Yoga as an Effective Therapy to Reduce Symptoms in Patients with Fibromyalgia

Rachel K. Johnson
Pacific University
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Abstract

Background: Fibromyalgia is a debilitating chronic disease characterized by musculoskeletal pain, fatigue, and compromises in cognition. One of the biggest challenges surrounding fibromyalgia is proper diagnosis, as there is no current diagnostic test established. Most practitioners utilize examining tender points and other subjective self-assessments to aid in the assessment of the condition. Current therapies include both medication and non-pharmacologic such as chiropractic therapy, acupuncture, aerobic exercise, and yoga. Yoga is an ancient Indian practice incorporating physical poses, deep breathing, self-awareness, and meditation. Yoga is an effective therapy modality for managing chronic illnesses including low back pain and arthritis. Although there is no cure for fibromyalgia, several studies considered yoga as a therapy for symptom management. Can yoga be an effective therapy for symptom reduction in patients with chronic fibromyalgia?

Methods: An exhaustive search of available medical literature using MEDLINE- Ovid, Web of Science and CINAHL was performed using the following key terms: “fibromyalgia” and “yoga”. These were screened for eligibility criteria. The resulting studies were then appraised and assessed for quality with GRADE.

Results: Three studies were included in this systematic review, meeting inclusion and exclusion criteria. One randomized control trial looked at 53 patients with chronic fibromyalgia and showed a significant improvement in the Fibromyalgia Impact Questionnaire Revised (FIQR) total score and in the strength assessment favoring the yoga intervention. Two pre-/post-therapy studies showed significant improvements in fibromyalgia symptoms, though assessed using different modalities including the Fibromyalgia Impact Questionnaire and the McGill Pain Questionnaire short-form 2.

Conclusion: Yoga has been shown to be an effective treatment modality in decreasing pain symptoms in patients with chronic fibromyalgia. Current research not only showed improvements in pain, but also in fibromyalgia-associated symptoms including mental clarity, anxiety, fatigue, and positive thinking. Further research will develop an objective way to measure symptoms and by doing this will decrease the risk for bias and validate the current treatment. Larger clinical trials and a longer follow-up will also be beneficial in confirming the current research.

Keywords: Fibromyalgia, yoga

Degree Type
Capstone Project

Degree Name
Master of Science in Physician Assistant Studies

First Advisor
Anjanette Sommers, PA-C

Keywords
Fibromyalgia, yoga

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Rachel K. Johnson

A Clinical Graduate Project Submitted to the Faculty of the

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Pacific University

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For the Masters of Science Degree, August 13, 2016

Faculty Advisor: Professor Brent Norris, MPAS PA-C

Clinical Graduate Project Coordinator: Annjanette Sommers, PA-C, MS
Biography

[Redacted for privacy]
Abstract

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Acknowledgements

[Redacted for privacy]
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List of Abbreviations

FIQ: Fibromyalgia Impact Questionnaire
FIQR: Fibromyalgia Impact Questionnaire Revised
FM: Fibromyalgia
HPA: Hypothalamic Pituitary Adrenal
OHSU: Oregon Health and Science University
PHQ-9: Patient Health Questionnaire-9
Yoga as an Effective Therapy to Reduce Symptoms in Patients with Fibromyalgia

Background

Fibromyalgia is a functional disorder characterized by chronic widespread musculoskeletal pain and tenderness, fatigue, and depression. Patients often describe symptoms as tenderness to touch or pressure affecting muscles and possibly joints, sleep problems, and problems with mental clarity. Symptoms of fibromyalgia and its related problems can vary in intensity, and often worsen with stress. Pathophysiology underlying the disease is still greatly unknown, but there is evidence that fibromyalgia patients experience altered hypothalamic pituitary adrenal (HPA) axis, abnormal pain processing in the central nervous system, and autonomic nervous system dysfunction including lower levels of serotonin, norepinephrine, and dopamine.

The illness can be incredibly difficult to accurately diagnose, as specific diagnostic tests are lacking. There are a number of ways to assess the disorder: the widespread pain index, where patients are asked to rate pain experiences within the last week in 19 regions of the body; symptom severity scale, where individuals rate the presence of symptoms including fatigue, mental “fuzziness” and lack of restful sleep; tender points, where patients endorse pain following palpation on 11 of the 18 points. According to the American College of Rheumatology, the following criteria are needed to diagnose fibromyalgia, when evaluating the pain and symptoms over the past week: based on the total of number of painful areas of the possible 19 parts, plus level of severity of these symptoms (fatigue, waking unrefreshed, cognitive problems, plus a number of other general physical symptoms). The criteria goes on to include evaluation of symptoms lasting at least three months at roughly the same intensity, and includes a
consideration that another health problem could explain the pain and related symptoms.\textsuperscript{2} Demographics that seem to be associated with fibromyalgia are females, low level of education, low socioeconomic status, and divorce.\textsuperscript{1} Seeing the trend in the associated demographics, many perceive fibromyalgia as a Western disease. However, no Western medicine techniques have been proven to rid patients of this disease. Thus, some consider turning to Eastern medicine techniques for help in improving symptoms.

Although there is no cure for fibromyalgia, the current treatment modalities focus on symptom management and include both medication and non-pharmacologic therapies. Medications focus on correcting the neurotransmitter imbalance, on blocking the over-activity of the nerve cells involved in pain transmission, and on improving sleep.\textsuperscript{2} Complimentary and alternative therapies include cognitive behavioral therapy, acupuncture, chiropractic and massage therapy, and physical exercise including aerobic and homeopathic therapies such as yoga.\textsuperscript{2,5}

Yoga is a form of exercise that incorporates mind, body, and breath into one practice. The practice evolved from ancient India and includes physical postures (asanas), breathing techniques, and meditation.\textsuperscript{6} The practice can range from gentle to rigorous physical poses and incorporate breath work as well as a deep self-awareness. The awareness around cognition, physical wellbeing, and emotion is described in yoga as the spiritual connection. Yoga’s relaxation techniques have been proven to lower blood pressure and reduce insomnia.\textsuperscript{7} Among others, physical benefits of practicing yoga include increased flexibility and muscle strength; improved respiration, energy, and vitality; and balanced metabolism. Self-awareness benefits include managing stress, decreasing anxiety, improving mental well being, and creating a more positive outlook on life.\textsuperscript{7}
Yoga may be used as an effective modality for coping with chronic pain as it incorporates exercise and stress management, two important lifestyle factors frequently included in medical guidelines for the management of chronic disease. Fibromyalgia has important characteristics that may be addressed by incorporating a yoga practice into a weekly routine. Can an 8-week course of yoga therapy significantly reduce symptoms of chronic fibromyalgia? This systematic review considers the evidence for recommending yoga as a supplemental therapy to patients suffering with fibromyalgia.

**Methods**

An exhaustive literature search using MEDLINE- Ovid, Web Science, and CINAHL was conducted. The following search terms were used: “fibromyalgia” and “yoga”. The bibliographies from several relevant background articles were used and eligibility criteria were applied. Included were studies conducted on patients with fibromyalgia, evaluating an only once-weekly 8-week yoga therapy program and measuring symptomatic improvement using a qualitative pain scale such as Fibromyalgia Intensity Questionnaire. Other inclusion criteria required human studies and studies published in the English language. Studies were excluded if they were review or overview articles. Articles were assessed for quality using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE).

**Results**

The initial search yielded 147 articles for review. After eliminating duplicates and screening these results for relevant articles using eligibility criteria, a total of 3 articles were
included in qualitative synthesis. These articles included one randomized control trial\textsuperscript{9} and two pre-/post-therapy studies.\textsuperscript{3,4} (See Table I).

**Carson et al**

This randomized control trial\textsuperscript{9} was performed in 2010. The authors considered an 8-week course of gentle yoga poses and meditation as a way to improve overall symptoms. The primary outcome was improved fibromyalgia symptoms, which were measured by the total score of the Fibromyalgia Impact Questionnaire Revised (FIQR). The FIQR is a self-assessment that considers pain, stiffness, poor sleep, depression, poor memory, anxiety, tenderness, poor balance, and environment sensitivity. Patients are given a score, ranging from 0-100 with higher scores indicating more symptom burden and functional limitations.\textsuperscript{9}

Individuals recruited to participate in the study were identified using a database of fibromyalgia patients referred to Oregon Health and Science University (OHSU) tertiary care center who had an interest in participating in research studies. To have met eligibility criteria, as defined by the American College of Rheumatology, patients needed to have the diagnosis of fibromyalgia for at least one year and had to be on a stable regimen of pharmacologic and/or non-pharmacologic treatment for fibromyalgia for equal to or greater than 3 months. Exclusion criteria included residing >70 miles from the research site or unavailable to attend the intervention at one of the scheduled times; currently engaged in intensive yoga practice (practice >3 days/ week); actively contemplating suicide; currently undergoing disability application, determination or litigation; scheduled for elective surgery during the study period; physically disabled in a manner that precluded meaningful participation in the intervention; unwilling to
forgo changing their voluntary pharmacologic and/or non-pharmacologic treatments for the length of their participation in the study; or do not speak English.9

Fifty-three patients completed a baseline assessment and were then randomly assigned to either start the 8-week yoga program immediately (n=25) or 3 months later (wait-list control) (n=28). An individual not involved in the study completed randomization using a random number table. Once patients completed their baseline assessments, they were able to open concealed envelopes revealing their respective participation group. Research assistants were blinded to the condition each participant was assigned.9

Patients completed the FIQR at baseline (2 weeks prior to yoga therapy) and at the completion of the study (the same week as the last yoga therapy session). Physical assessments, performed also at baseline and at the conclusion of the study, included myalgic tender points, strength, and balance. To assess pain coping strategies, patients completed online daily diary entries. Loss to follow-up reduced the study population by 5 patients, leaving a total of 50 patients to be analyzed in the group to which they were originally allocated.9

There was a significant difference in the FIQR total score and the strength assessment favoring the yoga intervention. The average FIQR total score for patients who performed yoga for 8 weeks went down from 48.32 (baseline) to 35.49 (post), as compared to the FIQR total score in the control group from 49.26 (baseline) to 48.69 (post). As recommended by Bennett et al,1 a clinically significant reduction in symptoms is defined as at least 14% reduction, this study observed a 31.4% decrease in FIQR total score.9 There was not a significant difference in myalgic tender point scores, 38.03 (yoga baseline) to 29.26 (yoga post) and 36.44 (control baseline) to 29.04 (control post). Regarding pain coping strategies, as assessed by six diary
outcomes on a 0-10 scale, there was a statistically significant improvement in the yoga group as compared to the control group. Of note, defining clinically important changes in measures of coping has yet to be completed.⁹ (See Table II.)

Curtis et al

This was a pre-/ post-intervention study³ that considered an 8-week Hatha yoga intervention as improving fibromyalgia symptoms, measured by an array of self-reported pain scales and by salivary cortisol levels. The authors wanted to know if yoga therapy would result in improving pain, anxiety/depression, mindfulness, and increased cortisol in patients with fibromyalgia. The authors screened 57 patients for eligibility including women; written diagnosis of fibromyalgia; not currently enrolled in a yoga practice; not self-reported or diagnosed bipolar, psychotic, or personality disorder; no medication changes one month prior to starting saliva collection and yoga program; no habit of smoking more than 15 cigarettes a day; and patients could not be currently pregnant or breastfeeding. This screening resulted in 24 eligible women, and authors were left with 19 patients who successfully completed the yoga program.³

Symptomatology was measured using a set of questionnaires including “McGill Pain Questionnaire short-form 2”, a numeric rating scale for pain intensity and unpleasantness, sum of local areas of pain, pain catastrophizing scale, pain disability index. Anxiety and depression were measured using the Hospital Anxiety and Depression Scale. Levels of mindfulness were assessed using the Five Facet Mindfulness Questionnaire. Ability to cope with chronic pain was assessed using the Chronic Pain Acceptance Questionnaire. Salivary cortisol levels were assayed using a highly sensitive enzyme immunosassay.³
To assess change in pain, mood, and mindfulness over time, the respective measures were conducted on three different occasions: immediately prior to the start of the first yoga class, before the 9th class (mid-intervention), and at the follow-up session. There was a significant change in mood and mindfulness but not in pain. Salivary cortisol levels were collected over a period of two days at three different times: immediately after waking in the morning, 30 minutes later before brushing teeth, eating food, or exercising, and at night just before going to sleep. These series of salivary tests were done just prior to the start of the yoga intervention and the day after the final yoga class. Levels from the two sampling days were averaged. Post-intervention salivary cortisol outputs were higher than pre-intervention levels, however there was not a significant difference between them. When an “intention to treat analysis” was performed, the post-intervention salivary cortisol levels were statistically significantly higher than pre-intervention levels.3 (See Table III.)

The study authors state their results agree with and confirm the findings of Carson et al,9 illustrating that improvements in pain, pain catastrophizing and chronic pain acceptance were made as a result of an 8-week yoga intervention. Insight as to why there were low levels of salivary cortisol occur in patients with fibromyalgia was given, that being a dysregulation in the hypothalamic-pituitary axis (HPA). Since the study demonstrated increased levels of total cortisol output as a result of yoga therapy, the authors infer that yoga therapy may normalize one aspect of the HPA axis dysregulation in women.3

**Hennard**

Hennard conducted a pre/post-therapy study in 2011 that considered 8 weeks of yoga and meditation to help manage fibromyalgia symptoms. The author measured physical function
and symptoms of fibromyalgia over the previous week by instructing the study participants to self-assess using the Fibromyalgia Impact Questionnaire (FIQ). The primary outcome was changes in participants’ self-reported symptoms after an 8-week course of yoga. Patients were recruited through physicians’ offices, support groups, and church affiliations. Eligibility criteria included a diagnosis of fibromyalgia, age 18 or older, able to attend a weekly class, and able to rise from the floor without assistance. Twenty-four women and one man met the inclusion criteria and 15 individuals remained at the conclusion of the study.4

Patients completed the FIQ on two occasions: before the first class and immediately following the last class of the 8-week program. Since both men and women participated in the study, one question in the FIQ regarding physical functioning was omitted, as there was a potential gender bias towards women. Patients were guided through 75 minutes of gentle yoga, meditation, discussion, and guided relaxation once per week. The attrition rate was 36%, with 9 of the original 25 participants dropping out due to childcare issues, traffic problems, and pain following class. In order to be considered for data analysis, participants needed to have attended at least 6 of the 8 classes, including the first and the last class; and must have completed the FIQ at the appropriately assigned times. Ten women and one man remained for analysis after elimination of non-eligible participants.4

The FIQ total improved significantly over the course of the 8-week yoga intervention. Significant differences were also seen in the number of days one felt good when measured pre- and post-interventional. Also assessed by the FIQ, significant differences were noted in measures of stiffness, anxiety, and depression. Although not significant, improvements were seen in the
degree of pain that interfered with work, pain severity, fatigue, and how one felt in the morning.\textsuperscript{4} (See Table IV.)

According to a pre-program questionnaire, 8 of the 11 participants indicated they already partake in some sort of exercise. Thus, the authors infer that overall improvement in stiffness was not due to beginning an exercise program. Regarding the significant improvements made in anxiety and depression, it is possible these scores improved as a result of social support, not from the yoga and meditation intervention. Although not significant, pain improvements made are consistent with previously cited articles. The main explanation the authors have regarding the lack of significance in pain improvement is the chronic nature of pain in fibromyalgia and the need for studies that assess the long-term effects of yoga and meditation.\textsuperscript{4}

Discussion

In appraising the current evidence, there was a significant difference in pain symptom scores when comparing scores pre- to post-yoga intervention across all studies.\textsuperscript{3,4,9} However, there are discrepancies in the exact method of measuring pain, as one study considered the McGill Pain Questionnaire short-form 2,\textsuperscript{3} one considered the Fibromyalgia Intensity Questionnaire,\textsuperscript{4} and one considered the Fibromyalgia Intensity Questionnaire Revised.\textsuperscript{9} The ability to compare specific endpoints is thus hindered, but inferences can be made from all in that symptoms improved regardless of the endpoint variability.

Other important limitations across all studies include the small sample size, as the largest population size was 53 participants.\textsuperscript{9} Discrepancies were also seen in demographics, as only one study included men and women,\textsuperscript{4} whereas the other two considered only women\textsuperscript{3,9} and the
studies had a predisposition for Caucasian and middle class individuals. All studies relied heavily on self-reported measurements, so the validity may be compromised. All studies also lacked follow-up beyond the conclusion of the 8-week study, so the long-term effects of yoga on patients with chronic fibromyalgia could not be assessed.

Two of the three studies had similar limitations and these flaws stemmed from a pre/post therapy design, which brings the potential for bias and qualifies a downgrade in quality for both.\textsuperscript{3,4} Also noted in these three was the lack of any blinding or randomization, and the intervention inconsistency, as home yoga was either not addressed, or documented in journal entries but not controlled by the study facilitators.

One study\textsuperscript{9} did not have any serious limitations, as Carson et al conducted a randomized, blinded control trial with clearly explained eligibility criteria and exclusion conditions. Patients were analyzed in the groups to which they were originally assigned, and intervention was delivered in a standardized fashion. All patient-important endpoints were considered; a wide variety of qualitative and quantitative measures were used to assess effect. The study also reported a very low attrition rate, which speaks to the quality and design of the study. Of note, in 2012, Carson et al published a follow-up study with results of patients who, in the original study were in the control group, completed 8 weeks of yoga therapy.\textsuperscript{10} Authors report the results of this follow-up study mirror results seen at post-treatment in the original yoga therapy group.\textsuperscript{10} Since these outcomes are replicable and maintained over time, the findings are more precise and the results more trusted.

Considering follow-up, all studies looked at practicing yoga for 8 weeks, so this is a good place to start, however the 8-week timeframe was not supported by any literature. Yoga was
researched as a supplemental therapy for fibromyalgia, so it should be prescribed as such: most patients respond better to a multi-dimensional approach incorporating pharmacologic and alternative therapy. The strong advantages of incorporating a yoga practice to manage symptoms outweigh its low risk of harm. Thus, clinicians should consider recommending yoga as a supplemental therapy to patients with fibromyalgia.

Looking at the overall GRADE quality of the studies, considering two studies\(^{3,4}\) downgrades occurred due to small sample size, lack of a control group, blinding and randomization. However, when taking into account the high quality of evidence from the Carson et al study,\(^9\) an overall moderate quality of evidence for the outcome of symptomatic improvement can be assumed. (See Table I.)

Moving forward from the synthesis of the current evidence, there is a need for more objective measures for quantifying symptoms associated with fibromyalgia. Once a quantitative method of examining symptoms is developed, treatment effectiveness can be more easily assessed. Other symptoms associated with fibromyalgia should be considered to assess the whole patient’s well being such as employing the Patient Health Questionnaire (PHQ-9) to assess depression. A larger RCT is needed to follow the positive results of the Carson et al study.\(^9\) Adding a control group to the two pre-/post-therapy studies along with randomization and blinding would increase validity and the quality of evidence would improve. Studies including a follow-up approximately 6 months beyond conclusion of the study would help clinicians in explaining the long-term benefits of practicing yoga to their patients with fibromyalgia.

In synthesizing the results from these three small studies, the consensus was that yoga improves symptoms in patients with fibromyalgia. Considering the type of yoga to recommend,
most of the research was done around Hatha yoga, which is the most basic type of yoga and incorporates physical poses and awareness to the breath; recommending Hatha yoga is most appropriate for beginners. One study noted a rise in pain and anxiety and a decrease in mindfulness at the mid-point in the study before noticing an improvement, so patients starting yoga therapy should be counseled to persevere through possible symptom flares. Encouraging patients to practice yoga at least once a week is important to promote consistent healing such as increasing parasympathetic nervous system activity and decreasing sympathetic nervous system activity. Clinicians can consider recommending a gentle yoga class through a local studio, applications available on phones or tablets, or finding videos through YouTube.

Considering a cost-benefit analysis, the benefits of yoga far outweigh any risks. Pain symptom reduction is a high priority for patients with fibromyalgia. As demonstrated by the literature, patients saw a significant decrease in their pain symptoms. However, even if patients did not see an improvement in symptoms, the list of benefits that make yoga worthwhile is endless, including mental clarity, positive thinking, increased flexibility and strength, improved sleep, and decreased anxiety. Risks for patients with fibromyalgia to begin a yoga practice include pain and other symptom worsening, muscle strain, or back injury. If yoga helps in even one area of suffering, it is worth the minimal costs. Therefore, yoga is effective in making significant improvements in a patient’s overall health with few, if any, repercussions.

**Conclusion**

Yoga can be considered a supplemental therapy for improving symptoms in patients with chronic fibromyalgia. When considering the current literature, difficulty arises when comparing outcomes side-by-side, as many different measurement techniques were used. However, since all
studies demonstrated significant improvements in symptoms, clinicians can be encouraged to recommend yoga to their patients with chronic fibromyalgia. The quality of evidence was moderate. Future research will validate yoga as an effective treatment by including larger sample sizes with a longer follow-up, and will focus on assessing fibromyalgia symptom improvement using an objective modality. Clinicians can now have faith there is a promising therapy they can offer patients with fibromyalgia that effectively reduces symptoms.
References


Table I: Quality Assessment of Reviewed Articles

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<th>Study</th>
<th>Design</th>
<th>Downgrade Criteria</th>
<th>Quality</th>
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<tbody>
<tr>
<td>Carson et al</td>
<td>RCT</td>
<td>Not Serious</td>
<td>High</td>
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<tr>
<td>Curtis et al</td>
<td>Pre-post</td>
<td>Very Serious a</td>
<td>Very Low</td>
</tr>
<tr>
<td>Hennard</td>
<td>Pre-post</td>
<td>Very Serious a,c</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

a Lack of blinding and randomization of study subjects and no control group
b Small sample size
c Attrition rate was 36%, no mention of exclusion criteria

Table II. Summary of findings: Carson et al

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline</th>
<th>Post intervention</th>
<th>P Value</th>
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<tr>
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<td>48.32</td>
<td>49.26</td>
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<td>Balance- eyes open</td>
<td>27.76</td>
<td>29.64</td>
<td>0.0881</td>
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Table III. Summary of findings: Curtis et al

<table>
<thead>
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<th>Mid-intervention</th>
<th>Post-intervention</th>
<th>P Value</th>
</tr>
</thead>
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<tr>
<td>Total McGill Pain Questionnaire short-form 2</td>
<td>4.03</td>
<td>3.38</td>
<td>3.62</td>
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<td>Hospital Anxiety Scale</td>
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<td>Hospital Depression Scale</td>
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<td>7.47</td>
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<td>Five Facet Mindfulness Questionnaire</td>
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<td>126.47</td>
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<td>Chronic Pain Acceptance Questionnaire</td>
<td>60.47</td>
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<td>0.003</td>
</tr>
<tr>
<td>Salivary cortisol levels</td>
<td>189.46</td>
<td></td>
<td>230.20</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

Table IV. Summary of findings: Hennard

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-intervention mean</th>
<th>Post-intervention mean</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIQ Total Scores</td>
<td>52.149</td>
<td>44.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Days felt good</td>
<td>1.91</td>
<td>3.55</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Days missed work</td>
<td>2.91</td>
<td>2.27</td>
<td>0.01</td>
</tr>
</tbody>
</table>