statistical Methods

First, on the basis of the first directional hypothesis articulated in the introductory section, we employed directional repeated-measures analysis of variance (ANOVA) at an alpha level of .05 to compare the efficacy of the forgiveness and FM health interventions from the pretest to the posttest, and from the pretest to the follow-up test, on 10 dependent variables (DVs) to see how the efficacy of the 24-week interventions maintains at the follow-up. We used repeated-measures ANOVA instead of independent-samples *t* test because the research design is a mixed factorial design with one between-subjects factor (treatment) and one within-subject factor subject to repeated measures (pretest, posttest, and follow-up test). Second, on the basis of the second directional hypothesis, we conducted directional one-way ANOVA at an alpha level of .05 to compare the mean scores of the forgiveness and FM health final tests between the two groups. Third, we analyzed individual outcomes using the reliable change index (RCI) proposed by Jacobson and Truax (1991), which measures how much change occurred between the pretest and the posttreatment, accounting for measurement error. Fourth, we conducted directional, Wilcoxon signed-ranks test to examine the within-group change for the forgiveness group.

Results

Figure 1 of the online supplemental materials shows the flow of participants through each stage of the pilot study. To ensure treatment fidelity, a graduate student auditor listened to two randomly chosen taped sessions (one forgiveness and one FM health) each week and rated them on a 10-item yes–no rating scale that assessed intervener integrity, knowledge, consistency, fairness, and enthusiasm for the forgiveness and FM health interventions. The average ratings for the 22 weeks were 100% "yes" for 10 items for the forgiveness intervention, and 100% "yes" for eight items, and 95.2% "yes" for two items for the FM health intervention. This may indicate that the intervener delivered the interventions accurately and fairly to both groups. There were no adverse events in either the forgiveness or FM health conditions during the pilot study. Furthermore, the inter-

vener listened each week to the taped sessions of the four case study candidates (who were randomly selected from the forgiveness group) to monitor their forgiveness process over the course of intervention. For this reason, we limited the auditor's evaluation to two sessions each week, because the intervener taped six sessions each week for 22 weeks, totaling 132 taped sessions out of 283 sessions. We thought reviewing 46.64% of all the sessions was sufficient to evaluate the intervention progress.

The assumptions of normality and homogeneity of variance in ANOVA regarding the distribution of the data were met by the Kolmogorov–Smirnov Test, Levene's Test, and the Mann–Whitney *U* tests. Only participants who completed the pilot study were included in the analysis to test the efficacy of the two interventions on those who finished. We accepted and used 100% of the data because there were no missing responses on any measure at the pretest, the posttest, and the follow-up test. Further, because the sample size was small, it was important that all the data were used for generating results. Once randomized, there were no significant differences in the demographic variables or the pretest scores between the two groups on any measure assessed by one-way ANOVA at an alpha level of .05. The pretest scores in Table 3 (see the online supplemental materials) show that both groups had very low levels of forgiveness, a severe affliction of FM, moderate depression, high anger and anxiety, very low self-esteem, low levels of catastrophizing, and the average levels of reinterpreting pain sensations compared with the published test norms.

The following are the means and standard deviations (in parentheses) of the FIQ scores administered at eight time points. For the forgiveness group's FIQ scores ($n = 5$), pretest = 65.59 (13.15), Week 4 = 55.33 (9.57), Week 8 = 53.18 (9.37), Week 12 = 47.81 (9.22), Week 16 = 43.91 (14.68), Week 20 = 53.15 (12.55), posttest = 36.87 (16.03), and follow-up test = 35.81 (28.32). For the FM health group's FIQ scores ($n = 6$), pretest = 55.46 (14.75), Week 4 = 52.30 (16.22), Week 8 = 43.51 (19.84), Week 12 = 43.60 (23.66), Week 16 = 42.96 (22.73), Week 20 = 55.36 (24.69), posttest = 50.28 (13.94), and follow-up test = 44.87 (26.60).

Results of Hypotheses Tests

Table 4 of the online supplemental materials shows the gain scores, and Table 5 (see the online supplemental materials) shows that relative to the FM health group, the forgiveness group demonstrated significantly greater improvements in forgiveness and overall FM health (measured by the FIQ) from the pretest to the posttest, and significantly greater improvements in forgiveness and state anger from the pretest to the follow-up test. We did not adjust a Type I error rate for repeated-measures ANOVA because we were interested in testing the efficacy of interventions on each DVs separately, not in the null hypothesis testing of all 10 DVs simultaneously. We computed Hedge's *g*s to reduce bias for the sample size by first computing Cohen's *d*s using the mean gain and standard deviation scores of the two groups and then converting to *g*s (Borenstein, Hedges, Higgins, & Rothstein, 2009, p. 27).

As shown in Table 5, the forgiveness variable for the between-groups comparison had a g of 2.72, with a power of .99 at the posttest, which is well above the required ES of 1.63 for the sample size of 11. State and trait anger, and catastrophizing DVs, had medium ESs from the pretest to the posttest favoring the forgiveness group; overall FM health, state and trait anxiety, and self-esteem DVs had medium to moderately large ESs from the pretest to the follow-up test favoring the forgiveness group. This shows that the nonsignificance is probably caused by the small sample size, rather than indicating a true effect. In addition, at the posttest, the forgiveness group had a higher score on the forgiveness final test relative to the FM health group, $F(1, 9) = 130.65$, $p < .001$, $g = 6.33$, 95% CI [3.47, 9.19]. Conversely, the FM health group scored higher than the forgiveness group on the FM health final test, $F(1, 9) = 44.76$, $p < .001$, $g = 3.70$, 95% CI [1.81, 5.59]. This indicates that both interventions were potentially helpful in increasing the respective knowledge of the forgiveness and FM health groups.

Results of Reliable Change Analysis and the Wilcoxon Signed-Ranks Test

On the basis of the RCI criteria suggested by Vinnars, Thormählen, Gallop, Nore'n, and Barber (2009), the results in Table 6 (see the online

supplemental materials) show that the total frequency of reliable change is 20 for all 10 DVs combined for the forgiveness group compared with seven in the FM health group from the pretest to the posttest. The total frequency is 21 for the forgiveness group relative to nine for the FM health group from the pretest to the follow-up test, indicating that overall a greater number of experimental participants had reliable change than the control group participants. Further, Table 7 (see the online supplemental materials) shows that the forgiveness group significantly improved in forgiveness, overall FM health, depression, trait anger, trait anxiety, self-esteem, and catastrophizing from the pretest to the posttest and in forgiveness, overall FM health, depression, state and trait anger, trait anxiety, and self-esteem from the pretest to the follow-up. The ES estimates (r^2) for the significant outcomes ranged from .31 to .41 for both the posttest and follow-up, indicating that the intervention accounted for .31% to .41% of the changes.

Discussion

Interpretation of the Results

This is the first study that conducted a forgiveness intervention on women with FM with a childhood abuse history, and the first to give weekly quizzes and forgiveness and FM health final tests. The primary hypothesis was partially supported, as the forgiveness group showed greater improvements in forgiveness, overall FM health, and state anger relative to the FM health group. The greater reduction of state anger in the forgiveness group at the follow-up may infer that forgiving parents may have had a gradual effect on diminishing the participants' situational anger. The results may be similar to those of previous forgiveness intervention studies (Coyle & Enright, 1997; Hansen, Enright, Baskin, & Klatt, 2009; Lin et al., 2004; Waltman et al., 2009), which showed an increase in forgiveness and a reduction in anger in the forgiveness group compared with the control group. The second hypothesis of comparing the forgiveness and FM health final test scores was fully supported with strong ESs.

The quizzes and the final tests were important motivators for participants to read the chapters and handouts prior to each session, because these helped them realize that what they were learning was important, and they studied the chapters to do well on the quizzes and final tests. These tests also gave them the impression that the intervener was serious about helping them gain knowledge and the ability to practice forgiveness and improve FM health. The intervener wrote 29 vignettes depicting interpersonal transgressions for the forgiveness quizzes, which required complex cognitive reasoning. The forgiveness intervention participants solved the vignette quizzes weekly, which may have enhanced their ability to forgive their parents in real life. Moreover, the FM health group participants practiced healthy lifestyles learned from the quizzes.

The fact that the participants were randomly assigned to the interventions suggests a causal inference with internal validity. Because of the random assignment, differences between the two intervention groups in terms of the offender (father vs. mother) are unlikely to have influenced the outcome of the study. Further, Table 6 presents that all or some forgiveness intervention participants had reliable change or improvement in seven nonsignificant DVs from the pretest to the posttest, and in eight nonsignificant DVs from the pretest to the follow-up test. This indicates that the forgiveness intervention may have been potentially helpful to the forgiveness group's improvement on these DVs, even if their ESs were not significant. When examining the posttest and follow-up test scores in Table 3, after the intervention and at the follow-up test, on average, the forgiveness group improved in all of the DVs better than or similar to the published norms. After the intervention and at the follow-up test, on average, the FM health group was still unforgiving, quite afflicted with FM, mildly depressed and anxious, and had a moderate situational anger compared with the published norms. Thus, the ESs (g) may support the theoretical and clinical significance of the outcomes, because good theories focus on the size of the effect (substantive significance) rather than only on statistical significance; otherwise, the ES probably would not be useful in interpretation and application (see Fritz, Morris, & Richler, 2012).

If the ES is interpreted as the mean of the treatment group in the control group distribution (Wampold, 2001), the forgiveness ES of 2.72 at the posttest means that the average per-

son in the forgiveness group forgave as well as or better than 99.7% of the FM health group. In fact, this is the highest of the forgiveness ESs reported in all other forgiveness intervention studies that implemented Enright's (2001) process model of forgiveness and provided alternative treatment for the control group. It is also important to heed that studies with small samples may generate larger ESs than studies with larger samples (Slavin & Smith, 2009). Thus, researchers are encouraged to conduct a forgiveness intervention with larger samples with FM to examine how the ESs improve or diminish.

The aforementioned results may be overall consistent with the literature arguing that FM is a stress disorder that may be associated with childhood abuse (see Arnold, 2010), and that participants' forgiving parents may have reduced the forgiveness group's stress level impacting the HPA and the ANS response, which is congruent with Worthington and Scherer's (2004) argument. The findings of this pilot study may advance the previous research on abused people with FM (Lumley et al., 2008) by including a control group and showing that the forgiveness intervention may be potentially more helpful than the FM health intervention in improving forgiveness, overall FM health, and state anger. Further, the results showed that the forgiveness intervention, which had spiritual components in its process, may have rendered a better physical and psychological health for the forgiveness group compared with the FM health group.

Clinical Observations for the Forgiveness Intervention Participants

We introduce two cases of clinical observations. Hannah (alias) was a 23-year-old Christian woman who had endured physical and emotional abuse, and emotional neglect, by her father and family in childhood. Her pretest scores showed a low level of forgiveness, a severe impact of FM, moderate depression, a norm level of state anger, high trait anger, high state and trait anxiety, very low self-esteem, and a moderate level of catastrophizing and reinterpreting pain sensations. She harbored significant resentment toward her father and had difficulty communicating with him. During the forgiveness intervention, Hannah started to understand her father through spiritual perspectives. Her father was also abused as a child by his own father, and Hannah admitted that she was holding resentment toward her grandfather as well, who passed away when she was 7 years old. She felt that her grandfather was partially responsible for how her father had turned out to be physically abusive. Hannah said, "I know God forgives people, so I think I can forgive my father as well." As she decided to offer a gift of forgiveness to her father, she telephoned him for the first time in her life and said kind words to him because she had never called or spoken with him over the phone previously. At the posttest and follow-up, Hannah improved substantially in all of the psychological and physical variables.

Second, Ruth (alias) was a 64-year-old, agnostic woman whose father ridiculed, teased, belittled, humiliated, bullied, and exerted harsh discipline and control toward her when she was a child. Her father passed away unexpectedly 12 years ago and Ruth did not have an opportunity to resolve her hurts toward him or even see his last moment. At the pretest, Ruth showed a low level of forgiveness, moderate impact of FM, moderate depression, high state and trait anger, high state and trait anxiety, an average level of self-esteem, low catastrophizing, and a higher than the norm level of reinterpreting pain sensations. During the forgiveness intervention, she once unexpectedly brought two large, thick albums filled with her father's photographs taken from his childhood to his old age. She had been gathering her father's pictures since her father had passed away because she had not had a chance to say good-bye to him. Ruth wanted the intervener to look at all of his pictures and documents, and so the intervener examined them together with Ruth. The intervener could observe that Ruth's emotion was changing from resentment in the beginning to longing for and missing her father as she worked on forgiveness. Ruth said, "If my father was alive, I would want to spend more time with him and allow him to take me out to dinner and pay for it, as this is something that my father would have most appreciated." She improved substantially in most of the psychological and physical variables at the posttest and follow-up including a very high level of forgiveness toward her father.

Participants' Reactions to the Interventions

The forgiveness intervention participants who read the books and experienced the intervention stated that the intervention was therapeutic, and that they could freely talk about the abusive experience within the confidentiality-assured and safe environment. They said that they had not thought about forgiving their parents seriously prior to the intervention, but that the forgiveness process had helped them to reframe their parents as those who deserve respect, no matter what they had done. They also stated that the forgiveness process appears to have positively impacted their FM health. In addition, the FM health intervention participants have made many positive comments, such as, "I would never learn this kind of information elsewhere," "My physician made copies of your course articles and handouts when I showed them to her," "Participating in this study has changed how my family views FM and the readings are very helpful," and "We are only a half way through the program and I received so many articles and handouts from you."

Strengths, Limitations, and Implications for Research and Practice

Because of the small sample size, the results cannot be generalized beyond the participants with FM in this pilot study. Nevertheless, four strengths of this pilot study may suggest the replicability of the pilot study outcomes. First, the forgiveness intervention participants worked on forgiving real-life transgressors for 24 weeks, not hypothetical transgressors, and the FM health intervention participants worked on improving their existing FM conditions. Second, the posttest was one week after the 24th session, which is close enough that other factors were unlikely to have intervened to diminish the 24-week intervention effect. Third, the 12-week follow-up is a reasonably long term for other confounding factors to occur in the participants, yet all participants completed the follow-up test. Fourth, there were no incentives given to the participants and their compliance rate was 100%.

There were some limitations in this pilot study, including attrition. The reason that the pilot study started with 16 participants is that there was one intervener who had to provide individual intervention to all participants each week for 24 weeks. Figure 1 of the online supplemental materials shows the reasons for participant withdrawal. Nevertheless, the attrition rate in this pilot study was 31.3%, which is in the lower end of the average attrition rate of 27% to 67% reported in 36 exercise intervention studies for people with FM (Jones & Liptan, 2009). The second limitation is using self-report measures. Yet Mease (2005) stated that specific and sensitive physiological tools for assessing the effects of an intervention on FM is still in its initial stage, and the best way to measure is via the self-report. Third, because most of the participants were Caucasian, the results may not be generalized to other racial groups. Fourth, this pilot study could have strengthened the fidelity check by using at least two auditors to calculate interrater reliability. Finally, although the research design of one intervener providing both interventions has a strength in the equality of the intervener's general characteristics across the programs (Wampold, 2001), the outcomes for the two groups may have been partially due to an "experimenter effect" (Wampold, 2001), because rapport between the intervener and the two groups was created. Nevertheless, the forgiveness intervention was different from other types of interpersonal therapy because forgiveness focuses on moral love and mercy against profound injustice as an outcome, whereas interpersonal therapy does not necessarily deal with moral injustice.

Overall, the findings may be encouraging for clinicians who are interested in implementing a forgiveness intervention for clients with FM suffering from childhood abuse. A spiritually sensitive therapy, such as the forgiveness intervention, may foster clients' spiritual development that goes beyond a mere symptom reduction and helps to achieve a higher level of functioning, positive experiences, and self-awareness (see Sperry, 2010). This pilot study included Protestant, Unitarian Universalist, Jewish, and agnostic participants. Forgiveness, from religious perspectives, can have divine qualities, which can be a means for pursuing God's plan, emulating God, or developing a closer relationship with God (Rye et al., 2000). As the participants' religiosity may have helped them cope with the abuse and foster forgiveness, the forgiveness intervention may lead religious/spiritual clients to understand forgive-

ness as a way to practice their spiritual/religious values and beliefs.

Further, although abused people with FM showed greater HPA and ANS dysfunction than nonabused people with FM (McLean et al., 2005), researchers and clinicians can test whether the forgiveness intervention may also help nonabused clients with FM to forgive any type of injustices as well as decrease anger and improve FM health. Researchers and clinicians could also examine the effect of forgiveness intervention on the HPA function or neuroendocrine symptoms in clients with FM or other rheumatic disorders, as biomarkers were not examined in this pilot study. Finally, clinicians may be able to help clients with FM change negative mental and physiological responses to an adaptive and healthy response as they learn to forgive. Such changes can play a part in overcoming the illness and developing strength and resilience.

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Appendix

Forgiveness Intervention Procedure

The first author developed the forgiveness intervention based on Dr. Robert Enright's (2001) book. In addition to the book, forgiveness intervention participants used a nine-page syllabus, and one- to two-page handouts, addressing the learning objectives and the summary of the chapter's main points for each session—all developed by the first author. The intervener met with each participant for 1 hr each week at the CTRC at all different times during the week so that the participants were not officially exposed to one another.

Weeks 1–8 focused on the definition of forgiveness and Phase 1, Uncovering Your Anger; Weeks 9–10 on Phase 2, Committing to Forgive; Weeks 11–16 on Phase 3, Working on Forgiveness; Weeks 17–20 on Phase 4, Discovery and Release from Emotional Prison (see Table 1 of the online supplemental materials); Weeks 21–23 on learning when is appropriate to say "I forgive you," and how the participants know when they have genuinely forgiven; and Week 24, examining the status and progress of the participants in terms of forgiving their parents.

Each participant took a quiz (four multiple-choice items that the intervener developed) each week at the beginning of the session that tested her knowledge of the reading assignments and handouts that were given to her a week earlier. The quizzes were different each week, and thus there was no overlap of the same quiz items. After the participant took the quiz, the intervener did not grade it, but reviewed the results with the participant to see what she had and had not learned. The intervener had her keep the quizzes so that she could continue to study. Next, the intervener discussed the journal entries that the participant wrote, addressing all of the questions in the book. This helped both of them to examine where the participant is in the

(*Appendix continues*)

forgiveness process. The intervener asked the participant to apply what she has learned about forgiveness to her parent and the abusive events.

The intervention was based on interpersonal, person-centered approach in which the treatment traction of helping participants to forgive occurred by gradually helping the participants to acknowledge their anger and helping them to see that holding onto anger is not a healthy way to deal with the abuse. Reframing the offender and the abusive events in terms of how the parents grew up and their situation at the time of offense, and learning to view their parents as a human being despite their wrongdoing, was the turning point for the participants. Finally, leading them to gradually see forgiveness as a strength that can transform their anger into positive thoughts, feelings, and behaviors toward the offender was the point at which the forgiveness work helped the participants to change.

The intervener and the participant discussed the content of the chapter that the participant had read for the session. The intervener asked the participant about the concepts of forgiveness, case examples illustrated in the book, and asked how she would apply those to her own situation. For example, after the participant had decided to forgive her father/mother (Decision phase), the participant entered the Work phase, which has one part in which the participant is asked to take cosmic (spiritual/religious) perspectives on the father/mother to understand the offender and reframe the offense in as broad a context as possible. Adapting from the journal entry questions in the book, the intervener asked the participant questions related to spirituality (see the questions included at the end of this appendix). However, the intervener never imposed any spiritual/religious values on the participant; the participant chose whether she would or would not rely on spirituality to forgive her parents.

There were three Christian and two agnostic participants in the forgiveness group. The Christian participants freely discussed the spiritual/religious issues regarding forgiveness by answering those journal entry questions and discussing them with the intervener during the session. The Christian participants stated that their faith in God had helped them endure in the past and is currently helping them forgive their parents during the intervention. One of the agnostic participants stated that she has started to attend a Christian church during the intervention and goes to the Sunday service sometimes. She stated that she thinks that God exists, but she was still soul-searching regarding her thoughts about God. The other agnostic participant attended a Christian school in childhood, but she stated that some disappointments with the doctrine and her parents led her to agnosticism. She had difficulty comprehending and expressing her worldview in relation to spirituality. When answering the spiritual questions, she consistently said that she was uncertain whether God exists. She stated, "If there is God, then I hope that my father is redeemable. But I don't know if I would see him in the afterlife because I don't know if there is such an afterlife." Nonetheless, she improved significantly in the level of forgiveness toward her father at the end of intervention, suggesting that discussing forgiveness in the spiritual context may have had some undetermined influence on her.

Examples of spiritual questions included, "How would you describe your father/mother when you take a cosmic perspective?", "What do you think about the divine?", "How does God see your father/mother?", "Do you have a worldview about redemption?", "Is your father/mother redeemable?", "Can you see your father/mother as a part of the divine plan, as belonging to a wider group than your family or the global community living on earth right now?", "Is it possible that you may see him or her in an afterlife?", "Your father/mother may be important to God. If this is true, how does this alter your perception of him/her?", and "Many spiritual or religious people see themselves as needing help from the divine to forgive. Is this true in your case? If so, what are you going to ask for God for helping you to forgive?" (adapted from Enright, 2001, pp. 153–154).

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