What non-pharmacological and non-invasive pain management interventions are available for individuals from Turkish-speaking ethnic groups with non-malignant chronic pain? A scoping review of published literature

Abstract

Objectives - a scoping review was selected to explore what non-pharmacological and non-invasive pain management interventions are available for individuals from Turkish-speaking ethnic groups with chronic pain and what represents the most appropriate intervention.

Inclusion criteria – adults with non-malignant chronic pain from Turkish-speaking ethnic groups residing in or outside of Turkey. All non-pharmacological and non-invasive pain management interventions were considered. No limits were placed on geographic location, gender, sex or healthcare setting.

Methods – the MEDLINE database was searched for published literature in April 2022. An English language filter was applied. No limits were placed on study design or date of publication. Data was charted from eligible studies into a data extraction table. Key concepts were identified during data extraction by DN.

Results – eleven studies were included in the final review. All were conducted within a quantitative research paradigm. The studies were completed in Turkey (7), Belgium (1), Sweden (1) and Switzerland (1). One was a multi-country review. No studies were conducted in the UK. The primary interventions were heterogenous and included: pain science education (2), cognitive behavioural therapy (2), transcranial magnetic stimulation (1), balneotherapy (1), extracorporeal shockwave therapy (1), transcutaneous electrical nerve stimulation (1) wool therapy (1), exercise & patient dialogues (1) and aromatherapy massage & reflexology (1). Location of pain, outcome measures and timings of follow-ups were heterogeneous.

Conclusions – intervention heterogeneity, exclusively quantitative methodology, and absence of studies completed in the UK meant no conclusions could be made on what represents the most appropriate non-pharmacological and non-invasive interventions intervention for individuals from Turkish speaking ethnic groups with non-malignant chronic pain.

Keywords

Turkish, Turkey, chronic pain, pain management, ethnicity, ethnic group

Introduction

Non-pharmacological and non-invasive interventions for non-malignant chronic pain are varied and often multi and or inter-disciplinary (1, 2). Group-based interventions, often called 'pain management programmes' (PMPs) routinely form part of pain management services in England and the UK (1, 3)although are not universally recommended (4). Equivalent services for non-English speaking patients with non-malignant chronic pain are less common and fail to reflect the ethnic diversity of some areas of England and the UK. For instance, London is the most ethnically diverse region in England and Wales with 43.4% identifying as White British compared with 78.4% for England and Wales overall (5). In the 2011 Census, 40.2% identified as either Asian, Black, Mixed or Other ethnic groups (6).

However, despite the diverse nature of some catchment areas, equivalent pain management services are not available for non-English speaking patients in some National Health Service (NHS) trusts. One example of this is in parts of London where a large percentage of individuals from the UK's Turkish-speaking ethnic groups live (6, 7).

Individuals from Turkish-speaking ethnic groups represent a small percentage of the total non-British population. Based on self-identified ethnic groups, they account for 1.56% of the population of England and Wales and 2.43% of the population of London (7). However, 64.14% of this group living in England & Wales live in London. Furthermore, UK residents born in Turkey are more likely to live in London (63.45%) and in Enfield (23.44%), Haringey (16.94%) or Islington (6.34%), the catchment area of one North London NHS trust (7).

Individuals from Turkish-speaking ethnic groups may share a common language however *'there is no intention to suggest or imply a cultural or otherwise homogeneity.'* (7). The term encompasses the three major ethnic groups in England; Turks, Turkish-Cypriots and Kurds from Turkey, in addition to other smaller groups with Turkish ethnic origins such as Bulgarian Turks. The decision to use Turkish-speaking ethnic groups was based on UK government guidance on writing about ethnicity (8). If specific ethnic groups are identified during this review, they will be reported as such as this may be salient for analysis purposes.

Addressing inequitable pain management services is important, including exploring options that may be appropriate for Turkish speaking groups. PMPs may represent one option to consider however as a PMP represents a complex intervention according to Medical Research Council (MRC) guidance, simple replication and translation of an English-language equivalent may reduce the likelihood of a good intervention-context fit (9, 10). Adapting and or developing complex interventions demands a good understanding of the contextual factors which can impact intervention replication in specific settings (9, 11, 12).

It is unclear what represents the most appropriate non-pharmacological and/or non-invasive intervention for this group. To improve our understanding of the complex relationship between intervention and context, two areas were prioritised:

1. Exploring relevant literature
2. Identify specific contextual factors

Methods

Due to the heterogenous nature of available interventions, a scoping review was selected to address the former (2, 9, 12, 13, 14, 15). A scoping review has been defined as '*a form of knowledge synthesis, which incorporate a range of study designs to comprehensively summarise and synthesise evidence with the aim of informing practice, programs, and policy and providing direction to future research priorities.'* (16)

Protocol & registration

The protocol was developed in accordance with published guidance on scoping reviews (2, 14, 15). Areas of uncertainty were discussed by email or video call via Microsoft Teams between DN and his co-authors JW, DD, and EG. A protocol for this scoping review has not been published because it was not eligible for registration on Prospero.

Eligibility criteria

Inclusion criteria was kept intentionally broad to avoid narrowing the focus of the review and reduce the likelihood of missing relevant publications across a heterogeneous evidence base. Limits were not placed on the age of participants, study design, study location or year of publication. Pharmacological and or invasive interventions were excluded.

Participants

Adults from Turkish-speaking ethnic groups with non-malignant chronic pain were included in the review. Chronic pain had to present for ≥ 3 months and meet the IASP definition for chronic pain (17).

Non-malignant chronic pain was chosen as this demarcation is consistent across guidelines, classification systems (1, 4, 18). Studies which included acute pain conditions were excluded.

Concept

All non-pharmacological and non-invasive pain management interventions were considered in the review providing their intended use was for the treatment of non-malignant chronic pain.

Context

Eligible participants residing in or outside of Turkey were included. Studies which included participants from Turkish-speaking ethnic groups but did not present their results separately, were excluded.

Context was kept deliberately 'open' therefore no limits were placed on geographic location, gender, sex or healthcare setting (14).

DN is a male physiotherapist with an interest in pain and self-identifies as white-British. JW is a female clinical academic physiotherapist with an interest in pain and self-identifies as black African (and naturalized British Citizen.) DD is a male physiotherapist and researcher who self-identifies as white-Irish.

Types of sources

This scoping review considered only international peer-reviewed journal articles and was limited to database searching. No limits were applied to study design and date of publication.

Search strategy

Search strategy and concept development was informed by the population, intervention, outcome (PIO) framework. Population (Turkish-speaking ethnic groups with non-malignant chronic pain) and intervention (non-pharmacological and non-invasive pain management) were included in the final search strategy outlined in appendix 1 (pg.20).

The search strategy was developed and refined using the MEDLINE database via the OVID research platform with the assistance of a skilled librarian (AK.) Feedback from librarians (NW, KP, JP) was sought via the King's Learning and Skills Service (KLaSS) 'advanced searching for systematic reviews discussion forum' in addition to co-author discussion. 'English-language' limits were applied to the final search strategy as the practicalities and costs associated with translation were outside the scope of this review. Due to time constraints only the MEDLINE database was searched. We selected MEDLINE as it is a large comprehensive database indexing journals and citations from the field of interest and on advice from an information specialist.

Source of evidence selection

The search strategy was developed and applied to the MEDLINE electronic database. Sequential title and abstract screening was completed by DN. Publications were excluded if they failed to meet the eligibility criteria. Full texts of eligible publications were sought, screened and excluded if ineligible. Uncertainty was discussed and resolved by consensus with DN, JW & DD by email or video call via Microsoft Teams.

Data extraction

A data extraction table was developed by DN, informed by methodological guidance (14, 15). The table was peer reviewed by co-authors JW and DD and piloted by DN before extraction. DN independently charted data from eligible publications. Areas of uncertainty were discussed with JW and DD. A summary of the data extracted is presented in Table 1 (pg.8). All extracted data is presented in appendix 2 (pg.21)..

Methodological guidance, review objectives and clinical experience informed the creation of a study-specific data extraction table. The following information from each study was extracted; reference (study name, author(s); context (country, location); study design (qualitative/quantitative); study population (age, pain characteristics, male:female ratio, ethnicity); sample size; intervention type; control; outcome measures; and key findings. Using (14, 15). Only published data was extracted, with no further data requests or confirmation from study authors undertaken.

Data analysis

Key concepts relevant to the research question and review objectives were developed by DN and agreed with JW, DD and EG prior to analysis. These included context, research paradigm, study design, participant characteristics (age/gender), location of pain, primary intervention and outcome measures (primary/secondary).

Frequency counts were tallied during data extraction for each concept by DN and are presented in Table 2 (pg.14).

We discussed using a risk of bias tool to assess the quality of the literature, but guided by the broader considerations of a scoping review to canvas available literature, we followed the convention of the methodology and did not comment specifically on quality (2, 14).

Results

Search strategy and selection process

The MEDLINE electronic database was searched by DN on the 29th April 2022. The search strategy identified 1070 citations. 1017 were available for title and abstract screening after an English-language filter was applied. Title and abstract screening identified 20 publications eligible for full text screening. All 20 publications were retrieved and assessed for eligibility. 9/20 were excluded for the following reasons: duration of pain not stated (n=2); acute pain conditions included (n=3); population ineligible (n=1); invasive intervention (n=1); intervention development phase (n=2). 11 publications were considered eligible for the review. This is summarised in the PRISMA diagram in Fig.1 (pg.6).

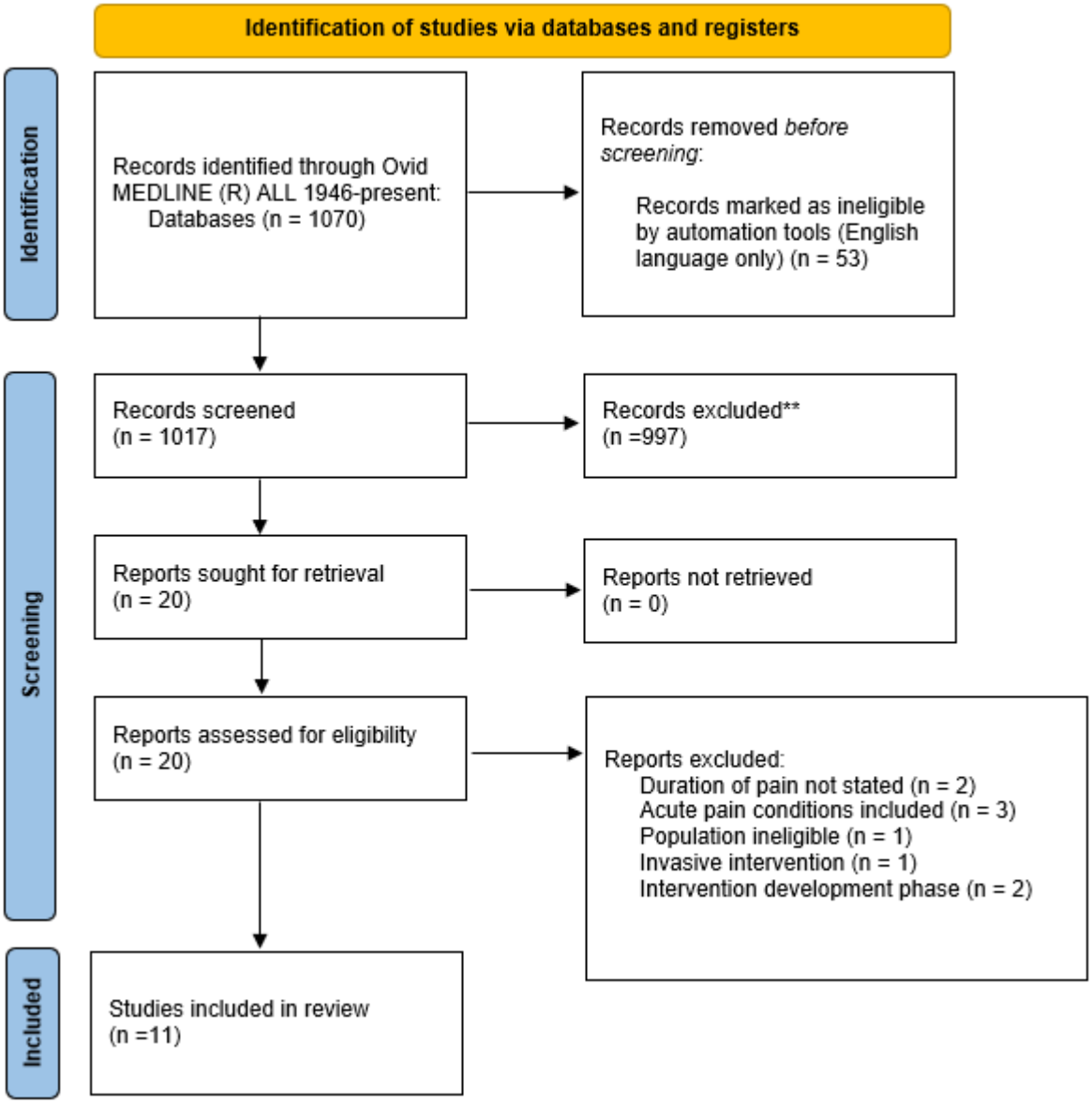

Fig.1 – PRISMA diagram selection of sources of evidence

Eleven studies were included in the review. Excluding the multi-country Cochrane review completed by Martimbianco, Porfírio (19), seven were conducted in Turkey. No studies completed in the UK were identified. The primary interventions were heterogenous and included: pain science education (2), cognitive behavioural therapy (2), transcranial magnetic stimulation (1), balneotherapy (1), extracorporeal shockwave therapy (1), transcutaneous electrical nerve stimulation (1) wool therapy (1), exercise & patient dialogues (1) and aromatherapy massage & reflexology (1).

The search strategy did not identify studies where the primary intervention was physical therapy despite being recommended for chronic pain (4, 20, 21).

There were large differences in the timing of follow-up data collection, ranging from 1 week to 12 months (19, 22). The follow-up timings of the 9 studies completed in Turkey ranged from 6 weeks (23, 24) to 6 months (25). This compared with a range of 4 weeks to 12 months in the studies completed outside of Turkey (22, 26).

All studies were conducted within a quantitative research paradigm including nine randomised controlled trials (RCT's). There were large differences in location of pain and outcome measures used.

Author & year	Context (city, country)	Study design / research paradigm	Study population (age, condition)	Sample size	Modality / intervention	Control	Outcome measures	Key findings
Bursali et al 2021	Istanbul, Turkey	Randomised, prospective, double-blind, placebo-controlled trial Quantitative	Aged 18-65 Failed back surgery syndrome (FBSS)	23 initially allocated 3 dropouts	Repetitive transcranial magnetic stimulation (r-TMS)	Sham (sound recording during application)	Visual analogue scale (VAS) low back & leg pain at rest, activity and sleep disturbance Owestry Disability Index (ODI); functional status Douleur Neuropathique en 4 Questions (DN4); neuropathic pain Pittsburgh Sleep Quality Index (PSQI); sleep quality Beck Depression Inventory (BDI); presence and severity of depressive symptoms	Statistically significant different ($p<0.05$) • Pain with activity VAS day 5 ($p=0.026$), day 10 ($p=0.016$) and 1 month after treatment ($p=0.04$) • DN4 day 10 ($p=0.039$), 1 month ($p=0.030$) • ODI day 10 ($p=0.035$) • PSQI day 10 ($p=0.019$) • BDI day 10 ($p=0.009$), 1 month ($p=0.017$) and 3 month ($p=0.044$) *only BDI maintained a SSD at 3 months
Orhan et al 2021	Ghent, Belgium	Randomised control trial Quantitative	Aged 18-65 CLBP	29 attended at least 1 session 4 dropouts from both groups	Culture-sensitive PNE in Turkish (csPNE)	Standard translated PNE in Turkish (sPNE)	Primary Revised Neurophysiology of Pain Questionnaire (r-NPQ); knowledge of pain Numerical Rating of Pain Scale (NRS); pain intensity Roland-Morris Disability Questionnaire (RMDQ); perceived disability	Both csPNE and sPNE programmes resulted in improvements in knowledge of pain, pain intensity, perceived disability and pain cognitions however the improvements were not statistically different between groups
Saracoglu et al 2021	Kutahya, Turkey	Single-center, prospective, assessor-blinded, randomized controlled trial	Age ≥18 FMS	40 randomised 4 dropouts	Pain neuroscience education (PNE)	Usual treatment – pharmacological therapy	Primary - Fibromyalgia Impact Questionnaire (FIQ); functional status. Minimal clinical important difference (MCID) = 14% or 8.1-point improvement	Baseline -> week 6 and baseline -> week 12 - statistical ($p<0.001$) and clinical (>8.1 points) improvement in PNE group compared with only statistical improvement ($p<0.001$) in the control

		12-week follow up period Quantitative						PNE significantly greater improvement in mean total score (p=0.001) and had a large effect size
Özkuk & Ates 2020	Bolu, Turkey	Prospective randomized controlled, single-blinded Quantitative	Aged 30-65 Chronic shoulder pain >3 months	60 randomised 2 dropouts	Balneotherapy (BT) + physical therapy (PT)	Physical therapy (PT)	Visual Analogue Scale (VAS); pain Shoulder Pain & Disability Index (SPADI); pain and disability Nottingham Health Profile (NHP); general quality-of-life	PT groups physical activity baseline was significantly lower than the BT group SPADI - statistically significant improvements in the BT group at week 3 (p<0.001) and week 7 (p<0.001) VAS - statistically significant improvements in the BT group at week 3 (p=0.002) and week 7 (p<0.001) NHP - statistically significant improvement in the BT group in the energy (p=0.001) and pain (p=0.027) subscales post intervention (week 3) and the pain (p=0.003) physical activity (p<0.001) and sleep (p=0.008) subscales 1 month post-intervention (week 7)
Çelik et al 2020	Bursa, Turkey	Prospective, randomized, placebo-controlled, double-blind study Quantitative	Aged 18-65 CLBP > 3 months	50 randomised, 25 in each group 5 dropouts	Extracorporeal Shock Wave Therapy (ESWT)	Placebo-ESWT	Numerical Rating Scale (NRS); pain Oswestry Disability Index (ODI); disability / daily activities Hospital Anxiety & Depression Scale (HADS); risk of anxiety and depression Short Form-36 (SF-36); quality of life	ESWT - statistically significant improvement found in all parameters of NRS (p= <.001), ODI (p= <.001), HADS anxiety (p= <.001 / <.001), HADS depression (p= <.001 / .003), and SF-36 except for emotional role at week 6 (p= .102) and week 12 (p= .194) Placebo-ESWT • Week 6 - statistically significant improvement was found in all parameters of NRS (p= .003 / .002), and ODI (p= .035). SF-36

								statistically significant difference in pain (p=.011), general health (p=.049), vitality (p= .0.44), and physical coping (p= .026) • Week 12 - statistically significant improvement in NRS (p= .002), but not in ODI (p=.108) or HADS (p= .317 / .329). SF-36 statistically significant difference physical function (p= .030), pain (p= .006), and physical component score (p= .001) •
Onur et al 2019	Istanbul, Turkey	Open/pilot trial Quantitative	Aged 18-65 Refractory chronic migraine	35 presented during the study period 21 ineligible 14 included in the study	1-2 sessions of history taking / examinations 12 x 40-minute CBT interviews	No control group	Hamilton depression & anxiety rating scale (HADS); severity of depression / anxiety Visual analogue scale (VAS); pain intensity Midas migraine disability assessment questionnaire (MIDAS); migraine-related disability	HADS - statistically significant decrease in HADS depression ($p < 0.0001$) and HADS anxiety ($p < 0.0001$) scores after CBT VAS - statistically significant decrease after CBT ($p < 0.0001$) Frequency of migraine attacks - statistically significant reduction after CBT ($p < 0.0001$) MIDAS - significant decrease after CBT ($p = 0.012$)
Martimbianco et al 2019	6/7 single centre trials in Turkey, Jordan & China 1/7multicentre study in Turkey	Review Quantitative	Adults ≥ 18 Chronic neck pain	651 participants	Transcutaneous electrical nerve stimulations (TENS)	Various controls used	Pain n=7 Disability n=3 Use of medication for pain n=3 Range of motion n=3 Work disability n=1 Quality of life n=1	Based on the GRADE approach, there was very low-certainty evidence about the effects of TENS when compared to sham TENS: uncertain difference in pain at short-term (immediately after 10 sessions of 30 minutes or one week after a single-session of 60 minutes) follow-up. None of the included studies that assessed this comparison reported on disability or adverse events

Metin & Ozdemir 2016	Turkey	Randomized controlled trial Quantitative	Aged ≥18 RA	54 randomized Aromatherapy = 19. n=2 dropouts (lost to follow up) Reflexology = 18. n=1 drop out Control = 17. No drop outs	Aromatherapy massage & reflexology	No intervention	Disease Activity Score (DAS28); RA disease activity Visual Analogue Scale (VAS); pain Fatigue Severity Scale (FSS); effect of fatigue on daily living	Statistically significant (p <.05) decrease in VAS & FSS in interventions groups compared with the control Aromatherapy massage significant decreased VAS from week 2, reflexology from week 1 Aromatherapy massage significantly reduced fatigue scores beginning of week 4, reflexology from week 1 Pain scores significantly lower each week (apart from week 4) in the reflexology group compared with the aromatherapy massage group Fatigue scores were significantly lower in all weeks in the reflexology group compared with the aromatherapy massage group
Sleptsova et al 2013	Basel region, Switzerland	Randomised controlled intervention trial Quantitative	Aged 20-65 Chronic pain	158 eligible participants, 146 enrolled, 116 randomised Drop-out rate CsCBT 29%, CsET 37% 87 included in the analysis of baseline and post-treatment effects	Culturally sensitive cognitive-behavioural therapy (CsCBT)	Culturally sensitive exercise treatment (CsET)	Turkish translation of Short Form 36 (SF-36); physical functioning, mental health and quality of life General Health Questionnaire (GHQ); depression Validated Turkish version of the Pain Disability Index (PDI); disability Healthcare utilisation costs 3 months pre/post intervention Revised semi structured Interview of Clinical Symptoms (SICS-R); pain	No significant or clinically relevant improvement at the 12month follow up in any of the major outcomes Modest beneficial effects of two SF-36 scales, assessed directly after treatment, were no longer found 12 months later Healthcare costs remained unchanged from before to after therapy Anecdotal acceptance of the intervention Long-term interventions of a behavioural nature feasible

				78 completed 12-month follow analysis			history, symptoms and cognitive/emotional aspects that influence pain Pain drawings Visual Analogue Scale (VAS); pain	
Kiyak 2009	Ankara, Turkey	Two group experimental study design Quantitative	Aged >18 FMS	50 participants randomised into 2 groups 25 in each group	Wool therapy - wool underwear, wool bed liner, wool quilt and pillow	Same as intervention group but synthetic / cotton material	Visual analogue scale (VAS); pain Fibromyalgia impact questionnaire (FIQ); daily activity and presence of symptoms of FMS Tender point count	Post-test scores were significantly better in the treatment group for FIQ, VAS and tender point score ($p<0.001$) Number of days the control groups used analgesics and/or NSAID drugs was higher in the control group ($p<0.001$) Participants in the treatment group experienced a significant reduction on the symptoms of FMS determined by pain level, tender point cunt and FIQ ($p<0.001$ all cases)
Löfvander et al 1997	Stockholm, Sweden	Randomised clinical trial Quantitative	Aged 25-45 On sick leave >6 weeks	60 randomised to groups A & B 52 attended first assessment, 8 dropouts 45 competed the study, 5 dropouts	Daily 1 hour 'all-round physical training and stretching programme' 4 x 45 min patient-doctor dialogues focused on ideas of pain	Daily 1 hour 'all-round physical training and stretching programme'	Diagnostic and Statistical Manual of Mental Disorders, Third Revised Edition (DSM-III-R); psychiatric disorders, severity of psychosocial stressors, pain anxiety University of Alabama in Birmingham scale (UAB); pain behaviour Participants / doctor rated functional ability in relation to occupational duties (work ability) Local health insurance office supplied information	At second assessment, the number of improved participants in one or a combination of the variables (diagnosed depressive mood, reported pain anxiety or self-rated work ability) were 18 in group A and 7 in group B ($p<0.01$)

							on sick leave status at 3 and 8 months following the study	

Table 1: summary of study-specific data extraction table

Country	Research paradigm	Study design	Participant characteristics		Location of pain	Primary intervention	Outcome measures (primary / secondary)
			Age	Gender			
Turkey n=9	Quantitative n=13	Randomised controlled trial n=9	Upper age limit 65 n=7	Mixed n=11	Back only n=3	Pain neuroscience education (PNE) n=2	Pain (VAS/NRS/neuropathic) n=10
Belgium n=1		Two group experimental n=1	No upper age limit n=4	Female only n=2	Fibromyalgia n=3	Cognitive behavioural therapy n=2	Condition-specific n=8
Switzerland n=1		Open / pilot n=1	≤45 n=1*		Migraines n=1	Transcranial magnetic stimulation (r-TMS) n=1	Quality of life n=3
Sweden n=1		Review n=1	None provided n=1		Neck only n=1	Balneotherapy n=1	Cognitive (depression, anxiety) n=5
Combination (China, Jordan, Turkey) n=1		Not stated n=1			Shoulder only n=1	Extracorporeal shockwave therapy (ESWT) n=1	Tender point count n=1
					Back and knee n=1	Transcutaneous electrical nerve stimulation (TENS) n=1	Kinesiophobia n=2
					Rheumatoid arthritis n=1	Music therapy n=1	Pain behaviour (including catastrophising) n=2
					Mixed (chronic pain) n=1	Wool n=1	Fatigue n=1
					Not stated (participants on sick leave)n=1	Acupuncture n=1	Sleep n=1
						Exercise +/- patient-doctor dialogues n=1	Occupational (functional work ability / work disability) n=1
						Aromatherapy massage & reflexology n=1	Disability n=1 (often included in condition specific measures e.g. ODI / RMD)

							Pain beliefs n=1
							Healthcare utilisation n=1
							Knowledge of pain n=1
							General health n=1
							Pain drawings n=1
							Pain pressure threshold n=1
							Review • Pain n=7 • Disability n=3 • Use of medication for pain n=3 • Range of motion n=3 • Work disability n=1 • Quality of life n=1

*inclusion criteria 16-45 but age range within study 25-45

Table 2: frequency counts for study-specific data extraction concepts

Discussion

This review aimed to map and summarise the published literature on non-pharmacological and non-invasive pain management interventions available for individuals from Turkish-ethnic groups with non-malignant chronic pain on the MEDLINE database. There were large differences in intervention type, the timing of follow-up data collection and study location but all studies were conducted within a quantitative research paradigm.

Our review did not identify any studies describing the experiences of individuals from Turkish-speaking ethnic groups living with or receiving treatment for chronic pain. In addition, all the studies were conducted outside the UK. As a result, little is known about their experiences of living with or receiving treatment for chronic pain in the UK. Bull, Young (27) discusses the difficulty of delivering PMPs in different languages without meaningful qualitative evaluation focusing on ethnic minorities within NHS services. Given the large Turkish-speaking population in parts of England and the UK, this warrants further investigation.

Whilst difficult to draw conclusions on why all the studies identified in this review were quantitative, this may reflect historical biases towards quantitative methodologies and RCT's within evidence based medicine, a position which has been critiqued (28). It may also reflect a broader underrepresentation of qualitative research methods within pain literature (29).

The value of qualitative research in highlighting contextual factors and their importance in complex intervention design has been well documented (9, 10, 11, 12, 30, 31, 32). There is a current lack of evidence addressing the effectiveness of pain management in people from culturally and linguistically diverse backgrounds (27). Furthermore, PMPs were developed and evaluated with white, western, English-speaking individuals and may not be directly transferable across different cultures and ethnicities (33). Therefore, it is unclear whether PMPs represent the most effective and efficacious intervention for individuals from Turkish-speaking ethnic groups living in the UK.

The search strategy was not exhaustive, focusing only on published literature from the MEDLINE database, without explicitly searching for exercise despite being recommended for chronic pain (4, 20). The failure to identify studies where exercise was the primary intervention may be because specific interventions were not included in the search strategy which was intentional. The search strategy was kept broad to reduce the chance of unknowingly omitting interventions. We believed this would have been more likely if we had attempted to disaggregate all known non-invasive and non-pharmacological chronic pain interventions for inclusion in the search strategy.

Only English language studies were included and no individuals from Turkish-speaking ethnic groups were consulted as part of the review. This reflected the practicalities and costs associated with translation and limited time available to DN as part of the internship scheme outlined below.

Finally, a protocol was not pre-registered increasing risk of bias. These pragmatic decisions reflected the limited time and resources available to DN.

Little is known about the experiences of Turkish speaking ethnic groups with non-malignant chronic pain living with or receiving treatment for chronic pain in the UK. Intervention heterogeneity, exclusively quantitative methodology and absence of studies completed in the UK meant no conclusions could be made on what represents the most appropriate non-pharmacological and non-invasive intervention for individuals from. Future research may choose to prioritise areas such as better understanding cultural beliefs about pain and expectations around treatment to inform decisions around intervention development.

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Appendix

Appendix 1: MEDLINE (OVID) search strategy

1.	exp Chronic Pain/
2.	exp Pain, Intractable/
3.	"pain* syndrome*".mp
4.	(pain* adj3 syndrome*).mp.
5.	exp Fibromyalgia/
6.	fibromyalgia.mp
7.	(chronic adj3 pain*).mp.
8.	(intract* adj3 pain*).mp.
9.	(persist* adj3 pain*).mp.
10.	(long* adj3 pain*).mp.
11.	(prolong* adj3 pain*).mp.
12.	(sustain* adj3 pain*).mp.
13.	(refractory adj3 pain*).mp.
14.	"chronic primary pain*".mp.
15.	(linger* adj3 pain*).mp.
16.	exp Ethnicity/
17.	ethnicity.mp.
18.	exp Minority Groups/
19.	minority groups.mp.
20.	exp "Emigration and Immigration"/
21.	exp "Emigrants and Immigrants"/
22.	Kurd*.mp.
23.	Turk*.mp.
24.	(Turk* adj3 Cyp*).mp.
25.	(Turk* adj3 population*).mp.
26.	(Turk* adj2 cyp* adj2 population*).mp.
27.	(Kurd* adj3 population*).mp.
28.	(Turk* adj3 language*).mp.
29.	(Turk* adj2 speak* adj2 communit*).mp.
30.	(Turk* adj2 cyp* adj2 communit*).mp.
31.	(Kurd* adj3 communit*).mp.
32.	(Turk* adj 3 born).mp.
33.	(Turk* adj2 cyp* adj2 born).mp.
34.	(Kurd* adj3 born).mp.
35.	(Turk* adj3 immigrant*).mp.
36.	(Turk* adj2 cyp* adj2 immigrant*).mp.
37.	(Kurd* adj3 immigrant*).mp.
38.	(Turk* adj3 migrant*).mp.
39.	(Turk* adj2 cyp* adj2 migrant*).mp.
40.	(Kurd* adj3 migrant*).mp.
41.	(generation* adj3 Turk*).mp.
42.	(generation* adj3 Kurd*).mp.
43.	(generation* adj2 Turk* adj2 cyp*).mp.
44.	(Turk* adj3 communit*).mp.
45.	(Turk* adj3 diaspora*).mp.
46.	(Kurd* adj3 diaspora*).mp.
47.	(Turk* adj2 cyp* adj2 diaspora*).mp.
48.	(Turk* adj3 origin*).mp.
49.	(Turk* adj2 cyp* adj2 origin*).mp.

50.	(Kurd* adj3 origin*).mp.
51.	(Turk* adj3 speak*).mp.
52.	(Turk* adj3 patient*).mp.
53.	(Turk* adj2 cyp* adj2 patient*).mp.
54.	(Kurd* adj3 patient*).mp.
55.	"non English language concordance".mp.
56.	"culturally and linguistically diverse".mp.
57.	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15
58.	16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56
59.	57 and 58
60.	limit 59 to English language

Appendix 2: study specific data extraction table

Reference – number, study name, author(s)	Context	Study design	Study population (including pain characteristics)	Sample size	Modality / intervention	Control	Outcome measures	Key findings
1. Effectiveness of repetitive transcranial magnetic stimulation in patients with failed back surgery syndrome: A double-blind randomized placebo-controlled study Bursali et al 2021	The Physical Medicine and Rehabilitation Clinic of Istanbul Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Turkey	Randomised, prospective, double-blind, placebo-controlled trial Quantitative	Aged between 18-65 Failed back surgery syndrome (FBSS) Persistent back and leg pain with no neurological deficit at least 6-months post-lumbar surgery 70% female / 30% male in both groups	23 initially allocated 3 dropouts; n=2 not compatible to the assessment (r-TMS), n=1 discontinued treatment (sham)	Repetitive transcranial magnetic stimulation (r-TMS) Primary motor field targeted with 70% excitation intensity of resting threshold and r-TMS was applied for 5 sessions at 5-Hz of r-TMS for 20 minutes, daily, 5 days per week, 10 sessions in total	Sham - sound recording during application	Visual analogue scale (VAS) low back & leg pain at rest, activity and sleep disturbance Owestry Disability Index (ODI); functional status Douleur Neuropathique en 4 Questions (DN4); neuropathic pain Pittsburgh Sleep Quality Index (PSQI); sleep quality Beck Depression Inventory (BDI); presence and severity of depressive symptoms Measures performed at baseline, day 5 & 10 of treatment, and month 1 & 3 post treatment by the same 'physiatrist' blinded to the treatment protocol and randomisation	Statistically significant different ($p<0.05$) • Pain with activity VAS day 5 ($p=0.026$), day 10 ($p=0.016$) and 1 month after treatment ($p=0.04$) • DN4 day 10 ($p=0.039$), 1 month ($p=0.030$) • ODI day 10 ($p=0.035$) • PSQI day 10 ($p=0.019$) • BDI day 10 ($p=0.009$), 1 month ($p=0.017$) and 3 month ($p=0.044$) *only BDI maintained a SSD at 3 months
2. Culture-sensitive and standard pain neuroscience education	Private health centre in Ghent, Belgium	Randomised control trial Quantitative	First generation Turkish migrants, born in Turkey, who indicated Turkish as their native	29 attended at least 1 sessions (15 csPNE, 14 sPNE)	Culture-sensitive PNE in Turkish Gender specific material 2 one-on-one sessions, first	Standard translated PNE in Turkish 2 one-on-one sessions,	Primary • Revised Neurophysiology of Pain Questionnaire (r-NPQ); knowledge of pain • Numerical Rating of Pain Scale (NRS); pain intensity	Both csPNE and sPNE programmes resulted in improvements in knowledge of pain, pain intensity, perceived disability and pain cognitions however the improvements were not statistically different between groups

improves pain, disability, and pain cognitions in first-generation Turkish migrants with chronic low back pain: a pilot randomized controlled trial Orhan et al 2021			language with non-specific CLBP living in Belgium aged between 18-65 Diagnosed with non-specific CLBP by a clinician, experiencing pain for at least 3 month with a mean frequency of ≥3 or more days per week Male and female	4 dropouts from both groups	session 45-60 mins, 2nd session 45 mins Education, patient leaflet, Q&A	first session 45-60 mins, 2nd session 45 mins Education, patient leaflet, Q&A	• Roland-Morris Disability Questionnaire (RMDQ); perceived disability Secondary • Pain Beliefs Questionnaire (PBQ); pain cognitions • Pain Catastrophizing Questionnaire (PCS); pain catastrophisation • Tampa Scale for Kinesophobia (TSK); fear of movement Measures completed at baseline and weeks 1 & 4	
3. Pain neuroscience education combined with usual treatment for fibromyalgia syndrome: A randomized controlled trial Saracoglu et al 2021	Physical Therapy Department of Kutahya Health Sciences University Hospital, Kutahya, Turkey	Single-center, prospective, assessor-blinded, randomized controlled trial 12-week follow up period Quantitative	Age ≥18 Diagnosed with Fibromyalgia Syndrome (FMS) using the American College of Rheumatology (ACR) 2010/2016 guidelines Turkish native language Female only although unintended	40 randomised 4 dropouts; n=1 lost to follow up (PNE), n=3 lost to follow up (usual care)	Pain neuroscience education (PNE) = 6 x 40-45 minute group face-to-face sessions, 4-5 participants Encouraged to perform exercise and physical activity Usual treatment	Usual treatment – pharmacological therapy, instructed not to alter for the 12 weeks of the study	Primary • Fibromyalgia Impact Questionnaire (FIQ); functional status. Minimal clinical important difference (MCID) = 14% or 8.1-point improvement Secondary • Pain pressure threshold (PPT); bilateral 5cm left and right of the spinous processes of C7, T8, L3, wrist extensor muscle belly, middle phalanx 2nd finger, gastrocnemius muscle belly • Tampa Kinesophobia Scale (TSK); kinesiophobia. MCID 4.5 points	FIQ • Baseline -> week 6 and baseline -> week 12 - statistical ($p<0.001$) and clinical (>8.1 points) improvement in PNE group compared with only statistical improvement ($p<0.001$) in the control • PNE significantly greater improvement in mean total score ($p=0.001$) and had a large effect size PPT • PNE – statistical improvement ($p<0.05$) in all measures baseline -> week 6 and baseline -> week 12 • Control – statistical improvement ($p>0.05$) only in the cervical region

							FIQ, TSK, PPT completed at baseline, after treatment (week 6) and 12 week follow up Compliance with home exercise programme was evaluated after treatment (week 6)	(baseline -> week 6) and lumbar region (baseline -> week 12) • PNE had significantly greater improvement of all regions (p<0.05) except the hand, and the effect sizes ranged from moderate to large TSK • PME – statistical (p<0.001) and clinical (>4.5 points) improvement baseline -> week 6 and baseline -> week 12 • Control - statistical (p<0.001) improvement baseline -> week 6 and baseline -> week 12 • PNE had significantly greater improvement in mean total score (p=0.001) and had a large effect size
4. Balneotherapy in the Treatment of Chronic Shoulder Pain: A Randomized Controlled Clinical Trial Özkuk & Ates 2020	Outpatient clinic, department of Medical Ecology and Hydroclimatology, Bolu, Izzet Baysal Physical Medicine and Rehabilitation Training and Research	Prospective randomized controlled, single-blinded Quantitative	Aged 30-65 Chronic shoulder pain >3 months Full active / passive range of motion (ROM) Pain associated with biceps tendinitis, impingement syndrome or	60 randomised 2 dropouts; n=2 discontinued the intervention (PT)	Balneotherapy (BT) + physical therapy (PT) BT – 15 x 20-minute sessions, 5 x weekly, water at 38-40 degrees Completed prior to PT, 40 minute break between interventions See next column	Physical therapy (PT) Hot-pack therapy (45 degrees) & transcutaneous electrical nerve stimulation (TENS), 15 x 20-minute session, 5 x weekly	Visual Analogue Scale (VAS); pain Shoulder Pain & Disability Index (SPADI); pain and disability Nottingham Health Profile (NHP); general quality-of-life Measures completed baseline, post-intervention (3 weeks) and 1 month post-intervention (7 weeks)	PT groups physical activity baseline was significantly lower than the BT group SPADI • statistically significant improvements in the BT group at week 3 (p<0.001) and week 7 (p<0.001) VAS • Statistically significant improvements in the BT group at week 3 (p=0.002) and week 7 (p<0.001) NHP

	Hospital (Bolu, Turkey)		rotator cuff disease 22 females in both groups, 6 males in the physical therapy (PT) group, 8 in the balneotherapy			Exercise programme – 3 weeks pendulum and passive ROM exercises, pain-free. 4 weeks stretching and strengthening, 5 repeats, 2 x daily		• Statistically significant improvement in the BT group in the energy (p=0.001) and pain (p=0.027) subscales post intervention (week 3) and the pain (p=0.003) physical activity (p<0.001) and sleep (p=0.008) subscales 1 month post-intervention (week 7)
5. The Effects Of Extracorporeal Shock Wave Therapy On Pain, Disability And Life Quality Of Chronic Low Back Pain Patients Çelik et al 2020	University of Health Sciences, Burse Yuksek Ihtisas Training and Research Hospital, Department of Physical Medicine and Rehabilitation (Bursa, Turkey) *additional details not available	Prospective, randomized, placebo-controlled, double-blind study Quantitative	Aged 18-65 Chronic low back pain for > 3 months History of physical therapy and/or spinal injection for low-back pain within the last 3 months Interventional group – 40/60% female/male Control group 60/40% female/male	50 randomised, 25 in each group 5 dropouts. n=5 from the placebo ESWT group due to private reason s	Extracorporeal Shock Wave Therapy (ESWT) – 12 x 20-minute sessions over 6 weeks Applied to the lumbar region, mean 1500 shock waves, frequency of 2.5 Hz, energy level pf 0.12 mJ/mm2 No analgesics except for paracetamol were given to the patients throughout the study period	Placebo-ESWT – 12 x 20-minute sessions over 6 weeks Applied to the lumbar region, energy level of 0.08 mJ/mm2	Numerical Rating Scale (NRS); pain Oswestry Disability Index (ODI); disability / daily activities Hospital Anxiety & Depression Scale (HADS); risk of anxiety and depression Short Form-36 (SF-36); quality of life Measures completed at baseline, end of treatment (week 6) and 12 weeks	ESWT - statistically significant improvement found in all parameters of NRS (p= <.001), ODI (p= <.001), HADS anxiety (p= <.001 / <.001), HADS depression (p= <.001 / .003), and SF-36 except for emotional role at week 6 (p= .102) and week 12 (p= .194) Placebo-ESWT • Week 6 - statistically significant improvement was found in all parameters of NRS (p= .003 / .002), and ODI (p= .035). SF-36 statistically significant difference in pain (p=.011), general health (p=.049), vitality (p= .0.44), and physical coping (p= .026) • Week 12 - statistically significant improvement in

								NRS (p= .002), but not in ODI (p=.108) or HADS (p= .317 / .329). SF-36 statistically significant difference physical function (p= .030), pain (p= .006), and physical component score (p= .001)
6. An open/pilot trial of cognitive behavioural therapy in Turkish patients with refractory chronic migraine Onur et al 2019	Psychiatry clinics, department of Psychiatry, Bakirkoy Research and Training Hospital for Psychiatry Neurology and Neurosurgery (Istanbul, Turkey)	Open/pilot trial Quantitative	Aged between 18 and 65 Fulfilled the International classification of headache disorders (2013 ICHD-III beta version) criteria for chronic migraine + American Headache Society (AHS) suggestions for 'refractory chronic migraine' Normal physical and neurological examination Sufficient language competence and intelligence Male and female	35 presented during the study period. 21 ineligible: Unable to attend regularly (n=6); alcohol abuse (n=6); lacking mental capacity (n=3); insufficient language skills (n=1); excluded as did not regularly (n=5) 14 included in the study	1-2 sessions of history taking / examinations 12 x 40-minute CBT interviews	No control group	Hamilton depression & anxiety rating scale (HADS); severity of depression / anxiety Visual analogue scale (VAS); pain intensity Midas migraine disability assessment questionnaire (MIDAS); migraine-related disability Measures completed prior to and 6 months after therapy Post treatment measures conducted by a physician blinded to the treatment protocol	HADS • Statistically significant decrease in HADS depression ($p < 0.0001$) and HADS anxiety ($p < 0.0001$) scores after CBT VAS • Statistically significant decrease after CBT ($p < 0.0001$) Frequency of migraine attacks - statistically significant reduction after CBT ($p < 0.0001$) MIDAS • Significant decrease after CBT ($p = 0.012$)

7. Transcutaneous electrical nerve stimulation (TENS) for chronic neck pain (Review) Martimbianco et al 2019	6/7 single centre trials carried out in Turkey, Jordan and China 1/7 was a multicentre study completed in Turkey	Review (split from a Cochrane Review on electrotherapy on electrotherapy for neck pain) of randomised controlled trials with parallel design Quantitative	Adults ≥ 18 years of age with chronic neck pain lasting longer than 12 weeks. Included: neck pain without specific cause, whiplash-associated disorder category 1 and II, myofascial pain syndrome in the upper trapezius muscle and neck pain with degenerative changes -Cervicogenic headaches -Neck disorders with radicular findings including degenerative joint or disc disease with degenerative disease with spinal stenosis, spondylolisthesis, or discogenic radiculopathy; WAD category III	651 participants	Mode - all studies used conventional TENS One study used burst TENS / acupuncture-like TENS (TENS applied over acupuncture points) Duration of sessions (minutes) • 5 x 15-30 • 1 x 20-30 • 1 x 60 Number of sessions • 5 x 10-15 • 1 x single session • 1 x 60 Duration of treatment programmes • 1 x 1 day • 1 x 2 weeks • 1 x 3 weeks • 3 x 4 weeks • 1 x 6 weeks	Different controls used: • Sham TENS x n=2 • Neck exercises n=2 • Kinesio-taping n=1 • Manipulation treatment n=1 • Low-level laser n=1 • Lidocaine injection 2mL n= 1 • Botulinum toxin-A injection 25 U n=1	Pain n=7 Disability n=3 Use of medication for pain n=3 Range of motion n=3 Work disability n=1 Quality of life n=1 Follow-up ranged from 1 week to 6 months	Based on the GRADE approach, there was very low-certainty evidence about the effects of TENS when compared to sham TENS: uncertain difference in pain at short-term (immediately after 10 sessions of 30 minutes or one week after a single-session of 60 minutes) follow-up. None of the included studies that assessed this comparison reported on disability or adverse events

			Male and female					
8. The Effects of Aromatherapy Massage and Reflexology on Pain and Fatigue in Patients with Rheumatoid Arthritis: A Randomized Controlled Trial Metin & Ozdemir 2016	Convenience sample from a rheumatology clinic in a university hospital located in a large city in Turkey	Randomized controlled trial Quantitative	Aged ≥18 Suffered from pain (VAS ≥4) and fatigue (Fatigue Severity Score ≥4) Diagnosed with rheumatoid arthritis (RA) for at least 1 year Not receiving complementary therapy, biological drug therapy or physiotherapy Male and female *2 males in each group only	54 randomized Aromatherapy = 19. n=2 dropouts (lost to follow up) Reflexology = 18. n=1 drop out (moved) Control = 17. No drop outs	Both aromatherapy massage and reflexology interventions were performed at home, in quiet room, convenient time. Continued their routine RA treatments but asked not to take analgesic drugs on the intervention days Aromatherapy massage – 3 x 30 minutes sessions (15 minutes on each knee) over 6 weeks Reflexology – 1 x 40-minute sessions (20 minutes on each foot) over 6 weeks	No intervention – weekly calls were made by the principal investigator to obtain VAS and FSS sores during the study period	Disease Activity Score (DAS28); RA disease activity Visual Analogue Scale (VAS); pain Fatigue Severity Scale (FSS); effect of fatigue on daily living VAS & FSS completed baseline and weekly from week 1 - 6	Statistically significant (p <.05) decrease in VAS & FSS in interventions groups compared with the control Aromatherapy massage significant decreased VAS from week 2, reflexology from week 1 Aromatherapy massage significantly reduced fatigue scores beginning of week 4, reflexology from week 1 Pain scores significantly lower each week (apart from week 4) in the reflexology group compared with the aromatherapy massage group Fatigue scores were significantly lower in all weeks in the reflexology group compared with the aromatherapy massage group
9. Culturally sensitive group therapy for Turkish patients suffering from	Referrals by general practitioners (GPs), outpatient unit of the host hospital or other clinics	Randomised controlled intervention trial Quantitative	First-generation Turkish immigrants in Switzerland suffering from chronic pain, aged between 20-65	158 eligible patients 146 patients enrolled 116 patients	Culturally sensitive cognitive-behavioural therapy (CsCBT) 25 x 90 minutes sessions within a 6-month period	Culturally sensitive exercise treatment (CsET) 25 x 90 minutes sessions	Turkish translation of Short Form 36 (SF-36); physical functioning, mental health and quality of life General Health Questionnaire (GHQ); depression	No significant or clinically relevant improvement at the 12month follow up in any of the major outcomes Modest beneficial effects of two SF-36 scales, assessed directly after treatment, were no longer found 12 months later

chronic pain: a randomised controlled intervention trial Sleptsova et al 2013	in Basel or the region Department of Psychosomatic Medicine University Hospital, Basel, Switzerland		Defined in accordance with the German version of the International Classification for Diseases (IHD) 10 Severe and distressing pain > 6 months duration which could not be fully explained by a physiological process or physical disorder Male and female	completed the pre-trial assessment, were eligible, consented and were randomised Drop-out rate 29% (CsCBT) 37% (CsET) Refused therapt 6% (CsCBT) 15% (CsET) 87 completed intervention and were included in the analysis of baseline and post-treatment effects 78 completed 12-month follow analysis	Adapted CBT group treatment programme for chronic pain with culturally sensitive, migration-specific elements Male/female separated Co-led by psychologist and physiotherapist and delivered in Turkish via an interpreter	withing a 6-month period Based on exercise therapy for treatment of non-specific low back pain Male/female separated Conducted by a German-speaking physiotherapist in Turkish via an interpreter	Validated Turkish version of the Pain Disability Index (PDI); disability Healthcare utilisation costs for 3 months pre/post intervention calculated by Swiss insurance companies Revised semi structured Interview of Clinical Symptoms (SICS-R); pain history, symptoms and cognitive/emotional aspects that influence pain Pain drawings; quantitative recording of pain distribution Visual Analogue Scale (VAS); pain Measures completed at baseline, post-treatment (6-month) and 12-months	Healthcare costs remained unchanged from before to after therapy Anecdotal acceptance of the intervention Long-term interventions of a behavioural nature feasible
10. A New Nonpharmacological Method In Fibromyalgi	Participants who applied to an outpatient clinic	Two group experimental study design	Diagnosed with Fibromyalgia (FM) using the ACR criteria	50 participants randomised into 2 groups	Provided with wool underwear, wool bed liner, wool quilt and pillow. Author	Same as intervention group but synthetic / cotton material	Visual analogue scale (VAS); pain Fibromyalgia impact questionnaire (FIQ); daily	Post-test scores were significantly better in the treatment group for FIQ, VAS and tender point score ($p<0.001$)

a: The Use of Wool Kiyak 2009	specialising in physical treatment and rehabilitation in Ankara, Turkey	Quantitative	Aged >18 No previous use of wool Had not received regular physical treatment for 2 months prior to the study All female *patients were selected for the study prior to randomisation	25 in each group	made the bed for each patient Instructed and expected to use the wool materials for the duration of the study, wearing the underwear constantly and keep track of their daily use of medications using a yes/no checklist Author visited on a weekly basis to assess compliance Treatment materials provided day after pre-test measures	Treatment materials provided day after pre-test measures	activity and presence of symptoms of FMS Tender point count Pre-test and post-test (6 weeks)	Number of days the control groups used analgesics and/or NSAID drugs was higher in the control group ($p<0.001$) Patients in the treatment group experienced a significant reduction on the symptoms of FMS determined by pain level, tender point cunt and FIQ ($p<0.001$ all cases)
11. Rehabilitation of young immigrants in primary care a comparison between tow treatment models Löfvander et al 1997	Primary health care centre, Stockholm, Sweden	Randomised clinical trial Quantitative	Local health insurance office compiled a list of all persons ≤45 years of age on sick leave >6 weeks Eligible persons were asked to enter a rehabilitation programme Participants aged between 25-45	60 randomised to groups A & B 52 attended first assessment. 8 dropouts; return to work (n=3) and abstained (n=5) 45 competed the study. 5	Daily 1 hour 'all-round physical training and stretching programme' supervised by a physiotherapist 4 x 45 min patient-doctor dialogues focused on ideas of pain	Daily 1 hour 'all-round physical training and stretching programme' supervised by a physiotherapist 1 x 20-30 minute return visit to doctor for support,	MSK physical examination 28 days apart Criteria from the Diagnostic and Statistical Manual of Mental Disorders, Third Revised Edition (DSM-III-R); diagnose psychiatric disorders and assess severity of psychosocial stressors including pain anxiety University of Alabama in Birmingham scale (UAB); pain behaviour Participants / doctor rated functional ability in relation to	Physiotherapy • No significant relationship between the number of physiotherapy sessions and any measured or assessed variable Psychiatric disorders • Significant decrease in the number of depressed participants in group A compared with group B at the second assessment ($p<0.05$) Severity of psychosocial stressors

				dropouts; abstained (n=7) (30 women / 15 men) No significant differences in somatic diagnoses		new physical examination and reassurance	occupational duties (work ability) Above measures completed baseline and at 28 days Local health insurance office supplied information on sick leave status at 3 and 8 months following the study	• Significant decrease in participants reporting pain anxiety in group A compared with group B ($p<0.05$) Pain drawings • Majority of participants (n=11 group A. n=13 group B, reported much less extensive pain after the programme ($p<0.001$) Pain behaviour • The number of participants with pain behaviour decreased only a little Doctors' assessments of work ability • 4 particpants in group A / 0 in group B were assessed as having become obviously improved Participants assessments of work ability • There was a significant difference between groups A & B in the number of participants who assessed themselves as able to work at least part-time ($p=0.005$) Total improvement • At second assessment, the number of improved participants in one or a combination of the variables (diagnosed depressive mood, reported pain anxiety or self-rated

								work ability) were 18 in group A and 7 in group B ($p<0.01$)