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REVIEW

Group Psychotherapy With Fibromyalgia Patients: A Systematic Review

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ABSTRACT

Objectives: This review aims to investigate the factors that play a role on the efficacy of group psychotherapy (GP) interventions for fibromyalgia syndrome (FMS).

Materials and methods: We employed a search using keywords group psychotherapy and fibromyalgia in the databases of Scopus, Web of Sciences, CINAHL, BMJ, MEDLINE, ScienceDirect and EBSCOhost.

Results: A total of 30 original studies were identified. These studies, which aimed to improve primary outcomes (POs-pain and fibromyalgia impact) and/or secondary outcomes (SOs-psychosocial), indicated that 15 were conducted in a multidisciplinary (MT) fashion, and the rest were unidimensional as they employed only GPs. Cognitive behavior therapy, which modifies dysfunctional thoughts and accompanying behaviors, was the most utilized psychological intervention. Overall, MTs were only slightly superior to GPs; however, improvements in POs were more frequent than SOs in MTs, and the vice versa in GPs.

Conclusion: Although studies varied in various methodological characteristics, the content of the interventions in MTs should be designed to cover the biopsychosocial nature of FMS.

Keywords: Fibromyalgia; group psychotherapy; multidisciplinary approach; review.

According to the definition of American College of Rheumatology, fibromyalgia syndrome (FMS) is characterized by widespread musculoskeletal pain of the body lasting more than three months.[1] It is the most common rheumatic syndrome and primarily females are affected.[2,3] FMS is also a complicated syndrome as it includes not only pain in tender points around the body, but also many adverse psychological, social and economic outcomes.[1] In addition to pain, FMS patients report anxiety, depression,[4,5] fatigue,[6] sleep disorder,[7,8] sexual disorders,[9] irritable bowel and leg syndrome[10] or migraine.[4] Cognitive and behavioral reactions to pain are critical because they can affect pain experience. Coping styles, self-efficacy, pain catastrophizing, patient satisfaction, pain acceptance and the (ab)use of medication are significant determinants of FMS symptomatology followed by negative consequences in the quality of life and daily functioning.[11-13] Due to such a complex burden on economic, social and healthcare systems, practical and cost-effective interventions are needed.[14-16]

The major treatments for FMS are pharmacological interventions which mostly involve combined medicine including amitriptyline, tramadol, anticonvulsants, or serotonin-noradrenalin reuptake inhibitors.[17] Although pharmacological strategies in treatment improve patient's symptoms, the effects remain limited and

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last for a short time (almost six months after the beginning of drug use); in addition, patients stop using medication because of the side effects.[17,18] Consequently, it is discussed that pure medical treatment may not be enough to deal with patients' multiple requests. Therefore, a biopsychosocial perspective in treatment is suggested.[17,18] European League Against Rheumatism (EULAR) proposed multidisciplinary treatment approaches, which include physical exercises, and pharmacological and psychological treatments.[17]

Therefore, due to comorbid situations and psychosocial variables related to FMS, psychological treatment has an important place in multidisciplinary interventions.[19,20] A great number of studies indicate that psychological treatment has beneficial effects on both primary outcomes (POs), which are pain intensity, fatigue, fibromyalgia impact and physical functioning, and secondary outcomes (SOs), which are mainly emotional stress (depressive and anxiety symptoms), coping, pain acceptance, and quality of life.[19] POs are identified as measures of fibromyalgia impact and pain sensation whereas SOs are characterized by psychosocial variables that are reported to be associated with pain.[20]

Recently, group psychotherapy (GP) is the most common psychotherapy method for FMS patients with its outweighing advantages to individual psychotherapies.[19] For example, it provides peer support, a sense of shared experience, and an opportunity to learn from and help others. Last but not least, it is more cost-effective.[21,22] However, according to the literature, although FMS patients report various benefits from GP, some studies demonstrate that these benefits are insignificant.[23-25] Moreover, most studies have not examined the effectiveness of their interventions on POs and SOs simultaneously. For those who have, some studies only state improvements in SOs, which, though, are not consistent across studies.

Because of these limitations or inconsistencies and a focus on only a specific group of variables, illuminating the factors that play a role in the effectiveness of GPs specific to FMS seems to be an important need. Therefore, in this review, we aimed to investigate the factors that play a role on the efficacy of GP interventions for FMS.

MATERIALS AND METHODS

In order to explore the conditions of effectiveness in GPs for FMS patients, a comprehensive bibliographic search of studies was employed using Istanbul University online library domain. Within this search, the social science and health science databases including Scopus, Web of Sciences, CINAHL, BMJ, MEDLINE, ScienceDirect, and EBSCOhost platforms were examined. While searching, the terms group psychotherapy and fibromyalgia were used as keywords without brackets in order to include all the manuscripts that may be of interest. This examination revealed that the first study which used GP for FMS patients was conducted in 1998.[26,27]

From this point on, in order to assess the effectiveness of GP interventions conducted with FMS patients, we focused only on studies that included GP as an intervention for FMS patients. Studies that did not use GP in the intervention were eliminated. On the other hand, since FMS symptoms are predominantly seen in adults, interventions involving adult patients were selected.[2] In addition, studies which implemented semi-experimental or experimental designs in their interventions were in the scope of this review. In this process, databases were browsed by two reviewers and studies written in English or in Turkish were selected where the latter is the reviewers' native language. To summarize, the inclusion criteria were *(i)* empirical articles (experimental or quasi-experimental design) published in scientific journals, *(ii)* those written in English or Turkish language, *(iii)* those including only GP interventions, and *(iv)* those performed with adult samples (18 years and over) with FMS diagnosis. Exclusion criteria were *(i)* not including a GP intervention, *(ii)* including interventions with no pre- or post-assessments, *(iii)* being only a pilot study, *(iv)* those including individuals with diagnosis other than FMS (such as rheumatoid arthritis, chronic pain, osteoarthritis), and *(v)* those conducted with participants who are children or adolescents.

The search identified 1,710 articles. These articles were reviewed by inclusion and exclusion criteria. A total of 901 studies that were case reports or reviews were eliminated because of not being empirical studies. The remaining

809 studies were reviewed by going over the abstract and the key words. Of these, 218 were duplicated, 453 did not include GP interventions, 10 were not conducted with adult patients, 50 did not involve FMS patients, and 18 were pilot studies. After excluding these articles with regard to inclusion/exclusion criteria, the remaining 60 articles were further analyzed. Among these final 60 articles, 21 were excluded because their full texts could not be reached and nine were also excluded as they included not only FMS patients but also other chronic pain patients. As a result, a total of 30 original articles were finally identified between 1998 and 2018. As the final total number of articles selected according to the inclusion and exclusion criteria stated above are limited in number, this review covers all these 30 articles within this time-span. The flowchart of the selection process described above is summarized in Figure 1.

RESULTS

Among the 30 articles analyzed in this systematic review, it was observed that in most of the studies, patients had been diagnosed according to FMS criteria which were indicated by Wolfe et al.[28] The participants were mostly females where some studies included samples only with females. The sample size had a range of 7 to 168. With respect to research design, 11 studies were observed to have no control groups. On the other hand, only three of the remaining 19 studies that used control groups were conducted using a randomized control trial (RCT) (Table 1). The number of the sessions changed between 6 and 36.

In terms of the presence of follow-up sessions, the review yielded 21 studies using follow-up examinations. The selection of the time-span of the follow-ups varied among the studies with a range of one month to 12 months. The most frequently administered instruments to assess the effectiveness of the interventions were Visual Analog Scale, Fibromyalgia Impact Questionnaire (FIQ), the 36-Item Short Form Health Survey, and European Quality of Life-5 Dimension (Table 1). A few studies employed sensory measures such as algometric pressure, incremental step test, dolorimetry, cold pressure test, tender point counts, and total myalgia score.

Another variable investigated in this review was the drop-out rates. It was observed that reported rates varied among these 30 studies. For example, the study of Suman et al.[29] reported no drop-out patients, while the studies

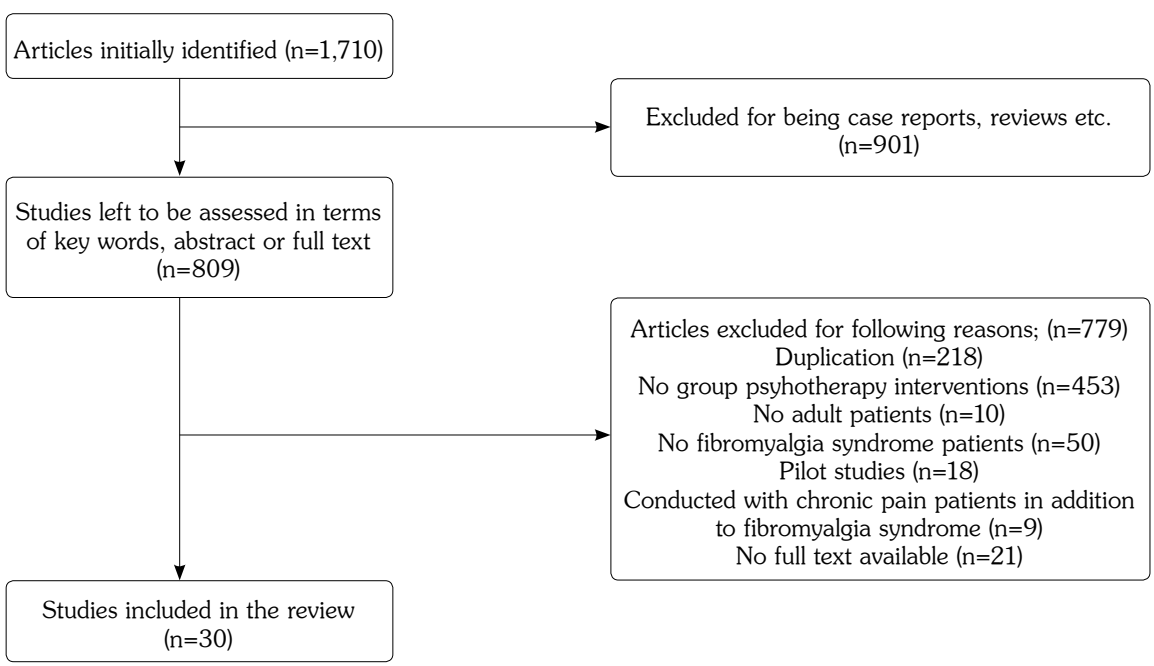

Figure 1. Flowchart of selection process of articles included in this review.

Table 1. Characteristics of the studies

	Authors name	Number of participants	Type of treatment	Number of sessions/ Frequency/time for session	Times of measurement	Control group	Measurement tools	Drop out rates (%)
1	Alda et al.,[50]	n=168 (159 females, 9 males)	CBT	10 sessions, once a week, 90 minutes	Pre- and post-treatment and at 1, 3 and 6 months	Yes (PT)	PCS, FIQ, HRS-D, HRS-A, VAS, CPAQ, EuroQoL-5D	10.76
2	Anderson and Winkler,[21]	n=56 (55 females, 1 male)	MT (CBT or supportive expressive techniques	14 sessions, once a week, 90 minutes	Pre– and post-treatment	Yes (attended CBT coping skills class)	FIQ, BDI-II, BAI, VAS	2
3	Astin et al.,[23]	n=128 (127 females, 1 male)	Mind-body intervention	8 sessions, once a week, 150 minutes	Pre- and post-treatment and at 16 and 24 weeks	Yes (education support)	Tender point count, total myalgic score, FIQ, SF-36, six minutes walk time test, BDI, CSQ	25.8
4	Castel et al.,[32]	n=39 (37 females, 2 males)	CBT group or CBT + hypnosis	1) CBT (in relaxation) 12 sessions, once a week, 90 minutes 2) CBT + hypnosis 12 sessions, once a week, 90 minutes + 20 minutes	Pre- and post-treatment	Yes (PT)	NPRS, FIQ, MPQ, HGSHS-A	7
5	Castel et al.[33]	n=93 (90 females, 3 males)	CBT group or CBT + hypnosis	14 sessions, once a week, 120 minutes	Pre- and post-treatment and at 3 and 6 months	Yes (PT)	NRS, CSQ catastrophizing subscale, HADS, FIQ, MOSSS	6.5
6	Cedraschi et al.[24]	n=164 (152 females, 12 males)	MT (CBT)	6 sessions, twice a week, 90 minutes	Pre- and post-treatment and at 6 months	Yes (WL)	FIQ, PGWB, regional pain score diagrams, PSM	21.4
7	Hooten et al.[41]	n=66 (33 females, 33 males)	MT (CBT)	3 sessions, once a week, 6 hours	Pre- and post-treatment	No	MPI, SF-36, CSQ catastrophizing subscale, CES-D	1.5
8	Karlsson et al.[34]	n=48 females	CBT	20 sessions, once a week, 180 minutes	Pre- and post-treatment, and at 12 months	Yes (WL)	MPI, MQ, ELS, DS	7
9	Kroese et al.,[56]	n=100 (94 females, 6 males)	MT	12 sessions, 3 days a week, 90 minutes	9 times: at the start of program, 1 and 2 months after the start, immediately upon completion the program and 5 aftercare meeting	No	FIQ, EuroQoL-5D	4.8
10	Lami et al.[35]	n=28 (15 females, 13 males)	CBT-I	9 sessions, once a week, 90 minutes	Pre- and post-treatment, and at 3 months	No	SF-36, MFI, HADS, FIQ, PSQI, PCS, PASS-20	41
11	Lera et al.[25]	n=83 females	MT or MT+CBT	MT: 14 sessions, once a week, 60 minutes CBT: 15 sessions, once a week, 90 minutes	Pre- and post-treatment and at 15 weeks and 6 months	Yes (MT)	FIQ, SF-36, SCL-90R	20

Table 1. Continued

	Authors name	Number of participants	Type of treatment	Number of sessions/ Frequency/time for session	Times of measurement	Control group	Measurement tools	Drop out rates (%)
12	Luciano et al.[48]	n=156 (147 females, 9 males)	ACT	8 sessions, once a week, 150 minutes	Pre- and post-treatment and at 6 months	Yes (PT or WL)	FIQ, PCS, HADS, CPAQ, VAS, EuroQoL-5D, AEs	13.4
13	Martin et al.[36]	n=110 (90 females, 20 males)	MT (CBT)	6 sessions, twice a week, 105 minutes	Pre- and post-treatment and at 6 month	Yes (PT)	CAD-R, FIQ	38.9
14	Martinez et al.[37]	n=59 females	CBT-I or SH	6 sessions, once a week, 90 minutes	Pre- and post-treatment and at 3 and 6 months follow-up	No	PSQI, MPQ-short form, MFI, FIQ, CPSS, PCS, SCL-90-R	7.47
15	Martins et al.[54]	n=27 (mostly females)	MT (CBT, educational activities and physical therapy)	12 sessions, once a week, 60 minutes	Short and medium term	Yes (WL)	FIQ, VAS, PSP	0
16	Mason et al.[43]	n=21 females	MT (CBT)	24 sessions, 6 days a week for one month, 120 minutes	Pre- and post-treatment and at 6 month	Yes (WL)	Dolorimetry, the cold pressure test, VAS, CSQ, FIQ, BDI	4.76
17	Parra-Delgado et al.[45]	n=33 females	MBCT	8 sessions, once a week, 150 minutes	Pre- and post-treatment and at 3 months follow-up	Yes (WL)	FIQ, BDI, VAS	11.76
18	Redondo et al.[38]	n=40 females	CBT or PE	8 sessions, once a week, 150 minutes	Pre- and post-treatment and at 6 and 12 months	No	FIQ, SF-36, BDI, BDA, CPSES, CPCI	22.5
19	Saral et al.[42]	n=66 females	MT (CBT)	10 sessions, once a week, 180 minutes	Baseline and at 6 months	Yes (WL)	VAS, FIQ, BDI, SF-36 algometric pressure	10.6
20	Scheidt et al.[46]	n=46 females	Short-term psychodynamic psychotherapy	25 sessions, once a week, 50 or 60 minutes	Pre- and post-treatment and at 12 month	Yes (PT)	FIQ, HADS, PDI, SC-27, HRQL	23.9
21	Suman et al.[29]	n=25 females	MT (CBT)	3 sessions, 5 days a week, 90 minutes	Pre-admission, pre- and post-treatment and at 3, 5 and 12 months	No	VAS, CES-D, BPCI, algometric pressure, incremental step test	0%
22	Turk et al.[26]	n=48 (46 females, 2 males)	MT for three psychosocial group: 1. Dysfunctional 2. Interpersonally distressed 3. Adaptive copers	6 sessions, 3 sessions at the first week and 1 session per week at the next 3 consecutive weeks, half day	Pre- and post-treatment and at 6 months	No	MPI, DS, ODS	18.06
23	Turk et al.[26]	n=67 (65 females, 2 males)	MT	6 sessions, three times a week, 6 hours	Pre- and post-treatment and at 6 months	No	MPI, CES-D, ODS, LWMAS, FIQ	43.28
24	Van Abbema et al.[30]	n=87 (78 females, 9 males)	MT	25 sessions, 5 days a week, 8 hours	Pre- and post-treatment	No	IPQ-R, FIQ	48.27

Table 1. Continued

	Authors name	Number of participants	Type of treatment	Number of sessions/ Frequency/time for session	Times of measurement	Control group	Measurement tools	Drop out rates (%)
25	Van Eijk-Hustings et al.[55]	N= 134 (129 females, 5 males)	MT or AE	MT: 36 sessions, three half days per week, 3 hours AE: 24 sessions, twice a week, 1 hour	Pre- and post-treatment	Yes (PT)	EuroQoL-5D, FIQ	30
26	Vallejo et al.[39]	N= 60 females	CBT or iCBT	10 sessions, once a week, 120 minutes	Pre-treatment and at 10 weeks, 3-6-12 months	Yes (WL)	FIQ	0
27	Van Koulil et al.[52]	N= 158 (148 females, 10 males)	CBT	16 sessions, twice a week 120 minutes + a final booster session after 3 months session	Pre- and post-treatment and at 6 month	Yes (WL)	IRGL, PCI, FIQ	4.63
28	Vazquez-Rivera et al.[44]	N= 34 females	CBT	5-6 sessions, once a week, 120 minutes	Baseline, pre- and post-treatment	No	BDI, STAI-S, CAD, FIQ, HAS	32
29	Vincent et al.[40]	N= 7 (6 females, 1 male)	MT (CBT, activity pacing or exercise therapy)	5 sessions, 5 days a week, 6-7 hours	Baseline and post-treatment, and at 3 months	No	MFSI-SF, CPSS, SF-36, FIQ	0
30	Wicksell, et al.[47]	N=40 females	ACT	12 sessions, once a week, 90 minutes	Pre- and post-treatment and at 3 months	Yes (WL)	PDI, FIQ, SF-36, SES, BDI, STAI, VAS, PIPS	17.5

CBT: Cognitive behavioral therapy; PT: Pharmacological treatment; CBT-I: Cognitive-behavioral therapy for insomnia; iCBT: Internet-delivered CBT; MT: Multidisciplinary treatment; ACT: Acceptance and commitment therapy; MBCT: Mindfulness-based cognitive therapy; SH: Sleep hygiene; PCS: Pain Catastrophizing Scale; FIQ: Fibromyalgia impact questionnaire; HRS-D: Hamilton Rating Scale for Depression; HRS-A: Hamilton Anxiety Rating Scale; VAS: Visual Analogue Scale; CPAQ: Chronic Pain Acceptance Questionnaire; EuroQoL-5D: Europen Quality of Life 5 Dimension; MT: Multidisciplinary treatment; PE: Physiotherapy; BDI-II: Beck Depression Inventory-Second Edition; BAI: Beck Anxiety Inventory; SF-36 (36-Items Short Form Health Survey), CSQ (Coping Strategies Questionnaire), WL (Waiting List), NPRS (Numeric Pain Rating Scale), MPQ (McGill Pain Questionnaire), HGSHS-A (Harvard Group Scale of Hypnotic Susceptibility Form A), NRS (Numeric Rating Scale), HADS (Hospital Anxiety and Depression Scale), MOSSS (Medical Outcomes Study Sleep Scale), PGWB (Psychological General Well-Being index), MPI (Multidimensional Pain Inventory), CES-D (Center for Epidemiologic Studies Depression Scale), PSP (Post-Sleep Protocol), MQ (Maastricht Questionnaire), ELS (Everyday Life Stress), DS (Depression Scale), MFI (Multidimensional Fatigue Inventory), PSQI (Pittsburgh Sleep Quality Index), PAS (Pain Anxiety Symptoms Scale), SCL90-R (Symptom Checklist-90 Rewised), AEs (Assessment of adverse events), CAD-R (Coping with Chronic Pain Questionnaire), PBPI (Pain and Beliefs Perception Inventory),CPSS (Chronic Pain Self-efficacy Scale), CPCI (Chronic Pain Coping Inventory), CPSES (Chronic Pain Self-Efficacy Scale), BDI (Beck Depression Inventory), PDI (Pain Disability Index), SC (Symptom Checklist), HRQL (Health-Related Quality of Life), BPCI (Brief Pain Coping Inventory), IPQ-R (Illness Perception Questionnaire- Revised), IRGL (Impact of Rheumatic Diseases on General Health and Lifestyle), HAS (Health Attitude Survey), STAI-S (State-Trait Anxiety Inventory), MFSI-SF (The Multidimensional Fatigue Symptom Inventory-Short Form), AE (Aerobic exercise), SES (Self-Efficacy Scale), STAI (The Spielberger Trait- State Anxiety Inventroy, PIPS (The Psychological Inflexibility in Pain Scale), PSM (Patient Satisfaction Measures),ODS (Oswestry Disability Scale), LWMAS (Locke-Wallace Marital Adjustment Scale).

Table 2. Summarized information on outcome variables, results of effectiveness at post-treatment and follow-up, and reported limitations

Authors name	POs	SOs	Results	Follow-up assessment	Reported limitations
1. Alda et al.[31]	Pain, global function	Pain catastrophizing, pain acceptance, depression, anxiety, quality of life	Significant improvements at all PO and SO except for anxiety (SO).	Improvements maintained + increase in pain acceptance (SO)	Type I error for secondary variables.
2. Anderson and Winkler[21]	Fibromyalgia impact, fatigue, pain, morning tiredness	Depression, anxiety,	Significant improvements at depression (SO), fibromyalgia impact, fatigue, pain (PO).	No follow-up assessment	Lack of randomization; outcome variables measured through self-reports.
3. Astin et al.,[23]	Pain, myalgiq score (number and severity of tender points), disability, 6 minute walk time	Coping strategies, depression	No significant change in terms of PO or SO.	Still no significant improvements	High attrition rate; no RCT; no active control group.
4. Castel et al.[32]	Pain intensity, sensorial quality of pain and fibromyalgia impact	Affective quality of pain	Medical treatment group: No significant improvement in PO or SO CBT: Significant improvement only for fibromyalgia impact (PO) CBT+hypnosis: Significant improvements for all PO and SO.	No follow-up assessment	High rate of drop-out; relatively small sample size; treatment outcome expectancy not evaluated; no long-term follow-up assessments.
5. Castel et al.[33]	Pain intensity, functionality, fibromyalgia impact	Catastrophizing, psychological distress, sleep disturbances	Significant difference between CBT + hypnosis and CBT in POs of fibromyalgia impact and SO of sleep disturbance. CBT + Hypnosis > CBT only.	Improvements maintained	No primary level assessment of hypnotic suggestibility and patients' pre-expectations about the treatment.
6. Cedraschi et al.,[24]	Functional consequences, pain	Quality of life, patient satisfaction	Significant improvement in only quality of life (SO).	No more maintained	Establishing no significant change in pain; generalizability problems.
7. Hooten et al.[41]	Functional restoration, physical function, reduction in medications, muscle relaxants	Emotional function	Significant improvements in physical (PO) and emotional functioning (SO) for both men and women.	No follow-up assessment	Limited sample size for a large number of multiple comparisons; short time interval between pre and post evaluation.
8. Karlsson et al.[34]	Pain severity, general activity level	Interference, affective distress, support from spouses/significant others, vital exhaustion, stress behavior, depression, life control	Significant improvements in SOs of life control, interference, affective distress, support from significant others and depression.	Improvements maintained and an enhanced effect of vital exhaustion (PO) and stress behavior (SO)	Small sample size; no FMS specific measures.
9. Kroese et al.[56]	Medical consumption, fibromyalgia impact	Feasibility, quality of life, social participation	Significant improvements at all PO and SO.	Improvements maintained	Small sample size; no control in medication; no specific measures examining pain appraisal.
10. Lami et al.[35]	Pain intensity, fatigue, functioning	Pain catastrophizing, emotional distress (anxiety and depression), pain anxiety, sleep quality	Male group: significant improvements in SOs of sleep quality, pain anxiety and catastrophizing. Female group: Significant improvements in SOs of sleep quality and depression and fatigue (PO).	Improvements maintained	Small sample size; illness adaptation variables not measured (such as coping styles, acceptance etc.); short follow-up interval; no active control group; no pre-treatment assessment; no measure of general stress.

Table 2. Continued

Authors name	POs	SOs	Results	Follow-up assessment	Reported limitations
11. Lera et al.[25]	Fibromyalgia impact, fatigue, physical well-being	Psychological well-being, coping, modifying lifestyles, pain behavior	Multidisciplinary treatment (MT) group: significant improvements on POs of physical well-being and fibromyalgia impact. MT+CBT < CBT-only in terms of fatigue (PO).	Improvements maintained	Small sample size; lack of psychopathology measures.
12. Luciano et al.[48]	Functional status, pain	Pain catastrophizing, pain acceptance, anxiety, depression, health-related quality of life	Significant improvements in sos of pain catastrophizing, pain acceptance, health-related quality of life, anxiety, and depression and pain (po).	No follow-up assessment	Lack of randomization and follow-up assessment; and the impossibility of distinguishing the interactive effects of the two main components of the intervention.
13. Martin et al.[54]	Pain, fibromyalgia impact, physical functioning	Health related quality of life	Significant improvements in pos of fibromyalgia impact, physical functioning and pain.	Improvements enhanced	Biased sample due to including only referred patients; small sample size, lack of any objective physical measure; sample not including male FMS patients; short interval assessment; no active control group.
14. Martinez et al.,[37]	Pain, fatigue, daily functioning	Sleep quality, self-efficacy, catastrophizing, anxiety, depression	CBT-I improved more than SH at all the SO and PO outcomes except for pain, and SOs of catastrophizing, anxiety, depression.	Improvements maintained in sleep quality. Significant improvements in SO's of pain catastrophizing, anxiety, depression	self-report and subjective measures; overlap between measurement tools; generalizability due to sample characteristics.
15. Martins et al.[54]	Pain, functional capacity	Anxiety and depressive symptoms, sleep quality, quality of life.	Significant improvements in POs of functional capacity and pain.	No follow-up assessment	Having no follow-up.
16. Mason et al.[43]	Pain sensitivity, tender points (cold pressor threshold, cold pressor tolerance), fibromyalgia impact	Depression, coping skill	Significant improvement in only depression (SO).	No follow-up assessment	No limitations reported.
17. Parra-Delgado et al.[45]	Fibromyalgia impact, pain intensity	Depressive symptoms	Significant reductions in depressive symptoms (SO) and fibromyalgia impact (PO).	Decrease in improvement at depressive symptoms; the other improvements maintained	No measurement of mindfulness; limited number of follow-up sessions; short follow-up time interval; small sample size.
18. Redondo et al.[38]	Tender point physical, activity, aerobic capacity, fibromyalgia impact	Anxiety, depression, pain self-efficacy, pain coping	PE: Significant improvement in activity (PO). CBT: Significant improvements in POs of fibromyalgia impact and SOs of relaxation strategies in pain coping. CBT > PE in terms of improvements.	Improvements not maintained	No limitations reported

Table 2. Continued

Authors name	POs	SOs	Results	Follow-up assessment	Reported limitations
19. Saral et al.[42]	Pain, tender point numbers, pressure pain threshold, fatigue, fibromyalgia impact	Sleep, health related quality of life, depression,	Significant improvements in POs of pain, number of tender points and pressure pain threshold and fatigue.	No more significant group differences	Short period of follow-up; 22 patients (in CBT group) too many for an ideal CBT session; lack of any specific content in intervention programs for improving sleep; differences in patient characteristics; no assessment of compliance with home exercises.
20. Scheidt et al.[46]	Functional physical symptoms, fibromyalgia related symptoms, pain related disability	Depression, anxiety, psychological distress, health related quality of life, psychiatric diagnoses	No significant improvements	Still no significant improvements	Small sample size; patients' motivation disregarded evaluators not blinded; self-report measures; high level of patient expectations.
21. Suman et al.[29]	Pain intensity, pain area, deep pressure pain threshold	Depression, coping	Significant improvements in POs of pain intensity, pain area and number of positive tender points and depression (SO).	Improvements maintained	No limitations reported.
22. Turk et al.[26]	Pain severity, activity level	Perceived interference of pain in life activities, affective distress, perceived control over life, support from significant others, responses by significant others	Dysfunctional group: significant improvements in POs of pain, and SOs of affective distress, perceived disability, and perceived interference of pain. Interpersonally distressed group: no significant improvements. Adaptive copers group: significant improvements only in PO of pain.	No follow-up assessment	No control group; self-report measures; no measures of patient adherence to the treatment recommendations.
23. Turk et al.[27]	Pain severity, physical impairment, fatigue	Life interference, sense of control, affective distress, depression, anxiety, interpersonal relationship, general activities	Significant improvements in all POs and SOs of life interference, sense of control, affective distress, depression, and anxiety	Improvements maintained in pain, life interference, sense of control, affective distress, and depression	Lack of control group; self-report assessment; no measures of patient adherence to the treatment recommendations
24. Van Abbema et al.[30]	Pain intensity, fibromyalgia impact, morning tiredness	Quality of life, depression	Significant improvements in PO of pain intensity, fibromyalgia impact, morning tiredness and depression (SO).	No follow-up assessment	No disease specific measurement; presence of uncontrolled confounders; type ii error occurred by a floor effect in FMS symptoms; bias in patient selection; high dropout rate.
25. Van Eijk-Hustings et al.[55]	Participation and health care utilization, fibromyalgia impact	Health-related quality of life	Mt group: significant improvements in health-related quality of life (so) and pos of fibromyalgia impact and reduction in health care utilization.	Improvements maintained	Lack of statistical power in terms of between-group differences at baseline.

Table 2. Continued

Authors name	PO	SO	Results	Follow up assessment	Reported limitations
26. Vallejo et al.[39]	Fibromyalgia impact	Psychological stress, depression, self-efficacy, coping strategies, catastrophing	CBT: significant improvements at all PO and SO except for self-efficacy. ICBT: significant improvements at all SO.	CBT group: improvements not maintained ICBT group: improvements in primary outcomes	Individual and group psychotherapy employed simultaneously; different expertise levels of the therapists.
27. Van Koulil et al.[52]	Physical functioning, fibromyalgia impact	Psychological functioning	Significant improvements in POs of physical functioning and fibromyalgia impact and psychological functioning (SO).	Improvements maintained	No comparison of the effects of tailored versus non-tailored treatments; the allocation to the Conditions and the execution of the measurements non-blind; Improvements due to possible effects of patient's expectation not controlled for; short follow-up interval.
28. Vazquez-Rivera et al.[44]	Physical functioning	Depression, anxiety, pain coping strategies, health attitude	Significant improvements in depression, anxiety, and use of distraction as a coping strategy of SOs.	No follow-up assessment	Lack of follow-up assessments; Potential confounding factors not controlled; self-report questionnaires; high attrition rates.
29. Vincent et al.[40]	Pain, fatigue, fibromyalgia impact, physical health	Self-efficacy, mental health	Significant improvements in POs of pain, fatigue and physical symptoms.	Improvements not maintained	Small sample size; study not designed as a clinical trial; unable to draw conclusions on clinical efficacy.
30. Wicksell et al.[47]	Pain-related disability, fibromyalgia impact,	Health-related quality of life, self-efficacy, depression, anxiety, psychological inflexibility	Significant improvements at all PO and SO.	Improvements maintained	Only female participants; generalizability problems due to restrictions in the use of analgesics and other treatments; lack of active control group.

POs: Primary outcomes; SOs: Secondary outcomes; CBT: Cognitive behavioral therapy; CBT-I: Cognitive behavioral therapy- Insomnia; SH: Sleep hygiene; PE: Physiotherapy; MT: Multidisciplinary treatment; iCBT: Internet-delivered CBT.

of Van Abbema et al.,[30] reported a drop-out rate which was almost 50%, where the mean drop-out rate of these 30 studies was calculated to be 15.83% (standard deviation=14.21). Information including substantive characteristics (i.e. participants, type of treatment), methodological characteristics (i.e. design and instruments), external characteristics (i.e. publication bias, year of publication) are summarized in Table 1 and effectiveness of interventions are shown in Table 2.

As to the therapeutic interventions, Cognitive Behavior Therapy (CBT), which modifies dysfunctional thoughts and behaviors through cognitive techniques (i.e. cognitive restructuring) or behavioral activation (i.e. relaxation, increasing activity),[29] was observed to be the main psychotherapy modality in 20 studies. With respect to these 20 studies, CBT was used as a single psychotherapeutic method in eight studies, CBT and hypnosis were combined in two studies, and CBT was joined with multidisciplinary programs in 10 (Table 1). The remaining 10 studies were based on different psychotherapeutic approaches aside from CBT; one being a mind-body intervention, two based on Acceptance and Commitment Therapy, one being a mindfulness-based cognitive therapy and one being short-term psychodynamic psychotherapy; the remaining five studies employed multidisciplinary interventions including physical exercise, drug management, and unidentified group psychotherapeutic techniques (Table 1). To summarize, these 30 studies indicated that 15 were conducted in a multidisciplinary fashion, and the rest employed unidimensional, in other words only GP interventions.

On the whole, these interventions aimed to improve POs including pain intensity, fatigue, fibromyalgia impact and/or SOs that consist of psychological factors such as depression, anxiety, quality of life, pain acceptance, and pain catastrophizing (Table 2). According to the results, it was observed that among the multidisciplinary interventions, eight studies revealed significant improvements in both POs and SOs, five studies in only primary, and two studies in only SOs. On the other hand, among the remaining 15 non-multidisciplinary/unidimensional treatments where only GP techniques were employed, nine showed improvements in both primary and secondary variables, two studies revealed changes only in primary and two studies only in secondary variables. However, there were two studies which reported no significant effects (Table 2).

These studies also reported some limitations such as having samples including mostly females, lack of randomization, high rates of drop-out, small sample size and generalizability problems, no long-term follow-up assessments, and lack of objective measures.

Despite these reported limitations, a further analysis was conducted for a more precise picture of the intervention effects as a function of outcome type (primary or secondary) and intervention type (multidisciplinary or unidimensional). For this purpose, percentage rates of improvements in POs, SOs and overall improvements regardless of POs or SOs were calculated for multidisciplinary treatments (MTs; n=15), and unidimensional/only GP treatments (U/GPs; n=15), respectively (Table 3).

These further results revealed that for MTs, among all outcome variables, 53% were POs (n=47), and 47% were SOs (n=41); whereas for U/GPs, these rates were 38% (n=37) and 62% (n=58), respectively. Although the overall improvement rate calculated regardless of outcome type was only slightly better for MTs (59%) when

Table 3. Rate and percentage of improvements as a function of intervention type and type of outcomes

	POs (Rate of improvement/%)	SOs (Rate of improvement/%)	POs+SOs (Rate of improvement/%)
MTs[3]	34:47/72	18:41/44	57:88/59
GPs[4]	16:37/43	38:58/65	54:95/57

POs: Primary outcomes; SOs: Secondary outcomes; Rate of improvement: Number of outcomes reported to yield improvements divided by total number of outcomes measured; %: Percentage of improvement where rate of improvement is multiplied by 100; MTs: Multidisciplinary treatments; GPs: Unidimensional/only group psychotherapies.

compared to U/GPs (57%) (see PO+SO column in Table 3), these rates seemed to change in terms of type of outcome. That is, with respect to MTs, the improvement rates for POs and SOs were 72% and 44%, respectively. On the other hand, these rates were 43% and 65%, respectively, for U/GPs (Table 3).

DISCUSSION

In this systematic review, 30 studies were examined employing GP interventions for FMS patients, conducted between 1998 and 2018. It was observed that studies have focused on different outcome variables associated with FMS and used various psychological approaches in this direction. Yet, these outcome variables could be grouped in two major categories of POs and SOs in line with EULAR recommendations.[20] Furthermore, it also seemed useful to categorize various treatment modalities employed in these studies into U/GPs and MT approaches (employing medical/physical treatment modalities in addition to GP interventions).

With respect to this two-fold classification in terms of outcomes and treatment modalities, this review overall delineates that CBT was the most frequently utilized psychotherapeutic modality of GP interventions, be it a MT or a U/GP.[21,24,25,29,31-44] On the other hand, other few interventions including different psychotherapeutic approaches (which are mind-body intervention, mindfulness based therapy, short-term psychodynamic psychotherapy, acceptance commitment therapy) aside from CBT were also utilized.[23,45-48]

However, the results of the studies revealed some inconsistencies. For some, there was either no difference between the groups or the intervention effects remained low or at a moderate level in terms of POs including pain intensity, fatigue, and physical functioning. This seemed to be the case for secondary variables like psychological stress (depressive and anxiety symptoms), sleep quality, self-efficacy, and pain coping strategies (Table 2).

The overall inconsistencies stated above might be a function of treatment type as exactly half of the studies employed U/GPs, and the rest MTs, the latter proposed to be more functional. Indeed, it is known that FMS patients restrict their movements because of their pain intensity and feelings of weakness and demonstrate a decrease in their functionality. What is thus aimed in these multimodal interventions is to gradually increase muscular strength of patients with physical therapy. However, that patients believe exercise makes their pain worse is an obstacle that may result in exercise avoidance. Accordingly, there are studies in the literature which report that when patients start exercising, their pain level increases.[49] At this point, interventions including physical exercise and CBT together become crucial and are suggested to stop the cycle of avoidance and fear of pain.[50,51] In fact, there is one specific study in this review that used a multidisciplinary approach including CBT with a special focus on behavioral strategies (behavioral activation and exercise) to facilitate physical exercise, the results of which did show improved POs[52] (Table 2).

Furthermore, unlike unidimensional interventions that use only psychotherapeutic modalities, MT approaches include physical exercises, pharmacological and psychological treatments.[17,19] As a result, treatment modalities which employ only psychological or medical/physical approaches independent of one another may miss the whole symptomatology of FMS patients where both primary and secondary variables interplay. The aim of CBT is primarily to identify and modify dysfunctional thoughts and secondly break the vicious circle between symptoms and dysfunctional performance by using behavioral interventions.[53] Accordingly, including physical exercise and ongoing medical treatment in the multidisciplinary intervention is viewed as important to record improvements in associated primary and secondary symptoms. Therefore, if the treatment modality is multidisciplinary, this may result in changes in both primary and secondary variables.[21,26,30,40,41,54] As expected, some of the MT studies in this review reported improvements not only in SOs such as depressive symptoms, quality of life, emotional functioning but also in POs including pain, fatigue, physical functioning and fibromyalgia impact. In addition to these reports, objective pain evaluations like pain area, tender points, and pressure pain threshold also improved significantly in some

other studies.[29,42] Besides, some of these studies showed improvements with regard to medical consumption and healthcare utilization.[55,56]

However, a closer look at the degree of improvements in terms of type of intervention and outcome variables made the way for one of the major findings of this review, which was not exactly in line with the above predictions (Table 3). First of all, MTs were only slightly more effective than U/GPs in terms of improvements, when the outcomes were not split into POs and SOs. Furthermore, MTs included in this review yielded a higher frequency of improvements in POs than SOs. There was an exactly opposite finding for U/GPs. The finding for U/GPs is not contrary to the expectations as summarized above. On the other hand, one possible explanation for the result concerning MTs can be the PO/SO ratio. A detailed analysis manifested a PO/SO ratio higher in MTs when compared to U/GPs (Table 3). This can be evaluated as a MT bias where MTs may primarily be designed to emphasize changes particularly in POs. Yet, this review also shows that PO frequency in MTs only slightly outweighed SOs, whereas this ratio was twice in favor of SOs in U/GPs. This suggests that although MTs have more or less met the standards, this seems more in quantity rather than quality. It may be the case that the quality (that is the content) of MTs are more likely to meet the anticipations of FMS patients who primarily consult with not secondary but primary symptoms, when compared to unidimensional CBT or psychological based GPs. However, the present review may not answer this possibility. Nevertheless, further interventions can contemplate on improving MTs in terms of content as well.[21,26,30,40-42,54-56]

In addition to the above findings, there are studies mentioned in this review which showed low or no treatment effect or insignificant group differences in terms of primary and/or secondary variables.[24,42,43] One should not disregard that all these may actually be related with five major methodological problems which are differences in number of sessions, employment of varying assessment tools, lack of (active) control group or RCTs, the absence and features of follow-up evaluations, and drop-out rates. Firstly, in terms of number of sessions, even though more intense and more frequent long-term interventions are suggested to enhance the effectiveness of the interventions,[57] there is a gradual increase in the number of interventions employing brief CBT modules because of its cost-effectiveness.[29,44] More research is needed comparing the short- and long-term therapy effects as a function of the number of sessions with RCTs.

Secondly, among the scales used in these studies, only FIQ evaluates the impact of FMS in terms of biopsychosocial perspective and this was the only scale that was developed specifically for FMS patients.[24] However, FIQ was administered in only some of the studies. Also, another major problem in evaluating FMS symptoms is the lack of objective measures. Only a few studies used objective means such as tender point counts, morning tiredness, and cold pressures.[23,24,29,42,43] It will be of advantage to employ objective measures where possible. As a result, the proof of the effectiveness of any intervention is limited to the extent of the method of measurement.

Thirdly, there are studies that lack control groups. There seems to be a need for more RCTs with "active control groups" which are implemented as another well-acknowledged intervention for illness conditions[58] besides the use of waitlist controls. Fourth, with respect to follow-up evaluations, there are studies covered in this review that have not conducted follow-ups. However, Kroese et al.[56] discussed that even one follow-up may not be enough. They suggested using "aftercare meetings" which are conducted in shorter time spans following the final session, and for several times. According to them, besides the aim of maintaining the improvements, these meetings could be a means to track changes in the improvements in a longitudinal fashion. Moreover, it is not only the presence or the frequency, but also the time interval of the follow-ups that may have made a difference. This is an issue on its own that is to be tested in RCTs.

Lastly, drop-out is also the most important obstacle against studies while assessing the effects of intervention. Therefore, in order to grasp the intervention effects, keeping patients within the interventions is crucial. However, the sample studies included in this review also varied as a function of drop-out rates. The literature indicates that the main reason of drop-out is heterogeneity

of the samples.[36,56,59] Therefore, this may suggest that the difference in the level of heterogeneity among the studies might also have had an effect on varying outcomes of effectiveness. As a result, tailored interventions planned so as to increase retention rates may be a suggestion.[52]

Besides these suggestions for further research, this review bears some limitations. The first limitation was the language barrier in reaching all the studies which are written in non-English. Moreover, the search could not cover some databases such as Cochrane Library, PsycINFO, ProQuest, or PubMed since Istanbul University library has no access to these. Another limitation was the lack of covering studies conducted only using medical/physical modalities. Therefore, the issues with respect to the potential superiority of multidisciplinary approaches should rather be reassessed in comparison to medically oriented unidimensional studies as well. This review also cannot lead to the conclusion that GPs are the primary and effective means of psychological interventions. Future reviews should consider the effectiveness of various other forms of psychological interventions in comparison to GPs in the similar two-fold fashion as this review primary versus secondary variables and multidisciplinary versus unidimensional modalities.

In conclusion, with respect to the results of this review, the major clinical suggestion may be to provide FMS patients a treatment setting where both medical/physical and psychological modalities are available simultaneously, so that the multidisciplinary quality can be satisfied. Another major suggestion may be to repeatedly evaluate improvements not only in one modality of symptoms but both at primary (i.e. exercise avoidance, pain intensity) and secondary (i.e. fear of exercise and fear of pain) levels with efficient instruments sufficient to cover the major goals of change, including objective measures, where possible. All of these may help multidisciplinary modalities in reaching the gold standard.[60]

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