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Cognitive Interventions and Nutritional Supplements (The CINS Trial)

A Randomized Controlled, Multicenter Trial Comparing a Brief Intervention With Additional Cognitive Behavioral Therapy, Seal Oil, and Soy Oil for Sick-Listed Low Back Pain Patients

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Study Design. A randomized controlled trial.

Objective. The aim of this study was to evaluate whether a tailored and manualized cognitive behavior therapy (CBT) or nutritional supplements of seal oil and soy oil had any additional benefits over a brief cognitive intervention (BI) on return to work (RTW).

Summary of Background Data. Brief intervention programs are clinically beneficial and cost-effective for patients with low back pain (LBP). CBT is recommended for LBP, but evidence on RTW is lacking. Seal oil has previously been shown to have a possible effect on muscle pain, but no randomized controlled trials have so far been carried out in LBP patients.

Methods. Four hundred thirteen adults aged 18 to 60 years were included. Participants were sick-listed 2 to 10 months due to LBP. Main outcome was objectively ascertained work participation at 12-month follow-up. Participants were randomly assigned to BI (n = 100), BI and CBT (n = 103), BI and seal oil (n = 105), or BI and soy oil (n = 105). BI is a two-session cognitive, clinical examination program followed by two booster sessions, while the CBT program is a tailored, individual, seven-session manual-based treatment.

Results. At 12-month follow-up, 60% of the participants in the BI group, 50% in the BI and CBT group, 51% in the BI and seal oil group, and 53% in the BI and soy oil group showed reduced sick leave from baseline, and had either partly or fully RTW. The differences between the groups were not statistically significant ($\chi^2 = 2.54$, $P = 0.47$). There were no significant differences between the treatment groups at any of the other follow-up assessments either, except for a significantly lower sick leave rate in the BI group than the other groups during the first 3 months of follow-up ($\chi^2 = 9.50$, $P = 0.02$).

Conclusion. CBT and seal oil had no additional benefits over a brief cognitive intervention on sick leave. The brief cognitive intervention alone was superior in facilitating a fast RTW.

Key words: absenteeism, brief intervention, chronic low back pain, cognitive behavior therapy, Oswestry, seal oil, sick leave.

Level of Evidence: 2

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Low back pain (LBP) is common in the general population and is the most expensive cause of work-related disability.[1,2] It is also the health condition that causes most years lived with disability.[3] In Norway, musculoskeletal disorders account for about 40% of the long-term sick leave, with LBP as the single most common diagnosis.[4]

Whether a LBP incident results in sick leave or not depends on complex individual, psychosocial, and work organizational factors.[2]

Brief intervention programs are considered clinically beneficial and cost-effective for patients with subacute LBP.[5] The prognosis for patients with LBP is good in the acute stage,[6] but poorer when the condition endures.[2,7–9] The treatment principles applied in the present study follow the evidence-based guidelines for the treatment of chronic LBP, developed in Europe.[10] The recommended treatments include conservative treatments such as cognitive behavior therapy (CBT) and brief educational interventions (BI). While the evidence points to these as effective treatments, many of the studies are at risk of bias,[11] and effect sizes are modest.[12]

Seal oil is a marine oil that is relatively rich in the omega-3 polyunsaturated fatty acids (PUFAs) eicosapentaenoic acid (EPA; 20:5n-3), docosapentaenoic acid (DPA; 22:5n-3), and docosahexaenoic acid (DHA, 22:6n-3). There is little scientific documentation of the medical effect of seal oil, apart from an indication of a positive effect on muscle pain.[13–16] A possible mechanism for these findings involve the effect of lowering the ratio of n-6 to n-3 PUFAs to suppress n-6 eicosanoids and proinflammatory cytokines, which may provide pain relief in chronic inflammatory disorders, as western diet is dominated by linoleic acid and arachidonic acid.[17] Given these preliminary findings, testing a possible effect of seal oil in LBP patients is an interesting experiment.

The Cognitive Interventions and Nutritional Supplements (CINS) trial was designed as a randomized controlled trial[18] to compare CBT when added to BI, with seal oil and soy oil when added to BI, with BI alone, in patients sick-listed for unspecific LBP.

MATERIALS AND METHODS

This was a four-arm, multicenter, randomized, double-blind, placebo-controlled trial conducted in Norway. The study took place at four different clinics from February 2008 to August 2010. The full protocol for the trial is published elsewhere.[18] The participants were randomized to BI only, BI and CBT, BI and seal oil, or BI and soy oil. For readability purposes, the four arms will be referred to as BI, CBT, seal oil, and soy oil hereon.

Recruitment Procedure

Eligible participants were aged 20 to 60 years and sick-listed 2 to 10 months for LBP. The Norwegian Labour and Welfare Administration sent a letter of invitation to eligible participants. Those who responded to the invitation (n = 2200) were screened by telephone and excluded if they did not fulfill the inclusion criteria or could not be reached (n = 1563). Eligible patients (n = 637) were referred to the clinic for inclusion in the trial.

Inclusion and Exclusion

Inclusion criteria required receiving at least 50% sickness compensation for one of the following International Classification of Primary Care (ICPC) diagnoses: L02 (back symptom/complaint), L03 (low back symptom/complaint), L84 (back syndrome without radiating pain), or L86 (back syndrome with radiating pain). Exclusion criteria were pregnancy, hemophilia, osteoporosis, recent back trauma, serious psychiatric disorders (using The Mini-International Neuropsychiatric Interview), not fluent in Norwegian, debilitating cardiovascular disease, anticoagulation treatment, and ongoing insurance issue for LBP or related conditions.

Interventions

Both BI and CBT followed detailed treatment manuals written for the trial. All CBT treatment sessions were audiotaped, and independent raters successively evaluated a random selection of the tapes using a modified Norwegian version of the Cognitive Therapy Adherence and Competence Scale (CTACS).[19] Fifteen percent of the sessions were double-rated by two experienced CBT therapists to test for inter-rater reliability.

BI is a brief cognitive, clinical examination program based on a noninjury model addressing pain and fear-avoidance, where return to normal activity and work is the main goal. BI also includes a follow-up session with a physiotherapist, involving an educational and a behavioral part. Patients were additionally offered two short booster sessions.

The CBT involved seven sessions of individual CBT over a period of 2 to 3 months. The CBT builds on the message contained in BI, where the aim was to help patients change cognitive and behavioral factors assumed to be partly responsible for the maintenance of symptoms and disability.

Patients randomized to nutritional supplements received commercially available seal or soy oil for the same duration as the CBT treatment, in a double-blind, randomized, controlled design. Oils were administered as 20 capsules daily. Testing of the oils before the intervention showed that vitamin A, that is, sum retinol (13-, 11-, 9-cis) and all trans retinol, that is, A_1 and 3,4 didehydro-all-trans retinol (A_2) in both oils were below 0.28 mg/kg. Vitamin D_3 content in daily soy oil and seal oil dosages were 1 and 0 μg, respectively. The antioxidant D-alpha-tocopherol was added in the case of seal oil, giving a vitamin E (alpha-tocopherol) content in seal oil and soy oil of 85.4 and 16.6 g/100 g, respectively. The seal oil contained 56.6 g/100 g monounsaturated fatty acids, which are less prone to lipid peroxidation than PUFAs, and the oil has no known major adverse effects.[15,16] Soy oil is common in the diet in the western world and is considered a placebo in this trial. Both oils were approved according to current legislations on contaminants and relevant quality standards.

Outcomes

The primary outcome was sick leave, obtained from national registry data at 12 months, which was operationalized as (1) transition from full-time sick leave to partial sick leave or full-time return to work (RTW), or (2)

transition from partial sick leave to a lower gradient of sick leave or full-time RTW.

Secondary outcome measures included Subjective Health Complaints (SHC),[20] Oswestry Disability Index to assess pain-related function,[21,22] and Hospital Anxiety and Depression Scale (HADS)[23] to assess psychological distress. In addition, back pain intensity over the last 14 days and pain during activity and rest over the last week (both measured on a numeric rating scale from 0 to 10) were used to measure pain complaints, and the health index from EQ5D was used to measure health-related quality of life.[24]

Sample Size

The sample size calculations were based on data from Hagen *et al*.[25] All calculations were based on a power of 80% and a significance level of 5%, and showed that the total number of participants needed was 97 in each treatment arm (N = 388). For details, see.[18]

Randomization and Blinding

Randomization and treatment allocation procedures were concealed and done according to a computer generated randomization list stratified by clinic and gender. A central telephone randomization system was used. At each of the participating clinics, a research assistant, not involved in the treatment, called the research unit to be informed about allocation. The allocation code, including details of block size, was not revealed to the researchers or the clinicians until recruitment, data collection, and laboratory analyses were complete. Block size varied between 8 and 24. For those participants allocated to nutritional supplementation, the clinics provided blinded boxes, containing capsules with either seal oil or soy oil. The capsules with placebo (soy oil) oil were matched to seal oil for taste, color, and size.

All researchers, clinicians, and participants were blinded to treatment allocation of individual participants for the nutritional supplements, and all researchers were blinded to group assignment.

Statistical Methods

The primary outcome was based on crude rates of participants with reduced sick leave in the four groups. For the secondary outcomes, we performed analyses with inverse probability weights[26] to account for possible attrition bias. Analyses adhered to the "intention-to-treat" principle. Per-protocol analyses were also performed.

According to the analysis plan,[18] Cox-proportional hazards models was intended used to measure the risk for transition between different states of disbursement. In addition, number needed to treat was planned to be assessed. However, both these analyses presuppose significant treatment effects, and were therefore not performed.

Sufficient adherence in the CBT treatment was defined as attending at least four out of seven sessions, or successful completion due to recovery and/or RTW. Adherence to the oils was measured through completed oil diaries and/or follow-up phone calls two and eight weeks after starting the treatment. Sufficient adherence was here defined as oral confirmation of compliance from the patients on the phone, or indications of full compliance, or only occasional omissions, from the diaries.

RESULTS

Of 637 patients screened for eligibility, 63 patients were not eligible and 160 patients were randomized to two other substudies that will be presented elsewhere. The 414 patients included in the CINS-trial were treated between February 2008 and August 2010. One patient was excluded after randomization due to serious psychopathology, leaving a total of 413 participants.

See Figure 1 for details about drop-out and loss to follow-up. All participants received and complied with the BI.

On the basis of diaries and the follow-up phone calls, the following side effects were reported: gastrointestinal discomfort, including regurgitation, nausea, flatulence, stomach ache, and discomfort (n = 30); difficulties swallowing the capsules (n = 11); and "other" side effects, including sleep problems, dizziness, weight gain, and itching (n = 7). No serious side effects were reported.

To assess care providers' adherence to the treatment manuals, an assessor evaluated every fifth BI and CBT session independently. The evaluations revealed overall high adherence to both interventions. The risk of contamination was accounted for by asking participants about cointerventions (for CBT) and diet (for oils), neither of which indicated any contamination of concern.

There was an equal gender distribution in patients referred and included in the trial. Mean age was 44.8 years, and the mean duration of back pain was 12.5 years (Table 1).

Participants' preferences were highest for CBT [n = 185 (56%)], followed by BI [n = 106 (35%)], seal oil [n = 70 (23%)], and soy oil [n = 27 (9%)].

Of the participants who responded to the self-reported question of treatment satisfaction (n = 217, 53%), most were satisfied (a little, some, or very satisfied) with the treatment they had received at 3 months follow-up (n = 135, 62%). The highest satisfaction was within the group receiving CBT, where 75% reported that they were somewhat or very satisfied, followed by 66% in seal oil, 55% in soy oil, and 52% in BI. Only 4% reported very low satisfaction with the treatment.

To test for blinding, participants were asked their best guess on what oil they had received. At 3 months follow-up, 41% of the participants who had received soy oil did not know what they had received, 21% guessed they had received soy oil, and 38% believed they had received seal oil. Forty-one percent of the participants who had received seal oil could not say which treatment they had received, 22% guessed they had received soy oil, and 37% guessed they had received seal oil. Blinding index in the seal oil group was 0.15; 95% confidence interval (CI), −0.04 to 0.35, while blinding index in the soy oil group was −0.16; 95% CI, −0.35 to 0.02.

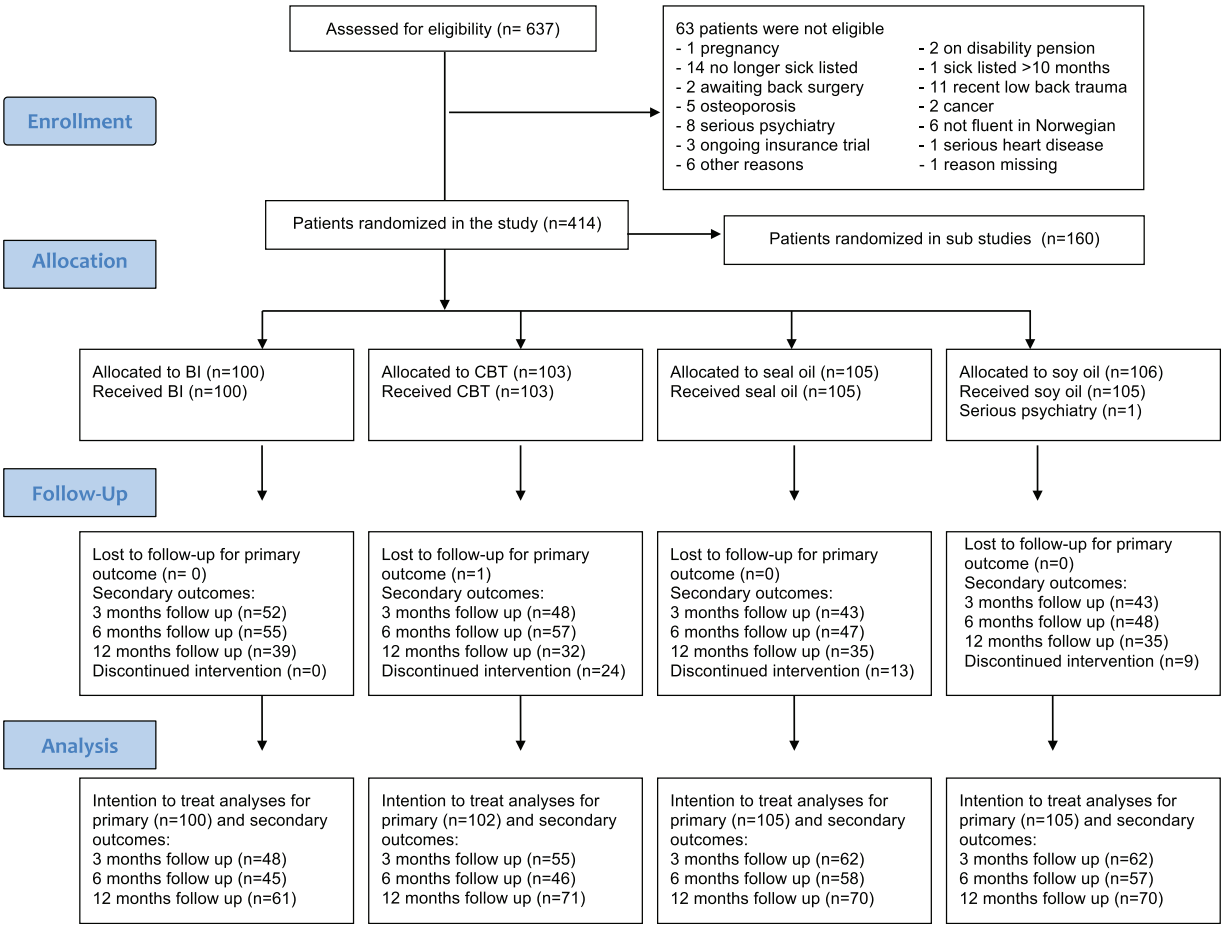

Figure 1. Flow chart.

TABLE 1. Baseline Characteristics of Participants (n = 413)

	BI (n = 100)	CBT (n = 103)	Seal Oil (n = 105)	Soy Oil (n = 105)	
Continuous Variables	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	***P***
Age	44.8 (9.7)	44.2 (8.8)	44.2 (10.3)	42.9 (9.7)	0.57
Duration of back pain (yrs)	12.5 (11.3)	10.1 (9.7)	10.0 (10.3)	10.9 (10.8)	0.37
Categorical variables	n (%)	n (%)	n (%)	n (%)	
Gender (women)	56 (56.0)	56 (54.4)	55 (52.4)	50 (47.6)	0.65
Civil status					
Married/cohabitant	71 (73.9)	70 (70.0)	74 (73.3)	76 (74.4)	
Single/widow/ divorced	25 (26.1)	30 (30.0)	27 (26.7)	26 (25.6)	0.89
Education					
Primary school (1–12 yrs)	60 (63.2)	62 (62.6)	68 (68.0)	61 (59.8)	
University/college	29 (30.5)	32 (32.3)	27 (27.0)	32 (31.4)	
Other	6 (6.3)	5 (5.1)	5 (5.0)	9 (8.8)	0.85
HADS					
Depression (score ≥8)	15 (15.5)	13 (13.1)	17 (16.8)	18 (17.6)	0.83
Anxiety (score ≥8)	17 (17.5)	16 (16.2)	23 (22.8)	25 (24.5)	0.39

TABLE 2. Differences in Proportions Between the Four Treatment Groups in Increased RTW at Each Month of Follow-up up Until 12 mo

ITT (Intention-to-treat), mo	BI		BI and CBT		BI and Seal Oil		BI and Soy Oil		χ^2	df	*P*
	#	%	#	%	#	%	#	%			
0–1	36	36	18	18	14	13	23	22	17.23	3	**<0.01**
0–2	49	49	40	39	31	30	38	36	8.48	3	**0.04**
0–3	60	60	47	46	43	41	44	42	9.50	3	**0.02**
0–4	64	64	49	48	51	49	52	50	7.32	3	0.06
0–5	63	63	59	57	54	51	62	59	2.93	3	0.40
0–6	61	61	61	59	58	55	56	53	1.57	3	0.67
0–7	58	58	60	58	56	53	56	53	0.96	3	0.81
0–8	58	58	63	61	55	52	57	54	1.94	3	0.59
0–9	53	53	61	59	54	51	57	54	1.42	3	0.70
0–10	57	57	55	53	55	52	57	54	0.48	3	0.92
0–11	59	59	59	57	57	54	53	51	1.75	3	0.63
0–12	60	60	51	50	54	51	56	53	2.54	3	0.47

The bold values are used to indicate statistical significant differences.

Primary Outcome Measure

At 12 months follow-up, 60% in the BI group, 50% in the CBT group, 51% in the seal oil group, and 53% in the soy oil group showed reduced sick leave from baseline, and had either partly or fully returned to work. There were no significant differences between the treatment groups (Table 2).

There were no significant differences between the treatment groups at any of the other follow-up assessments either, except for the first three months of follow-up (Table 2 and Figure 2). Pairwise comparisons showed that the significant difference in all cases involved a lower sick leave rate in the BI group than the other groups.

Furthermore, a comparison of full RTW (*i.e.*, not receiving any sickness benefits) was also conducted at 12 months follow-up. The results showed 56% full RTW in the BI group, 47% in the CBT group, 51% in the seal oil group, and 48% in the soy oil group. There were no significant differences between the treatment groups.

Per-protocol analyses were also conducted. They showed the same as intention-to-treat, with no significant differences between the treatments at any of the follow-ups.

Secondary Outcome Measures

For the secondary outcome measures, there were few significant differences between the treatments. Only three significant differences were detected, all in favor of the CBT group; less gastrointestinal complaints at 6 months, and lower back pain intensity and pain during activity at 12 months (Table 3).

DISCUSSION

The main results in this study showed that neither CBT nor seal oil had any additional benefits over a brief cognitive intervention (BI) on any primary nor secondary outcomes, except for a possible small effect of CBT on pain intensity and gastrointestinal complaints. In fact, the BI alone turned out to be superior in facilitating a fast RTW than the other groups.

The main strength of the study is the multicenter RCT design with complete data for the primary outcome through the use of registry data. The problem of loss to follow-up was therefore eliminated for the primary outcome, though remained for secondary outcomes. Another key strength was staff adherence to the BI and CBT protocol. This was carefully monitored through audiotapes and revealed satisfactory adherence with no major deviations. The blinding of the two nutritional supplement treatments further appeared to be successful according to the blinding index,

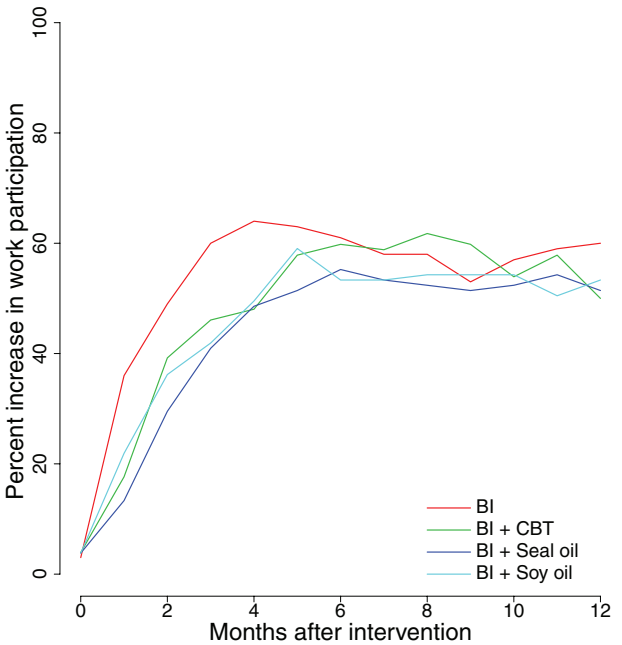

Figure 2. Increase in return to work from baseline up until 12 months follow-up.

TABLE 3. Estimated Marginal Mean Values for the Secondary Outcomes at the 3 Follow-up Periods

ITT	BI Mean (95% CI)	BI and CBT Mean (95% CI)	BI and Seal Oil Mean (95% CI)	BI and Soy Oil Mean (95% CI)	F†	*P*
Back pain (last 14 d)						
Baseline	6.48 (6.14–6.42)	6.32 (5.92–6.72)	6.73 (6.37–7.09)	6.52 (6.15–6.89)	0.84	0.48
Baseline*	6.35 (5.73–6.98)	5.76 (4.94–6.57)	6.50 (5.95–7.05)	6.40 (5.85–6.94)	1.11	0.35
3 mo	5.65 (4.92–6.38)	5.23 (4.50–5.95)	5.89 (5.29–6.50)	5.08 (4.52–5.64)	1.47	0.22
6 mo	4.73 (4.00–5.46)	4.60 (3.79–5.42)	5.22 (4.61–5.84)	4.82 (4.19–5.45)	0.61	0.61
12 mo	5.59 (4.98–6.21)	4.42 (3.71–5.14)	5.67 (5.10–6.25)	5.06 (4.39–5.73)	2.92	**0.03**
Pain during activity (last wk)						
Baseline	6.10 (5.72–6.49)	5.67 (5.19–6.15)	6.36 (6.00–6.72)	5.97 (5.53–6.41)	1.88	0.13
Baseline*	5.66 (4.96–6.35)	4.78 (3.80–5.76)	6.29 (5.81–6.76)	6.00 (5.35–6.65)	3.42	**0.02**
3 mo	5.70 (5.01–6.40)	4.92 (4.19–5.65)	5.95 (5.28–6.61)	4.87 (4.22–5.51)	2.53	0.06
6 mo	4.74 (4.05–5.43)	4.19 (3.32–5.06)	4.77 (4.15–5.39)	4.25 (3.55–4.94)	0.72	0.54
12 mo	5.28 (4.68–5.88)	3.96 (3.22–4.70)	5.12 (4.50–5.73)	4.35 (3.73–4.96)	3.44	**0.02**
Pain during rest (last wk)						
Baseline	4.05 (3.59–4.51)	3.67 (3.19–4.15)	4.36 (3.91–4.80)	3.83 (3.39–4.27)	1.69	0.17
Baseline*	3.63 (2.85–4.40)	3.48 (2.64–4.33)	4.07 (3.46–4.69)	3.80 (3.09–4.51)	0.49	0.69
3 mo	3.79 (3.17–4.40)	3.53 (2.87–4.19)	3.75 (3.09–4.41)	3.39 (2.82–3.96)	0.38	0.77
6 mo	2.99 (2.36–3.62)	3.19 (2.44–3.93)	3.35 (2.71–3.99)	2.81 (2.16–3.45)	0.51	0.68
12 mo	3.82 (3.17–4.48)	3.36 (2.66–4.05)	3.30 (2.78–3.83)	2.93 (2.36–3.49)	1.38	0.25
Pain-related function (ODI)						
Baseline	28.1 (25.5–30.6)	29.2 (26.7–31.8)	29.9 (27.6–32.2)	29.7 (27.4–32.0)	0.44	0.72
Baseline*	28.6 (23.8–33.5)	29.3 (24.8–33.8)	28.3 (25.2–31.4)	28.5 (24.9–32.1)	0.05	0.99
3 mo	24.6 (20.8–28.4)	24.9 (20.6–29.1)	25.4 (22.1–28.8)	23.1 (19.6–26.6)	0.31	0.82
6 mo	20.6 (16.3–24.9)	20.9 (15.9–26.0)	21.5 (18.4–24.6)	23.2 (19.1–27.3)	0.28	0.84
12 mo	22.3 (18.7–25.9)	19.2 (15.2–23.2)	21.7 (18.3–25.2)	20.5 (16.7–24.4)	0.51	0.68
Anxiety symptoms (HADS)						
Baseline	4.85 (4.10–5.59)	4.98 (4.21–5.74)	4.72 (4.05–5.38)	5.28 (4.57–5.99)	0.45	0.72
Baseline*	4.84 (3.61–6.08)	4.37 (3.31–5.44)	4.36 (3.32–5.40)	4.30 (3.36–5.24)	0.21	0.89
3 mo	4.39 (3.13–5.64)	4.60 (3.67–5.52)	4.36 (3.41–5.32)	3.88 (2.87–4.89)	0.37	0.78
6 mo	3.94 (2.64–5.24)	3.38 (2.51–4.24)	3.92 (2.90–4.94)	3.77 (2.82–4.72)	0.29	0.83
12 mo	4.30 (3.17–5.44)	3.32 (2.53–4.11)	4.47 (3.46–5.48)	4.00 (3.04–4.95)	1.27	0.28
Depressive symptoms (HADS)						
Baseline	3.92 (3.19–4.64)	3.96 (3.30–4.63)	3.88 (3.24–4.52)	4.35 (3.69–5.02)	0.42	0.74
Baseline*	3.47 (2.28–4.66)	3.31 (2.26–4.36)	2.91 (1.99–3.82)	3.53 (2.58–4.48)	0.34	0.79
3 mo	3.44 (2.46–4.43)	3.40 (2.59–4.22)	3.42 (2.44–4.40)	3.42 (2.44–4.40)	0.00	0.99
6 mo	3.12 (2.08–4.16)	2.28 (1.45–3.12)	2.94 (2.13–3.76)	3.61 (2.49–4.74)	1.28	0.28
12 mo	3.17 (2.19–4.15)	2.71 (2.04–3.37)	3.47 (2.50–4.44)	3.34 (2.45–4.23)	0.74	0.53
Musculoskeletal complaints (SHC)						
Baseline	8.37 (7.49–9.25)	8.45 (7.56–9.34)	8.72 (7.87–9.56)	8.44 (7.56–9.33)	0.12	0.95
Baseline*	8.04 (6.43–9.65)	8.12 (6.75–9.48)	8.52 (7.24–9.81)	8.83 (7.44–10.2)	0.28	0.84
3 m	7.06 (5.87–8.26)	6.88 (5.46–8.30)	7.50 (6.29–8.71)	7.33 (6.18–8.49)	0.18	0.91
6 mo	7.26 (5.84–8.67)	6.49 (4.92–8.05)	7.15 (5.89–8.40)	7.97 (6.68–9.26)	0.71	0.55
12 mo	6.60 (5.58–7.61)	6.34 (5.20–7.48)	6.98 (5.85–8.11)	7.29 (5.99–8.59)	0.47	0.71
Pseudoneurological complaints (SHC)						
Baseline	4.46 (3.76–5.16)	4.54 (3.80–5.29)	4.73 (4.05–5.40)	4.67 (4.01–5.34)	0.12	0.95
Baseline*	4.12 (3.16–5.08)	4.10 (2.87–5.33)	3.85 (2.79–4.91)	4.93 (3.88–5.99)	0.89	0.45
3 mo	3.80 (2.93–4.66)	3.70 (2.78–4.61)	3.86 (3.12–4.59)	4.14 (3.05–5.23)	0.13	0.94
6 mo	3.97 (2.91–5.03)	2.67 (1.80–3.54)	3.67 (2.71–4.62)	4.52 (3.37–5.66)	2.46	0.06
12 mo	3.80 (3.01–4.58)	3.28 (2.58–3.98)	3.76 (2.90–4.62)	3.95 (2.93–4.97)	0.53	0.66
Gastrointestinal complaints (SHC)						
Baseline	2.29 (1.74–2.83)	2.11 (1.59–2.62)	2.27 (1.75–2.80)	2.37 (1.85–2.90)	0.18	0.91
Baseline*	2.23 (1.18–3.28)	1.69 (0.88–2.49)	1.92 (1.14–2.71)	2.65 (1.89–3.41)	1.07	0.37
3 mo	2.33 (1.57–3.09)	1.59 (1.06–2.12)	2.58 (1.81–3.35)	2.44 (1.48–3.41)	1.95	0.12
6 mo	2.45 (1.55–3.36)	1.22 (0.77–1.66)	2.26 (1.50–3.03)	2.43 (1.64–3.21)	4.20	**0.01**

TABLE 3 (*Continued*)

ITT	BI Mean (95% CI)	BI and CBT Mean (95% CI)	BI and Seal Oil Mean (95% CI)	BI and Soy Oil Mean (95% CI)	F†	*P*
12 mo	2.42 (1.64–3.20)	1.68 (1.20–2.17)	2.10 (1.48–2.71)	2.23 (1.61–2.84)	1.13	0.34
Health-related quality of life (EQ5D)						
Baseline	58.8 (55.6–61.9)	53.7 (50.2–57.2)	55.8 (52.3–59.3)	53.8 (50.2–57.4)	1.84	0.14
Baseline*	58.5 (53.7–63.3)	58.3 (52.7–63.8)	58.8 (53.2–64.4)	54.8 (49.3–60.3)	0.54	0.65
3 mo	63.1 (58.5–67.7)	64.3 (58.8–69.7)	58.5 (53.7–63.2)	63.0 (58.2–67.8)	1.05	0.37
6 mo	65.1 (59.2–70.9)	69.8 (64.8–74.8)	63.0 (57.6–68.4)	61.6 (56.7–66.5)	1.96	0.12
12 mo	63.0 (58.3–67.7)	66.1 (61.5–70.7)	66.0 (61.8–70.1)	65.2 (61.2–69.2)	0.37	0.77

*Values only for those who responded–all follow-ups ($n = 154$).
†$df = 3$.

and compliance was relatively high for both CBT and nutritional supplements. The low participation rate is, however, a weakness of the study. Of the many invitations sent out, only 414 ended up participating in the trial. We have no information about the nonresponders and do not know how many of them would fulfill the selection criteria, although we expect a considerable amount to be noneligible based on the major drop in sick leave at three months.[9] Nevertheless, we cannot rule out a possible selection bias that could have influenced the representativeness of our study population. Furthermore, as the unique Norwegian system offers 100% sickness compensation from day one up until a year, the LBP-related sick leave could be a confounder in and of itself, acting as a vicarious motive for other problems and concerns that do not qualify for sickness compensation. Our data did indeed show that about one-third of the participants reported that pain was not their main problem.[27]

The lack of an additional RTW effect of the CBT was counter to our hypothesis. In a similar trial from UK, group CBT resulted in sustainable and cost-effective improvements in disability and pain.[28] This was contrary to our findings and raise the question of whether the format of treatment delivered (group *vs*. individual) could be influential. However, our results are in line with the previous trial by Indahl *et al*.,[29] and Karjalainen *et al*.,[30] showing that BIs are as effective or even more effective than longer interventions. The results are also in line with earlier studies showing equal effect between extensive multimodal CBT and ordinary treatment by the general practitioner.[31] Extensive multimodal CBT seems to be effective only when given to patients with poor prognosis.[32]

Participants receiving CBT reported the highest treatment satisfaction, and the trend on secondary outcomes points toward superiority of the CBT. This might have been demonstrated more clearly with a larger sample size. The results on RTW, however, were less promising. The reasons for this may be many. First, it is difficult to outperform an already established effective intervention whose main aim is rapid RTW. Second, the CBT was not delivered by experienced CBT therapists, which may have influenced the results. And finally, one might speculate whether the purely individual focus of the CBT may have been too narrow, and that combining a patient-directed and workplace-directed intervention might have improved the outcome.[33]

The lack of additional effects of seal oil on symptom reduction was also counter to our hypothesis.[13–16] The trend on the secondary outcomes points in the rather opposite direction, namely that the patients receiving seal oil were worse off on several pain-related outcomes compared with placebo and the other treatment arms. Furthermore, in terms of RTW, there is a consistently lower RTW trend for the patients receiving nutritional supplements, particularly the seal oil group. The reason for this cannot be answered by the trial. One might, however, speculate whether requiring the participants to take 20 capsules of oil every day for 3 months, after first being reassured about the good prognosis and encouraged to stay active, might have confused the patients and strengthened their patient identity. Alternatively, the prolonged sick leave might have been a reaction to the disappointment of an improvement that never came, or perhaps even a response to a slight increase in symptoms in the seal oil group.

The trial did not include a control condition for BI, but the previously established effectiveness of BI on RTW[25,29,34] might imply that BI is difficult to outperform, and that additional management of LBP may require more extensive or alternative approaches. An avenue for future studies could be to look at effective components of the BI, and whether they can be enhanced.[35] Another consideration concerns the emerging interest in stratified care approaches to LBP.[36–38] Risk-based stratification, where treatment is provided according to prognosis (low, medium, high), has recently been demonstrated to improve disability outcomes, including RTW.[39] Further attempts to identify subgroups of patients who might benefit from different treatment strategies have also been made.[36,40] Whether intervention strategies guided by such screening procedures could produce better disability outcomes could be a question for future research to explore.

➢ Key Points

- ❑ Brief intervention programs are clinically beneficial and cost-effective for patients with LBP.

- Cognitive behavior therapy is one of the recommended treatments for LBP, but until now, evidence from randomized controlled trials on RTW has been lacking.
- Seal oil has previously been shown to have a possible positive effect on muscle pain, but no randomized controlled trials have so far been carried out in a population of LBP patients.
- Our study suggests that neither CBT nor seal oil has any overall benefits over a brief cognitive intervention program in LBP.

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