

Appendix 1a. The excluded full-text papers regarding application of a behavioral medicine approach in physiotherapy for patients with musculoskeletal pain (n=27).

Reference	Reasons for excluding
Archer et al. [1]	Non-randomized.
Beissner et al [2]	A feasibility study.
Ben-Ami et al [4]	Non-randomized.
Bennel et al [6]	PTs did not deliver all treatments.
Bergström et al [7]	Subgroup analyses from an RCT.
Brady et al [8]	Study protocol.
Cheng et al [9]	Study protocol.
Emilsson et al [10]	Observational study.
Geraghty et al [11]	Study protocol.

Geraghty et al [12]	A feasibility study.
Hay et al [13]	Study protocol.
Hinman et al [14]	Study protocol.
Hunter et al [15]	Study protocol.
Hurley et al [16]	Non-randomized.
Jensen et al [18]	PTs were not the only ones to deliver the treatment.
Jensen et al [17]	PTs were not the only ones to deliver the treatment.
Lang et al [22]	PTs did not deliver the treatment
Lamb et al [21]	PTs were not the only ones to deliver the treatment.
Nicholas et al [26]	PTs did not deliver all parts of the treatment.

Nicholas et al [27]	PTs did not deliver all parts of the treatment.
Rayburn et al [29]	Non-randomized.
Rogers et al [32]	Non-randomized.
Rolving et al [33]	Study protocol
Rolving et al [34]	PTs did not deliver all parts of the treatment.
Skolasky et al [36]	Non-randomized.
Skolasky et al [35]	Non-randomized.
Wiangham et al [39]	Study protocol

Appendix 1b. The excluded full-text papers of implementing behavioral medicine approach in physiotherapy for patients with musculoskeletal pain (n=12).

Reference	Reasons for excluding
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Bekkering et al [3].	The guidelines are about stay active and, exercise.
Beneciuk et al [5]	Unclear what the PTs did or did not do with the StarT Back Tool responses from the patients when treating the patients.
Keogh et al [19]	Observational study.
Kongsted et al [20]	Study protocol.
Lawford et al [23]	No patient outcomes reported.
Lawford et al [24]	Study of moderators.
Matthews et al [25]	Development and feasibility study.
Overmeer et al [28]	No patient outcomes reported. Only satisfaction with the treatment and opinions about PTs treatment behavior.

Rebbeck et al [30]	Guidelines for act as usual, reassurance for patients with WAD.
Richmond et al [31]	Explorative study.
Stevenson et al [37]	No patient outcomes reported.
Suman et al [38]	Process evaluation study.

- [1] Archer KR, Motzny N, Abraham CM, Yaffe D, Seebach CL, Devin CJ, Spengler DM, McGirt MJ, Aaronson OS, Cheng JS, Wegener ST. Cognitive-behavioral-based physical therapy to improve surgical spine outcomes: a case series. *Phys Ther* 2013;93(8):1130-1139.
- [2] Beissner K, Parker SJ, Henderson CR, Jr., Pal A, Iannone L, Reid MC. A cognitive-behavioral plus exercise intervention for older adults with chronic back pain: race/ethnicity effect? *J Aging Phys Act* 2012;20(2):246-265.
- [3] Bekkering GE, van Tulder MW, Hendriks EJ, Koopmanschap MA, Knol DL, Bouter LM, Oostendorp RA. Implementation of clinical guidelines on physical therapy for patients with low back pain: randomized trial comparing patient outcomes after a standard and active implementation strategy. *Phys Ther* 2005;85(6):544-555.
- [4] Ben-Ami N, Chodick G, Mirovsky Y, Pincus T, Shapiro Y. Increasing Recreational Physical Activity in Patients With Chronic Low Back Pain: A Pragmatic Controlled Clinical Trial. *J Orthop Sports Phys Ther* 2017;47(2):57-66.
- [5] Beneciuk JM, George SZ. Pragmatic Implementation of a Stratified Primary Care Model for Low Back Pain Management in Outpatient Physical Therapy Settings: Two-Phase, Sequential Preliminary Study. *Phys Ther* 2015;95(8):1120-1134.
- [6] Bennell KL, Nelligan R, Dobson F, Rini C, Keefe F, Kasza J, French S, Bryant C, Dalwood A, Abbott JH, Hinman RS. Effectiveness of an Internet-Delivered Exercise and Pain-Coping Skills Training Intervention for Persons With Chronic Knee Pain: A Randomized Trial. *Ann Intern Med* 2017;166(7):453-462.
- [7] Bergstrom C, Jensen I, Hagberg J, Busch H, Bergstrom G. Effectiveness of different interventions using a psychosocial subgroup assignment in chronic neck and back pain patients: a 10-year follow-up. *Disabil Rehabil* 2012;34(2):110-118.

- [8] Brady B, Veljanova I, Schabrun S, Chipchase L. Integrating culturally informed approaches into the physiotherapy assessment and treatment of chronic pain: protocol for a pilot randomised controlled trial. *BMJ Open* 2017;7(5):e014449.
- [9] Cheng ST, Chan KL, Lam RWL, Mok MHT, Chen PP, Chow YF, Chung JWY, Law ACB, Lee JSW, Leung EMF, Tam CWC. A multicomponent intervention for the management of chronic pain in older adults: study protocol for a randomized controlled trial. *Trials* 2017;18(1):528.
- [10] Emilson C, Asenlof P, Pettersson S, Bergman S, Sandborgh M, Martin C, Demmelmaier I. Physical therapists' assessments, analyses and use of behavior change techniques in initial consultations on musculoskeletal pain: direct observations in primary health care. *BMC Musculoskelet Disord* 2016;17:316.
- [11] Geraghty AW, Stanford R, Little P, Roberts L, Foster NE, Hill JC, Hay E, Stuart B, Turner D, Yardley L. Using an internet intervention to support self-management of low back pain in primary care: protocol for a randomised controlled feasibility trial (SupportBack). *BMJ Open* 2015;5(9):e009524.
- [12] Geraghty AWA, Stanford R, Stuart B, Little P, Roberts LC, Foster NE, Hill JC, Hay EM, Turner D, Malakan W, Leigh L, Yardley L. Using an internet intervention to support self-management of low back pain in primary care: findings from a randomised controlled feasibility trial (SupportBack). *BMJ Open* 2018;8(3):e016768.
- [13] Hay EM, Dunn KM, Hill JC, Lewis M, Mason EE, Konstantinou K, Sowden G, Somerville S, Vohora K, Whitehurst D, Main CJ. A randomised clinical trial of subgrouping and targeted treatment for low back pain compared with best current care. The STarT Back Trial Study Protocol. *BMC Musculoskelet Disord* 2008;9:58.
- [14] Hinman RS, Lawford BJ, Campbell PK, Briggs AM, Gale J, Bills C, French SD, Kasza J, Forbes A, Harris A, Bunker SJ, Delany CM, Bennell KL. Telephone-Delivered Exercise Advice and Behavior Change Support by Physical Therapists for People with Knee Osteoarthritis: Protocol for the Telecare Randomized Controlled Trial. *Phys Ther* 2017;97(5):524-536.
- [15] Hunter DJ, Hinman RS, Bowden JL, Egerton T, Briggs AM, Bunker SJ, Kasza J, Forbes AB, French SD, Pirota M, Schofield DJ, Zwar NA, Bennell KL. Effectiveness of a new model of primary care management on knee pain and function in patients with knee osteoarthritis: Protocol for THE PARTNER STUDY. *BMC Musculoskelet Disord* 2018;19(1):132.
- [16] Hurley DA, Murphy LC, Hayes D, Hall AM, Toomey E, McDonough SM, Lonsdale C, Walsh NE, Guerin S, Matthews J. Using intervention mapping to develop a theory-driven, group-based complex intervention to support self-management of osteoarthritis and low back pain (SOLAS). *Implement Sci* 2016;11:56.
- [17] Jensen IB, Bergstrom G, Ljungquist T, Bodin L. A 3-year follow-up of a multidisciplinary rehabilitation programme for back and neck pain. *Pain* 2005;115(3):273-283.
- [18] Jensen IB, Bergstrom G, Ljungquist T, Bodin L, Nygren AL. A randomized controlled component analysis of a behavioral medicine rehabilitation program for chronic spinal pain: are the effects dependent on gender? *Pain* 2001;91(1-2):65-78.

- [19] Keogh A, Matthews J, Hurley DA. An assessment of physiotherapist's delivery of behaviour change techniques within the SOLAS feasibility trial. *Br J Health Psychol* 2018;23(4):908-932.
- [20] Kongsted A, Ris I, Kjaer P, Vach W, Morsø L, Hartvigsen J. GLA:D(®) Back: implementation of group-based patient education integrated with exercises to support self-management of back pain - protocol for a hybrid effectiveness-implementation study. *BMC Musculoskeletal Disord* 2019;20(1):85.
- [21] Lamb SE, Hansen Z, Lall R, Castelnovo E, Withers EJ, Nichols V, Potter R, Underwood MR. Group cognitive behavioural treatment for low-back pain in primary care: a randomised controlled trial and cost-effectiveness analysis. *Lancet* 2010;375(9718):916-923.
- [22] Lang E, Liebig K, Kastner S, Neundörfer B, Heuschmann P. Multidisciplinary rehabilitation versus usual care for chronic low back pain in the community: effects on quality of life. *Spine J* 2003;3(4):270-276.
- [23] Lawford BJ, Bennell KL, Kasza J, Campbell PK, Gale J, Bills C, Hinman RS. Implementation of person-centred practice principles and behaviour change techniques after a 2-day training workshop: A nested case study involving physiotherapists. *Musculoskeletal Care* 2019;17(2):221-233.
- [24] Lawford BJ, Hinman RS, Kasza J, Nelligan R, Keefe F, Rini C, Bennell KL. Moderators of Effects of Internet-Delivered Exercise and Pain Coping Skills Training for People With Knee Osteoarthritis: Exploratory Analysis of the IMPACT Randomized Controlled Trial. *J Med Internet Res* 2018;20(5):e10021.
- [25] Matthews J, Hall AM, Hernon M, Murray A, Jackson B, Taylor I, Toner J, Guerin S, Lonsdale C, Hurley DA. A brief report on the development of a theoretically-grounded intervention to promote patient autonomy and self-management of physiotherapy patients: face validity and feasibility of implementation. *BMC Health Serv Res* 2015;15:260.
- [26] Nicholas MK, Asghari A, Blyth FM, Wood BM, Murray R, McCabe R, Brnabic A, Beeston L, Corbett M, Sherrington C, Overton S. Self-management intervention for chronic pain in older adults: a randomised controlled trial. *Pain* 2013;154(6):824-835.
- [27] Nicholas MK, Asghari A, Blyth FM, Wood BM, Murray R, McCabe R, Brnabic A, Beeston L, Corbett M, Sherrington C, Overton S. Long-term outcomes from training in self-management of chronic pain in an elderly population: a randomized controlled trial. *Pain* 2017;158(1):86-95.
- [28] Overmeer T, Boersma K, Main CJ, Linton SJ. Do physical therapists change their beliefs, attitudes, knowledge, skills and behaviour after a biopsychosocially orientated university course? *J Eval Clin Pract* 2009;15(4):724-732.
- [29] Rayburn KS. A Model for Integrative Transformation: A Back Pain Group Appointment Program. *Altern Ther Health Med* 2017;23(1):8-13.
- [30] Rebeck T, Maher CG, Refshauge KM. Evaluating two implementation strategies for whiplash guidelines in physiotherapy: a cluster randomised trial. *Aust J Physiother* 2006;52(3):165-174.

- [31] Richmond H, Hall AM, Hansen Z, Williamson E, Davies D, Lamb SE. Exploring physiotherapists' experiences of implementing a cognitive behavioural approach for managing low back pain and identifying barriers to long-term implementation. *Physiotherapy* 2018;104(1):107-115.
- [32] Rogers D, Nightingale P, Gardner A. A 12-h combined physical and psychological treatment programme for patients with persistent back pain. *Musculoskeletal Care* 2018;16(2):318-321.
- [33] Rolving N, Oestergaard LG, Willert MV, Christensen FB, Blumensaat F, Büniger C, Nielsen CV. Description and design considerations of a randomized clinical trial investigating the effect of a multidisciplinary cognitive-behavioural intervention for patients undergoing lumbar spinal fusion surgery. *BMC Musculoskelet Disord* 2014;15:62.
- [34] Rolving N, Sogaard R, Nielsen CV, Christensen FB, Büniger C, Oestergaard LG. Preoperative Cognitive-Behavioral Patient Education Versus Standard Care for Lumbar Spinal Fusion Patients: Economic Evaluation Alongside a Randomized Controlled Trial. *Spine (Phila Pa 1976)* 2016;41(1):18-25.
- [35] Skolasky RL, Maggard AM, Wegener ST, Riley LH, 3rd. Telephone-Based Intervention to Improve Rehabilitation Engagement After Spinal Stenosis Surgery: A Prospective Lagged Controlled Trial. *J Bone Joint Surg Am* 2018;100(1):21-30.
- [36] Skolasky RL, Riley LH, 3rd, Maggard AM, Bedi S, Wegener ST. Functional recovery in lumbar spine surgery: a controlled trial of health behavior change counseling to improve outcomes. *Contemp Clin Trials* 2013;36(1):207-217.
- [37] Stevenson K, Lewis M, Hay E. Does physiotherapy management of low back pain change as a result of an evidence-based educational programme? *J Eval Clin Pract* 2006;12(3):365-375.
- [38] Suman A, Schaafsma FG, Buchbinder R, van Tulder MW, Anema JR. Implementation of a Multidisciplinary Guideline for Low Back Pain: Process-Evaluation Among Health Care Professionals. *J Occup Rehabil* 2017;27(3):422-433.
- [39] Wiangkham T, Duda J, Haque MS, Price J, Rushton A. Acute Whiplash Injury Study (AWIS): a protocol for a cluster randomised pilot and feasibility trial of an Active Behavioural Physiotherapy Intervention in an insurance private setting. *BMJ Open* 2016;6(7):e011336.