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Review Article

# The Effectiveness of Adding a Health Education Program to Fibromyalgia Treatment: A Systematic Review of Randomized Controlled Trials and Meta-Analysis

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ABSTRACT

*Objectives:* Evaluate the effectiveness of adding health education programs to a fibromyalgia intervention, focusing on pain intensity and the impact of fibromyalgia on quality of life.
*Design:* Systematic review and meta-analysis of randomized controlled trials.
*Data Sources:* Databases: Web of Science, Medline, Scopus, Cumulative Index to Nursing and Allied Health Literature, Latin American and Caribbean Health Sciences Literature and PsycINFO.
*Review/Analysis Methods:* Literature from 2005–2025 was reviewed. Risk of bias was assessed by two researchers using the Cochrane Collaboration's tool. Quality of evidence was measured using the Grading of Recommendations, Assessment, Development, and Evaluation tool.
*Results:* The systematic review included 7 randomized controlled trials. 6 studies were included in the meta-analysis of the impact of fibromyalgia on quality of life, and five in the pain intensity meta-analysis. Meta-analysis results showed that health education significantly reduced pain intensity (MD=-13.10; 95% CI [-22.06, - 4.14], $p$=0.004) and improved the impact of fibromyalgia on quality of life (SMD=-0.39; 95% CI [-0.55, -0.23], $p$<.001).
Subgroup analyses showed that adding education to usual care led to clinically relevant reduction in pain intensity (MD=-19.53; 95% CI [-31.68, -7.39], $p$=0.002) and statistically significant improvement in the impacf of fibromyalgia on quality of life (SMD=-0.46; 95% CI [-0.66, -0.26], $p$ < .001).
*Conclusions:* Health education programs are effective in improving pain intensity and reducing the impact of fibromyalgia on quality of life. Further research is needed to support findings.
*Nursing Practice Implications:* By implementing health education for fibromyalgia patients, nurses can improve outcomes, enhancing the quality of care provided.


Fibromyalgia is characterized by widespread musculoskeletal pain (affecting four of the five body regions) and chronic pain (lasting more than 3 months) and is associated with psychological disorders such as depression, anxiety, fatigue, and cognitive impairment, directly affecting overall quality of life (Wolfe et al., 2014, 2016). Fibromyalgia is one of the most common chronic generalized musculoskeletal pain conditions. Its prevalence is 2%-3% in the general population, affecting more women than men (3:1 ratio) (Queiroz, 2013; Sarzi-Puttini et al., 2020).

Beyond its clinical characteristics, fibromyalgia is often experienced as an invisible condition that can make patients feel misunderstood not only by health care professionals but also by their social environment (Russell et al., 2018). This sense of invisibility and lack of understanding about chronic pain conditions can contribute to social stigmatization. Furthermore, when pain is considered medically unexplained, it can increase the risk of social exclusion. In cases in which stigma becomes internalized by individuals with chronic pain, it is associated with lower levels of perceived control over pain and higher levels of pain catastrophizing

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(Cohen et al., 2011; Davis & Gillard, 2022; De Ruddere et al., 2016; Waugh et al., 2014).

Fibromyalgia management and care often include strategies such as exercise, education, pharmacologic treatment, psychotherapy, physical therapy, and mindfulness. In this context, previous studies noted the importance of patients understanding their condition before starting pharmacologic treatment (Sarzi-Puttini et al., 2020). In general, education programs have been proven to benefit patients with chronic health problems. Regarding chronic pain issues, education programs are essential, as they provide patients with the tools and knowledge to improve their attitudes and behaviors. Education programs have also been proven to be cost-effective, thus becoming a key component of a chronic care plan (Climent-Sanz et al., 2020; Musekamp et al., 2016; Stenberg et al., 2018; Vargas-Schaffer & Cogan, 2014). Finally, according to the European League Against Rheumatism (EULAR), the initial approach to the disease should focus on nonpharmacologic interventions, including education and exercise (Macfarlane et al., 2017).

In this review, we adopted the World Health Organization's definition of health education as the basis for defining a health education program or intervention. According to the World Health Organization, health education refers to "consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge and developing life skills which are conducive to individual and community health" (World Health Organization, 1998). For the purposes of this review, brief or unstructured advice and opportunistic recommendations were not considered to fall within the definition of health education programs or interventions.

In addition, integrating perspectives from the literature, this review defines an intervention as an action aimed at improving health that may involve a single component or a combination of components that may interact (Thomas et al., 2024; World Health Organization, 2023). Thus, this study included works in which an educational program was added to the experimental group as an adjunct to an existing intervention provided to participants in both groups in order to explore how education may provide added value in improving health outcomes in fibromyalgia.

In line with these definitions, various educational approaches have been developed to empower people with fibromyalgia in understanding and managing their condition. In this context, among the various approaches developed for health education programs, one has emerged that consists of reconceptualizing pain, with a focus on gaining a better understanding of the origin of the perceptual experience of pain, thus offering fibromyalgia patients the opportunity to change their misconceptions and maladaptive beliefs (Amer-Cuenca et al., 2020; Moseley, 2003). This type of health education program is called pain neuroscience education, and a recently published systematic review and meta-analysis shows that adding this specific type of health education program to multimodal fibromyalgia treatment results in statistically significant improvements (Saracoglu et al., 2022). However, some of the included studies combined pain neuroscience education with other components not received by the control group, such as therapeutic exercise or cognitive behavioral therapy, making it difficult to discern the effect of education.

To our knowledge, no previous review has specifically examined the effects of adding a health education program to one of the study groups, both of which received the same base intervention. Unlike previous reviews, we included only randomized controlled trials (RCTs) in which the educational program was the only intervention that varied between groups, allowing a clearer assessment of its added value regardless of the nature of the health education intervention. This study therefore aimed to assess whether incorporating an educational program into an established intervention influences pain intensity and the impact of fibromyalgia on quality of life through a systematic review and meta-analysis.

## Methods

### *Search Strategy*

We conducted a systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (Page et al., 2021). The search process was carried out in MEDLINE, Web of Science, Scopus, Cumulative Index to Nursing and Allied Health Literature, Latin American and Caribbean Health Sciences Literature, and PsycINFO to ensure broad coverage of nursing, biomedical, and psychological literature. To include recent approaches and reflect a key moment in the management of fibromyalgia, the search was limited to the years 2005-2025. This period is based on the 2008 EULAR guideline, which analyzed the evidence available up to 2005 and was described by its authors as the first set of recommendations commissioned for fibromyalgia (Carville et al., 2008). The strategy combined natural and controlled vocabulary using Boolean operators adapted to each database. The population, intervention, comparison, and outcome model was followed; however, comparison terms were not used, as they were examined in the eligibility criteria instead. The complete strategies are available in Appendix 1. In addition, references in relevant literature reviews were manually searched for potential additional records missed in the database search.

### *Inclusion and Exclusion Criteria*

Articles meeting the following inclusion criteria were included: (1) population diagnosed with fibromyalgia according to the criteria of the American College of Rheumatology (Wolfe et al., 1990, 2010, 2011, 2016); (2) population aged 18 years or older; (3) articles published between 2005 and 2025; (4) articles examining the effects of adding an educational program or intervention as previously defined and regardless of the delivery modality (whether it was conducted individually or in groups and whether that modality was in person, written, or remote) to an experimental group receiving the same intervention as the control group, which did not receive an educational program; (5) RCTs; (6) articles analyzing the impact of fibromyalgia on quality of life and pain intensity; and (7) full-text articles available in English, French, or Spanish. Quasi-experimental and observational studies, either descriptive or analytical, as well as populations combining different diagnostic labels for chronic pain were excluded. Studies were excluded in cases in which the experimental group received additional sessions of physical exercise, mindfulness intervention, acupuncture, or other interventions that were not provided to the control group and were not consistent with the definition of an educational program as previously defined, ensuring that the educational component was the only difference between groups.

In this review, educational programs were defined based on the World Health Organization framework as those intended to improve health knowledge and develop life skills. In operational terms, eligible programs had to (1) be structured with a predefined sequence of sessions or modules; (2) explicitly aim to improve knowledge about the condition, including its symptoms, treatment, or self-care; and (3) promote the development of life skills relevant to health promotion and fibromyalgia management. Brief or unstructured advice and opportunistic recommendations were not considered sufficient to meet these criteria. In line with World Health Organization guidance, life skills were understood to include decision-making, problem-solving, creative and critical think-

ing, communication skills, interpersonal relationship skills, self-awareness, empathy, and the ability to manage stress and cope with emotions (World Health Organization, 1998).

### Screening

First, two authors screened the articles by title and abstract based on the inclusion and exclusion criteria. Second, the authors assessed whether the preselected articles met the inclusion criteria by reading their full text. Finally, in case of disagreement on eligibility, a third researcher was appointed to make the final decision.

### Procedure and Data Extraction

Two researchers independently performed the data extraction. Disagreements were resolved through joint discussions with a third researcher to reach a consensus. A structured table developed by the authors was used for data extraction. The collected data included the total sample size of each study as well as the sample size of each group included in the final analysis, the interventions applied, the instruments used to measure the outcomes, the assessment time, and the main results of each study.

### Risk of Bias Assessment

Risk of bias was independently assessed by two researchers using the Cochrane Collaboration's tool for randomized trials (Higgins et al., 2011). Disagreements were resolved through joint discussions with a third researcher to reach a consensus.

### Data Synthesis and Analysis

A qualitative synthesis was performed, and a quantitative synthesis (pairwise meta-analysis) was performed when the necessary data were available and the results were comparable in terms of assessment time, measurements, and characteristics of both the interventions and the comparators according to the eligibility criteria. The data collected for the quantitative synthesis comprised the mean and standard deviation for each treatment group. In cases in which the studies reported other scorable measures (e.g., median and interquartile range), these were transformed into mean and standard deviation (Higgins et al., 2019). The outcome variables analyzed were the impact of fibromyalgia on quality of life and pain intensity. The Fibromyalgia Impact Questionnaire (FIQ) is a continuous measure, providing scores ranging from 0 to 100, whereas the visual analog scale (VAS), which measures pain intensity, provides scores ranging from 0 to 10 or 100. The results of the VAS were standardized to a scale of 0-100 to facilitate the synthesis of the results and to be able to use a mean difference (MD). Some versions of the FIQ range from 0 to 80; in this case, we calculated the standardized mean difference (SMD) and its standard error. Effect sizes were interpreted following Cohen's thresholds for small, medium, and large effects (Cohen, 1998).

Two meta-analyses were performed, one per outcome. To improve interpretation and reduce clinical heterogeneity related to different types of comparators, subgroups were defined according to the shared baseline intervention received by both study groups (e.g., exercise or treatment as usual, which mainly consisted of pharmacologic treatment). This strategy was used instead of an educational format, which had initially been considered. This was deemed appropriate as all programs, although diverse, were consistent with the key principles of health education. Furthermore, it was estimated that this strategy provided a clearer assessment of the additive effect of health education.

A fixed effects model was used when homogeneity was observed, whereas a random effects model was used when heterogeneity was observed. To check for heterogeneity, an $I^2$ coefficient $>50\%$ and $\chi^2$ test result of $p < .05$ were used. Where possible, publication bias was assessed using funnel plots. Review Manager version 5.4.1 software was used for statistical analysis. The certainty of evidence was measured using the GRADEpro Guideline Development Tool, which assesses risk of bias, inconsistency, indirectness, imprecision, and publication bias (Balshem et al., 2011).

## Results

### Selection Process

Figure 1 shows the selection process. A total of 1,261 studies were identified. After removing duplicates and assessing the inclusion criteria, seven were selected for the systematic review, with six included in the meta-analysis of the impact of fibromyalgia on quality of life and five included in the meta-analysis of pain intensity, as they provided the necessary data. All of the articles were RCTs.

### Characteristics of Included Studies

A summary of study characteristics is shown in Table 1, including sample size, intervention characteristics, assessment times, measurement instruments, and main results. The total number of participants analyzed was 602, and participants were aged 18 years or older. The sample from the 2013 study by Luciano et al. was excluded from the total number of participants, as it presented long-term follow-up data from the same sample that was included in the authors' 2011 study (Luciano et al., 2011, 2013). Both studies had the same recruitment period and referred to highly similar clinical settings, databases, and eligibility criteria, suggesting that they were likely based on the same cohort.

Throughout the review process, all studies selected were RCTs. Regarding sample size, four of the seven studies analyzed had a total sample size of more than 100 participants, with the largest sample size being 216 participants (Luciano et al., 2011, 2013). The smallest sample size was 32 participants (Ceballos-Laita et al., 2020).

The health education programs analyzed provided education on fibromyalgia and self-management strategies (Rooks et al., 2007), a pain neuroscience education approach (Ceballos-Laita et al., 2020; Barrenengoa-Cuadra et al., 2021; Saracoglu et al., 2021; de Sousa et al., 2023), or a psychoeducational approach (Luciano et al., 2011, 2013). The interventions to which these health education programs were added were principally treatment as usual, which consisted mainly of pharmacologic management (Luciano et al., 2011, 2013; Barrenengoa-Cuadra et al., 2021; Saracoglu et al., 2021), or a physical exercise intervention (Rooks et al., 2007; Ceballos-Laita et al., 2020; de Sousa et al., 2023).

The duration of the interventions varied widely, ranging from a minimum of 6 weeks to a maximum of 16 weeks. The most common frequency of educational sessions was one per week (Luciano et al., 2011, 2013; Ceballos-Laita et al., 2020; Barrenengoa-Cuadra et al., 2021; Saracoglu et al., 2021), although one of these programs included an additional reinforcement session 1 month later (Barrenengoa-Cuadra et al., 2021). The most frequent duration of each educational session was 2 hours (Rooks et al., 2007; Luciano et al., 2011, 2013; Barrenengoa-Cuadra et al., 2021). The most frequent assessment times were pretest and post-test, although less frequent assessments were carried out during the intervention and at 3, 6, and 12 months post-test.

**Table 1**
Characteristics of Selected Studies.

| Study | Population | Interventions | Assessment time | Instruments for measuring outcomes | Main results |
|---|---|---|---|---|---|
| Rooks et al., 2007 | N = 207 Aerobic exercise and flexibility group (n = 51)<br>• Age 48 ± 11 years<br>Strength training, aerobic exercise, and flexibility group (n = 51)<br>• Age 50 ± 11 years<br>Fibromyalgia HEP group (n = 50)<br>• Age 51 ± 12 years<br>Group combining strength training, aerobic exercise, flexibility, and HEP (n = 55)<br>• Age 50 ± 11 years | Aerobic exercise and flexibility group<br>• Mainly aerobic exercise and, at the end, flexibility exercises. Two 60-min sessions per week for 16 weeks. Written instructions were provided for a third day of weekly exercise on their own.<br>Strength training, aerobic exercise, and flexibility group<br>• First section = aerobic exercise; second section = strength training; third section = flexibility. Two 60-min sessions per week for 16 weeks. Written instructions were provided for a third day of weekly exercise on their own.<br>Fibromyalgia HEP group<br>• Seven educational sessions about the condition and promoting self-care skills. Supplementary reading material was also provided. One 120-min session every 2 weeks for 16 weeks.<br>Group combining strength training, aerobic exercise, flexibility, and HEP<br>• Combination of strength training, aerobic exercise, flexibility, and HEP. | Pretest<br>Post-test<br>6-month follow-up | FIQ<br>VAS FIQ<br>SF-36<br>BDI<br>SES<br>6MW | Among the three exercise groups, the group combining strength training, aerobic exercise, flexibility, and health education tended to show greater improvements in self-assessed outcome scores. |
| Luciano et al., 2011 | N = 216 Group receiving a psychoeducational HEP and TAU (n = 108)<br>• Age 55.17 ± 8.58 years<br>Group receiving TAU (n = 108)<br>• Age 55.42 ± 8.63 years | Group receiving HEP (psychoeducational approach) and TAU<br>• Nine 2-h group sessions over 2 months at a rate of one session per week for 9 weeks.<br>Group receiving TAU<br>• Mainly pharmacologic treatment adapted to the patient's particular set of symptoms plus aerobic exercise advice tailored to their profile. | Pretest<br>Post-test | FIQ<br>VAS FIQ<br>STAI-T<br>MCSDS | The addition of psychoeducational HEP resulted in statistically significant changes at post-test based on FIQ and pain intensity. |
| Luciano et al., 2013 | N = 216 Group receiving a psychoeducational HEP and TAU (n = 108)<br>• Age 55.17 ± 8.58 years<br>Group receiving TAU (n = 108)<br>• Age 55.42 ± 8.63 years | Group receiving HEP (psychoeducational approach) and TAU<br>• Nine 2-h group sessions over 2 months at a rate of one session per week for 9 weeks.<br>Group receiving TAU<br>• Mainly pharmacologic treatment adapted to the patient's particular set of symptoms plus aerobic exercise advice tailored to their profile. | Pretest<br>Post-test<br>6-month follow-up<br>12-month follow-up | FIQ<br>VAS FIQ<br>EQ-5D<br>CSRI<br>QALY | The addition of psychoeducational HEP resulted in statistically significant effects at 12-month follow-up based on FIQ and pain intensity. |
| Ceballos-Laita et al., 2020 | N = 32 In-person PNE and therapeutic exercise group (n = 16)<br>• Age 52.13 ± 10.31 years<br>Therapeutic exercise group (n = 16)<br>• Age 53 ± 10.68 years | In-person HEP (PNE approach) and therapeutic exercise group<br>• Eight 30- to 45-min PNE sessions (once a week for 8 weeks) and three 60-min sessions of exercise per week for 10 weeks.<br>Therapeutic exercise group<br>• Three 60-min sessions of exercise per week for 10 weeks. | Pretest<br>Post-test<br>3-month follow-up | FIQR<br>VAS<br>Algometer score (number of tender points)<br>PCS<br>HADS<br>HAQ | Significant reductions in pain intensity at post-test were observed in the in-person PNE and therapeutic exercise group compared with the therapeutic exercise-only group. |
| Barrenengoa-Cuadra et al., 2021 | N = 137<br>Group receiving in-person PNE and TAU (n = 70)<br>• Age 52.3 ± 9.2 years<br>Group receiving TAU (n = 67)<br>• Age 51.4 ± 10.2 years | Group receiving in-person HEP (PNE approach) and TAU<br>• Six weekly 2-h sessions and a seventh 2-h session 1 month later plus TAU.<br>Group receiving TAU<br>• Mainly pharmacologic treatment adapted to the patient's particular set of symptoms plus exercise advice. | Pretest<br>Post-test<br>6-month follow-up<br>12-month follow-up | FIQ<br>VAS FIQ<br>BPI-SF<br>HADS<br>HAQ<br>PCS<br>PSD<br>WPI<br>SSS | The FIQ total score significantly improved in the group receiving in-person PNE combined with TAU compared with the group receiving TAU alone. A large effect size was observed in the FIQ total score at post-test and was sustained at 12-month follow-up. |

(*continued on next page*)

**Table 1** (*continued*)

| Study | Population | Interventions | Assessment time | Instruments for measuring outcomes | Main results |
|---|---|---|---|---|---|
| Saracoglu et al., 2021 | N = 36<br>Group receiving in-person PNE and TAU (n = 19)<br>• Age 44.25 ± 7.87 years<br>Group receiving TAU (n = 17)<br>• Age 41.44 ± 11.35 years | Group receiving in-person HEP (PNE approach) and TAU<br>• One session per week for 6 weeks with an approximate duration of 40- to 45-min each and TAU.<br>Group receiving TAU<br>• Mainly pharmacologic treatment adapted to the patient's particular set of symptoms. | Pretest<br>Post-test<br>12-week follow-up | FIQ<br>PPT<br>TSK | Both groups showed statistically significant improvements in FIQ scores from baseline to post-test and follow-up. However, only the group receiving in-person PNE combined with TAU achieved clinically relevant improvements. |
| de Sousa et al., 2023 | N = 75<br>PNE and therapeutic aquatic exercise group (n = 36)<br>• Age 45.4 ± 13.7 years<br>Therapeutic aquatic exercise group (n = 39)<br>• Age 48.4 ± 14.3 years | HEP (PNE approach) and therapeutic aquatic exercise group<br>• Therapeutic aquatic exercise and four sessions of PNE with a frequency of one PNE session every 3 weeks for 12 weeks starting at the same time as the first therapeutic aquatic exercise session; 1-h group PNE sessions with up to five participants.<br>Therapeutic aquatic exercise group<br>• Two 45-min sessions of therapeutic aquatic exercise per week for 12 weeks in groups of up to five participants. | Pretest<br>During (6 weeks)<br>Post-test<br>12-week follow-up | VAS<br>FIQR<br>SF-36<br>PSQI<br>PPT | Both groups showed reduced pain intensity and lower FIQR scores after treatment, which remained below baseline levels. |

HEP = health education program; FIQ = Fibromyalgia Impact Questionnaire; VAS-FIQ = Visual Analogue Scale item within the FIQ; SF-36 = 36-Item Short-Form Health Survey; BDI = Beck Depression Inventory; SES = Self-Efficacy Scale (adapted); 6MW = 6-Minute Walk; TAU = Treatment as usual; STAI-T = State-Trait Anxiety Inventory – Trait Scale; MCSDS = Marlowe-Crowne Social Desirability Scale; EQ-5D = EuroQoL-5D questionnaire; CSRI = Client Service Receipt Inventory; QALY = quality-adjusted life-year; PNE = pain neuroscience education; FIQR = Revised Fibromyalgia Impact Questionnaire; VAS = Visual Analogue Scale; PCS = Pain Catastrophizing Scale; HADS = Hospital Anxiety and Depression Scale; HAQ = Health Assessment Questionnaire; BPI-SF = Brief Pain Inventory - Short Form; PSD = Polysymptomatic Distress Scale; WPI = Widespread Pain Index; SSS = Symptom Severity Score; PPT = pain pressure threshold; TSK = Tampa Scale for Kinesiophobia; PSQI = Pittsburgh Sleep Quality Index.

*Risk of Bias and Quality Assessment*

Figure 2 shows that there was a low risk of bias overall, with the exception of blinding of patients and therapists. As such, in one of the studies, there was a high risk of bias in the blinding of patients, personnel, and assessors. In addition, allocation concealment was rated as unclear in two of the included studies.

*Meta-Analysis Results*

The values shown in the forest plots (Figs. 3 and 4) are the mean differences and 95% confidence intervals obtained from the tools used to assess each variable. In all studies, the VAS was used to assess pain intensity, and different FIQ versions were used to assess the impact of fibromyalgia on quality of life. Both assessments took place at post-test, as this was the most frequently used measurement across the included studies. Two subgroups were created for each meta-analysis. One compared a health education program plus treatment as usual, which was principally pharmacologic, versus treatment as usual alone. The other compared a health education program plus exercise versus exercise alone. In all cases, the group including the health education program was considered our experimental group. One study was excluded from the meta-analysis because it studied the variables in only the long term and not at post-test (Luciano et al., 2013).

*Pain intensity*

Five of the studies included in our research measured the pain intensity outcome. All of them used the VAS, either as a standalone tool or as part of the FIQ (VAS FIQ).

Figure 3 shows that the meta-analysis performed on the pain intensity variable revealed statistically significant differences in favor of the experimental group (MD = −13.10, 95% CI [−22.06, −4.14], $p = .004$). Regarding the subgroup analysis, only the comparison of treatment as usual and health education program versus treatment as usual alone revealed statistically significant improvements in favor of the experimental group (MD = −19.53, 95% CI [−31.68, −7.39], $p = .002$).

*Impact of fibromyalgia on quality of life*

Six of the studies selected for our study measured the impact of fibromyalgia on quality of life outcome. All studies used the FIQ or revised FIQ.

Figure 4 shows that the meta-analysis conducted on the impact of fibromyalgia on quality of life revealed statistically significant differences in favor of the experimental group (SMD = −0.39, 95% CI [−0.55, −0.23], $p < .001$). As for the subgroup analysis, only the comparison of treatment as usual and health education program versus treatment as usual alone revealed statistically significant improvements in favor of the experimental group (SMD = −0.46, 95% CI [−0.66, −0.26], $p < .001$).

*Assessment of Risk of Publication Bias*

Figure 5 shows the funnel plot for the pain intensity variable and Figure 6 illustrates the funnel plot for the impact of fibromyalgia on quality of life. Both funnel plots displayed an approximately symmetrical distribution, suggesting a low risk of publication bias.

*Certainty of Evidence*

The certainty of evidence was assessed for the overall meta-analysis results of pain intensity and the impact of fibromyalgia on quality of life using the GRADEpro Guideline Development Tool (Table 2) (Balshem et al., 2011). We rated both results as not important, as the minimal clinically important difference was not

**Table 2**
Certainty of Evidence Assessment

| Certainty assessment | | | | | | | No. of patients | | Effect | | Certainty | Importance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of studies | Study design | Risk of bias | Inconsistency | Indirect evidence | Imprecision | Other | Intervention | Comparison | Relative (95% CI) | Absolute (95% CI) | | |
| Pain intensity (VAS) | | | | | | | | | | | | |
| 5 | RCTs | Serious[a] | Not serious | Not serious | Not serious | None | 288 | 278 | – | MD −13.10 (−22.06 to −4.14) | ⊕⊕⊕◯ Moderate | Not important |
| Impact of fibromyalgia on quality of life (FIQ) | | | | | | | | | | | | |
| 6 | RCTs | Serious[a] | Not serious | Not serious | Not serious | None | 304 | 298 | – | SMD −0.39 (−0.55 to −0.23) | ⊕⊕⊕◯ Moderate | Not important |

Certainty of evidence rated with GRADE: ⊕⊕⊕⊕ = High certainty; ⊕⊕⊕◯ = Moderate certainty; ⊕⊕◯◯ = Low certainty; ⊕◯◯◯ = Very low certainty.
[a] Most information comes from studies with low risk of bias; results show differences in CI.
CI = confidence interval; VAS = visual analog scale; RCTs = randomized controlled trials; MD = mean difference; FIQ = Fibromyalgia Impact Questionnaire; SMD = standardized mean difference.

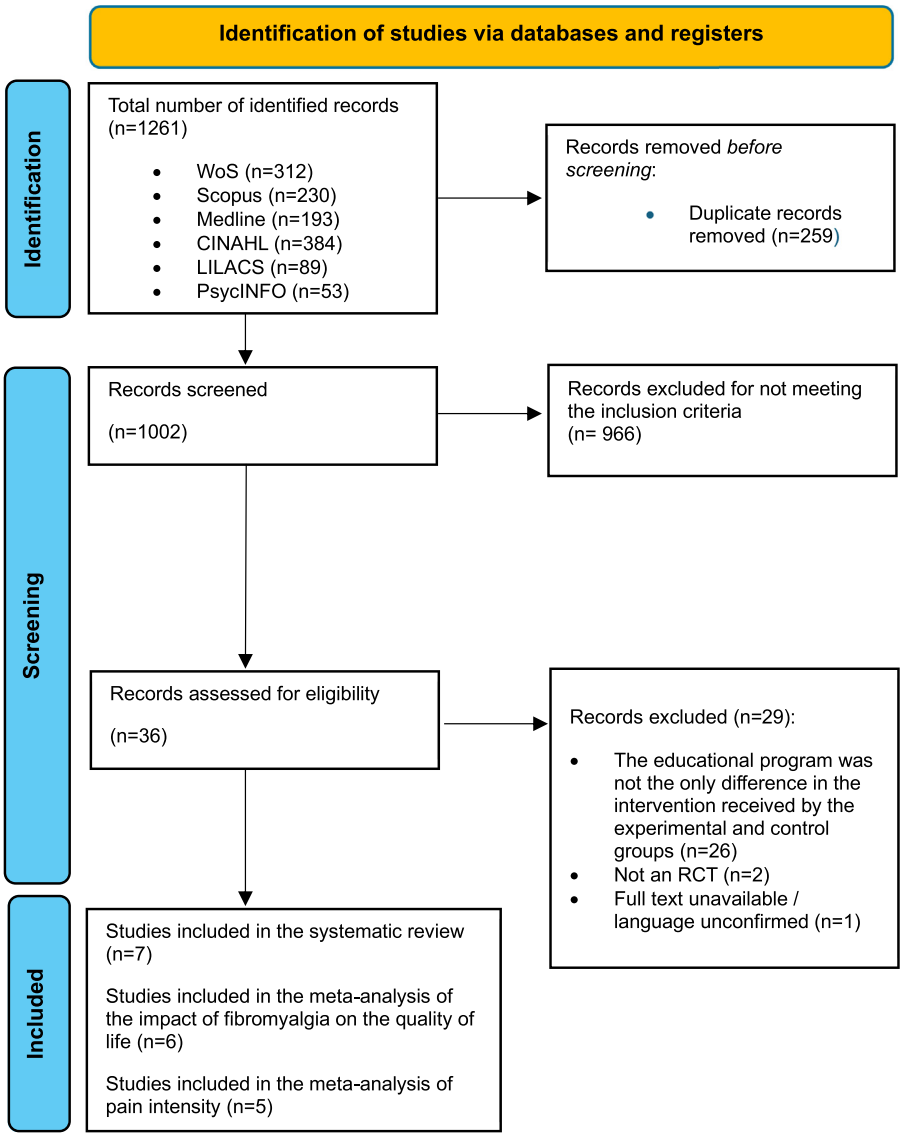


**Figure 1.** Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram. WoS = Web of Science; CINAHL = Cumulative Index to Nursing and Allied Health Literature; LILACS = Latin American and Caribbean Health Sciences Literature; RCT = randomized controlled trial.

reached for pain intensity and a small effect size was detected for the impact of fibromyalgia on quality of life. However, the certainty of evidence obtained for both outcomes was rated as moderate.

## Discussion

To the best of our knowledge, this is the first systematic review and meta-analysis to assess the added value of incorporating a health education program into an intervention already implemented in both study groups to mitigate pain intensity and the impact of fibromyalgia on quality of life. Despite differences in the nature of the health education programs, all were considered to meet the key features of health education, allowing us to present the findings in an integrated way. We included only RCTs in which the educational component was the only intervention differing between groups, a design that represents a key contribution of this review, as it helps clarify the specific contribution of health education.

Our overall meta-analysis reveals that the addition of a health education program offers statistically significant improvements in pain intensity and impact of fibromyalgia on quality of life, with moderate certainty of evidence for both outcomes. Only the subgroup adding health education to treatment as usual, which was primarily pharmacologic in nature in the included studies, showed statistically significant improvements in both results.

Furthermore, the addition of a health education program to treatment as usual (Luciano et al., 2011, 2013; Barrenengoa-Cuadra et al., 2021; Saracoglu et al., 2021) not only generated a statistically significant improvement in pain intensity but also exceeded the minimal clinically important difference in subgroup meta-analysis, with an improvement of 19.53 points out of 100 on the VAS (Albright et al., 2001). These results can be explained by the limited effectiveness of pharmacologic therapies in fibromyalgia, which obtained only a “weak” recommendation by EULAR (Macfarlane et al., 2017). They also support earlier work highlighting the importance of patient education when pharmacologic treatment is being considered (Sarzi-Puttini et al., 2020).

In the subgroup meta-analysis of adding health education to exercise, no statistically significant differences were observed in either pain intensity or the impact of fibromyalgia on quality

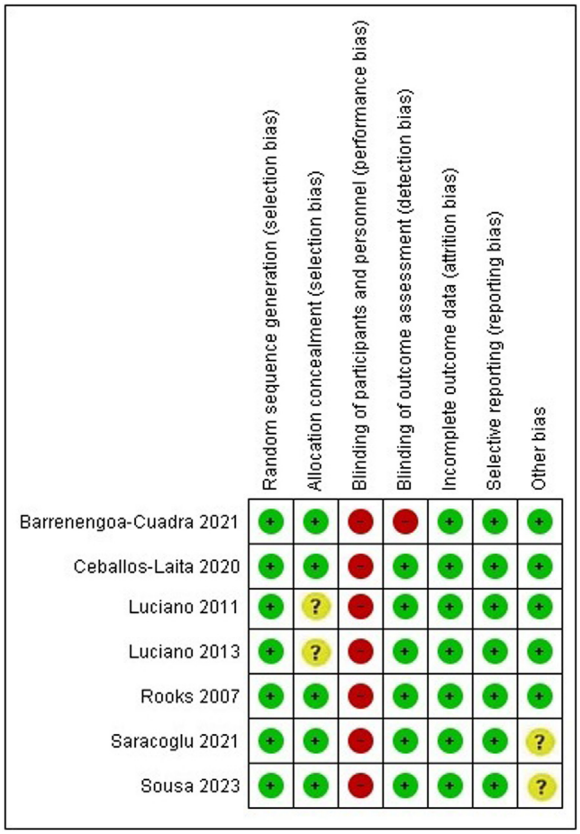


**Figure 2.** Summary of risk of bias results using the Cochrane Collaboration's tool for randomized trials.

of life compared with exercise alone. These findings may be influenced by the well-established efficacy of exercise intervention for fibromyalgia, which has a "strong" recommendation by EULAR (Macfarlane et al., 2017).

Although a small effect size was detected for the impact of fibromyalgia on quality of life in the subgroup that added a health education program to exercise and the result approached statistical significance, it did not reach the threshold. However, in the overall meta-analysis, the addition of a health education program demonstrated a statistically significant improvement in the impact of fibromyalgia on quality of life with a small effect size.

Because no previous meta-analysis has focused on the effect of a health education program on a shared intervention, we will compare our findings with related studies. A recent systematic review and meta-analysis evaluated the effect of a health education program with a pain neuroscience education approach on pain intensity and fibromyalgia impact (Suso-Martí et al., 2022). Statistically significant differences in pain intensity were observed after the intervention. In the sensitivity analysis at follow-up, the face-to-face interventions also showed significant effects. The impact of fibromyalgia was only significant at follow-up in the primary analysis. Although the study had noteworthy results, it did not specifically evaluate pain neuroscience education as a uniquely added component, and in some cases it was compared with other educational approaches.

By contrast, another recent meta-analysis included studies in which health education was delivered alone or with other interventions, allowing for different comparators, such as active or no treatment (Huang et al., 2025). Although the authors found a significant effect on symptom severity, the role of health education as an adjunct to a shared base treatment was not a central focus and remained less clearly explored.

Similarly, a systematic review and meta-analysis of standalone educational interventions found a significant improvement in the outcome 'global assessment,' although with low certainty of evidence (Duhn et al., 2023). However, some included studies used no intervention or waiting list comparator, which differs from our stricter inclusion approach.

By contrast, a systematic review found that standalone educational interventions were not effective in reducing pain intensity or the impact of fibromyalgia on quality of life (Elizagaray-García et al., 2016). However, when implemented in combination with coping strategies and exercise, the evidence becomes stronger.

A recent study examined an educational intervention for people with fibromyalgia and found that sleep hygiene education led to reduced pain and improved sleep quality (Başar Okul & Kars Fertelli, 2025). These results suggest the potential of educational strategies and reflect the interest in this type of approach, which is also the focus of this review. Although this study is thematically related, it could not be included in our synthesis because the educational program was delivered as a single intervention in the experimental group and the control group did not receive any intervention.

It is also important to note that all of the studies we analyzed had a high risk of bias in the blinding of patients and educators. There is an inherent risk of bias in the im-

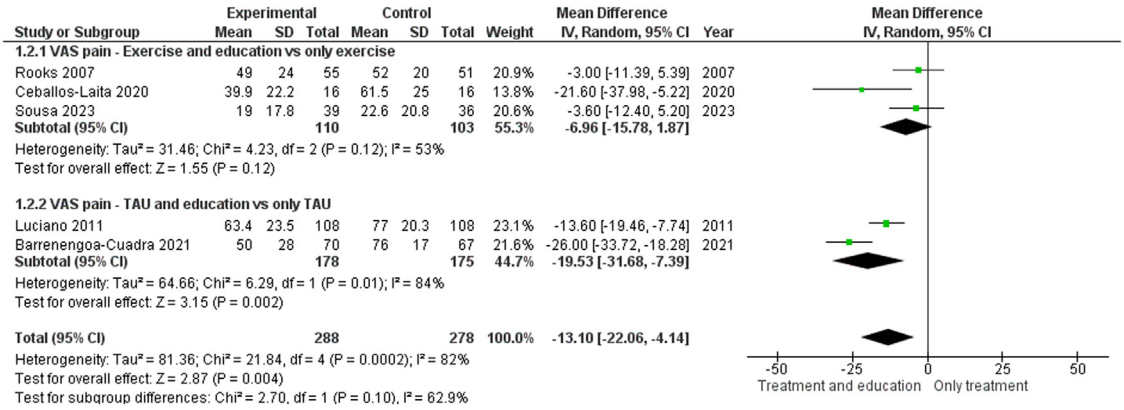


**Figure 3.** Effect of a health education program on pain intensity (forest plot of the meta-analysis). Forest plots show the results obtained from each comparison and the effect sizes. SD = standard deviation; CI = confidence interval; VAS = visual analog scale; *df* = degrees of freedom; TAU = treatment as usual.

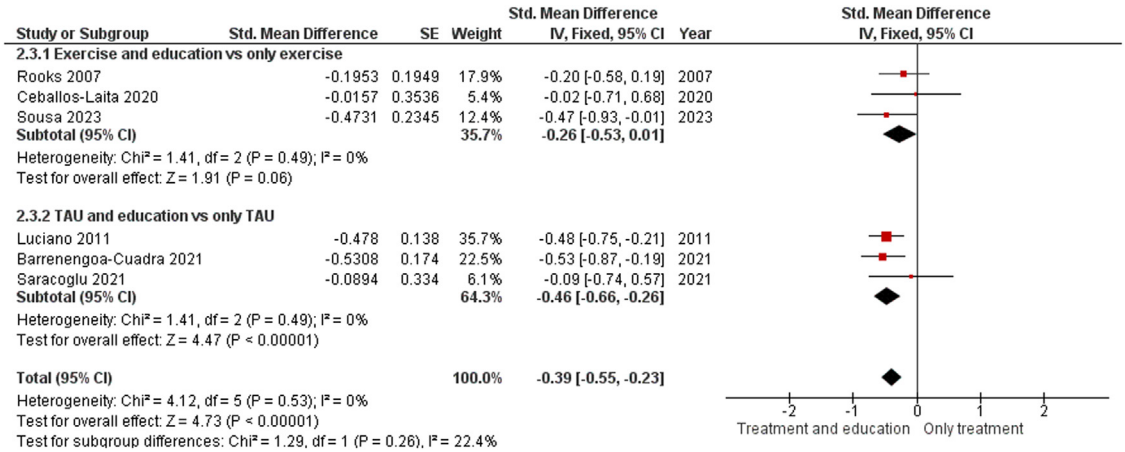


**Figure 4.** Effect of a health education program on fibromyalgia's impact on quality of life (forest plot of the meta-analysis). Forest plots show the results obtained from each comparison and the effect sizes. Std. = standardized; SE = standard error; CI = confidence interval; *df* = degrees of freedom; TAU = treatment as usual.

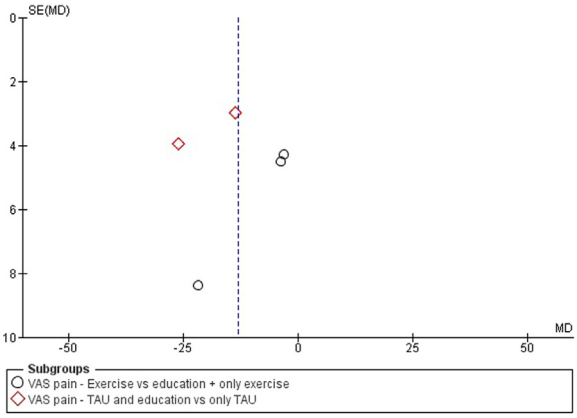


**Figure 5.** Funnel plot of the meta-analysis of the effect of a health education program on pain intensity. SE = standard error; MD = mean difference; VAS = visual analog scale; TAU = treatment as usual.

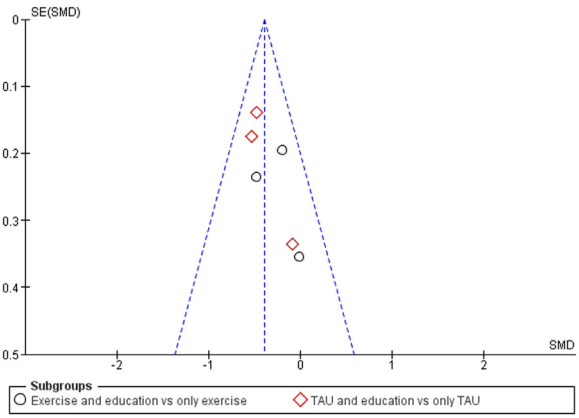


**Figure 6.** Funnel plot of the meta-analysis of the effect of a health education program on fibromyalgia's impact on quality of life. SE = standard error; SMD = standardized mean difference; TAU = treatment as usual.

plementation of educational interventions, as blinding is not possible.

Future lines of research can be derived from this study. These may include the integration of different approaches in health education programs in fibromyalgia and therefore the standardization and implementation of a unified health education program as well as the evaluation of its effectiveness.

This review has several limitations, such as those inherent to the impossibility of blinding patients and educators in the context of an educational intervention as well as the diversity among health education programs in issues such as dosage, periodicity, and contents. This heterogeneity of interventions may have affected the generalizability of the findings. Even so, this variability reflects the intention to provide an overview of the main types of health education interventions consistent with an operational definition based on that of the World Health Organization. To minimize methodological heterogeneity, we included only studies in which the educational component was the only intervention differing between groups. In order to improve the interpretability of the findings, subgroup analyses based on the intervention shared by both study groups were considered a more appropriate approach. However, the limited number of studies per subgroup and the heterogeneity of intervention characteristics require that the results be interpreted with caution. Finally, using a 20-year search window may have affected the scope of the literature captured.

### *Implications for Nursing Practice*

Our results may have relevant implications for the management of fibromyalgia, as the addition of a health education program showed statistically significant improvements overall despite variability in educational approaches. Moreover, in the subgroup analysis, it is worth noting the improvement in pain intensity of 19.53 points out of 100 on the VAS when adding a health education program to treatment as usual, which was based primarily on medication.

These findings may support the recommendation that nurses and health care professionals implement health education interventions at primary care facilities, where the disease is initially managed, as well as in specialized health care settings. In addition, these programs may position nurses and health care professionals as key facilitators by providing patients with essential knowledge that supports self-care and health management. This can lead to statistically significant improvements in both pain intensity and the impact of fibromyalgia on quality of life and may also offer clinically relevant benefits for reducing pain when added to usual treatments, which were predominantly pharmacologic in this review.

## Conclusions

According to our findings, incorporating a health education program into fibromyalgia treatment was associated with reductions in pain intensity and the impact of fibromyalgia on quality of life. The certainty of evidence was rated as moderate for both outcomes. For pain intensity, when an educational program was added to treatment as usual, which consisted mainly of pharmacologic treatment, the results suggested clinically relevant improvements according to the subgroup analysis. However, variability between interventions and the limited number of comparators should be considered when interpreting these findings. Nevertheless, these findings may support the recommendation that nurses and health care professionals consider incorporating a health education program into clinical practice. Further high-quality experimental research is needed to confirm the consistency of these results in future studies.

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## Study Registration

The study protocol was registered in PROSPERO (CRD42023485431).

## Data availability

The data used for this study are available from the corresponding author upon reasonable request.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## CRediT authorship contribution statement

**Andrés Arana-Rodríguez:** Conceptualization, Writing – original draft, Investigation. **Francisca María García-Padilla:** Supervision, Project administration, Methodology. **Almudena Garrido-Fernández:** Writing – review & editing, Supervision, Resources. **Miriam Sánchez-Alcón:** Visualization, Supervision. **Julia Sánchez-Galloso:** Writing – review & editing, Data curation. **Álvaro-José Rodríguez-Domínguez:** Validation, Software, Formal analysis.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.pmn.2025.08.010.

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