**SUPPLEMENT**

**Index**

Appendix A. References of Systematic Reviews and Meta-analyses Reviewed...….…....………..…......p.2

Appendix B. Search Strategies ……………………………………………….………….………………p.5

Supplementary Table 1. Characteristics of Included Studies ……….p.6

Supplementary Table 2. Risk of Bias……………………………………………………..……p.12

Supplementary Figure 1. Funnel plot………………………………………………………………...…p.13

Supplementary Table 3. Subgroup analysis…………………………………..p14

Supplementary Figure 2. Normal Probability Plot of Standardized Shrunken Residuals……………...p.16

**Supplementary Appendix A. References of Reviewed Systematic Reviews and Meta-analyses**

1. Brown HE, Gilson ND, Burton NW, Brown WJ. Does physical activity impact on presenteeism and other indicators of workplace well-being? Sports Med. 2011;41(3):249-262. doi:10.2165/11539180-000000000-00000.
2. Potter R, Ellard D, Rees K, Thorogood M. A systematic review of the effects of physical activity on physical functioning, quality of life and depression in older people with dementia. Int J Geriatr Psychiatry. 2011;26(10):1000-1011. doi:10.1002/gps.2641.
3. Das JK, Salam RA, Lassi ZS, et al. Interventions for adolescent mental health: an overview of systematic reviews. J Adolesc Health. 2016;59(4S):S49-S60. doi:10.1016/j.jadohealth.2016.06.020.
4. Wegner M, Helmich I, Machado S, Nardi AE, Arias-Carrion O, Budde H. Effects of exercise on anxiety and depression disorders: review of meta-analyses and neurobiological mechanisms. CNS Neurol Disord Drug Targets. 2014;13(6):1002-1014.
5. Rosenbaum S, Vancampfort D, Steel Z, Newby J, Ward PB, Stubbs B. Physical activity in the treatment of Post-traumatic stress disorder: a systematic review and meta-analysis. Psychiatry Res. 2015;230(2):130-136. doi:10.1016/j.psychres.2015.10.017.
6. Hall KS, Hoerster KD, Yancy WS. Post-traumatic stress disorder, physical activity, and eating behaviors. Epidemiol Rev. 2015;37:103-115. doi:10.1093/epirev/mxu011.
7. Mammen G, Faulkner G. Physical activity and the prevention of depression: a systematic review of prospective studies. Am J Prev Med. 2013;45(5):649-657. doi:10.1016/j.amepre.2013.08.001.
8. Zhai L, Zhang Y, Zhang D. Sedentary behaviour and the risk of depression: a meta-analysis. Br J Sports Med. 2015;49(11):705-709. doi:10.1136/bjsports-2014-093613.
9. Park SH, Han KS, Kang CB. Effects of exercise programs on depressive symptoms, quality of life, and self-esteem in older people: a systematic review of randomized controlled trials. Appl Nurs Res. 2014;27(4):219-226. doi:10.1016/j.apnr.2014.01.004.
10. Cooney GM, Dwan K, Greig CA, et al. Exercise for depression. Cochrane Database Syst Rev. 2013;(9):Cd004366. doi:10.1002/14651858.CD004366.pub6.
11. Cramer H, Lauche R, Langhorst J, Dobos G. Yoga for depression: a systematic review and meta-analysis. Depress Anxiety. 2013;30(11):1068-1083. doi:10.1002/da.22166.
12. Robertson R, Robertson A, Jepson R, Maxwell M. Walking for depression or depressive symptoms: a systematic review and meta-analysis. Ment Health Phys Act. 2012;5(1):66-75.
13. de Souza Moura AM, Lamego MK, Paes F, et al. Effects of aerobic exercise on anxiety disorders: a systematic review. CNS Neurol Disord Drug Targets. 2015;14(9):1184-1193. doi:10.2174/1871527315666151111121259.
14. Nystrom MB, Neely G, Hassmen P, Carlbring P. Treating major depression with physical activity: a systematic overview with recommendations. Cogn Behav Ther. 2015;44(4):341-352. doi:10.1080/16506073.2015.1015440.
15. Rebar AL, Stanton R, Geard D, Short C, Duncan MJ, Vandelanotte C. A meta-meta-analysis of the effect of physical activity on depression and anxiety in non-clinical adult populations. Health Psychol Rev. 2015;9(3):366-378. doi:10.1080/17437199.2015.1022901.
16. Yan S, Jin Y, Oh Y, Choi Y. Effect of exercise on depression in university students: a meta-analysis of randomized controlled trials. J Sports Med Phys Fitness. 2016;56(6):811-816.
17. Josefsson T, Lindwall M, Archer T. Physical exercise intervention in depressive disorders: meta-analysis and systematic review. Scand J Med Sci Sports. 2014;24(2):259-272. doi:10.1111/sms.12050.
18. Schuch FB, Vancampfort D, Richards J, Rosenbaum S, Ward PB, Stubbs B. Exercise as a treatment for depression: a meta-analysis adjusting for publication bias. J Psychiatr Res. 2016b;77:42-51. doi:10.1016/j.jpsychires.2016.02.023.
19. Farah, WH, Alsawas, M, Mainou, M, et al. Non-pharmacological treatment of depression: a systematic review and evidence map. Evid Based Med. 2016;21(6):214-221.
20. Mura G, Carta MG. Physical activity in depressed elderly. A systematic review. Clin Pract Epidemiol Ment Health. 2013;9:125-135. doi:10.2174/1745017901309010125.
21. Schuch FB, Vancampfort D, Rosenbaum S, et al. Exercise for depression in older adults: a meta-analysis of randomized controlled trials adjusting for publication bias. Rev Bras Psiquiatr. 2016c;38(3):247-254. doi:10.1590/1516-4446-2016-1915.
22. Rhyner KT, Watts A. Exercise and depressive symptoms in older adults: a systematic meta-analytic review. J Aging Phys Act. 2016;24(2):234-246. doi:10.1123/japa.2015-0146.
23. Lindheimer JB, O'Connor PJ, Dishman RK. Quantifying the placebo effect in psychological outcomes of exercise training: a meta-analysis of randomized trials. Sports Med. 2015;45(5):693-711. doi:10.1007/s40279-015-0303-1.
24. Cramer H, Anheyer D, Lauche R, Dobos G. A systematic review of yoga for major depressive disorder. J Affect Disord. 2017;213:70-77. doi:10.1016/j.jad.2017.02.006.
25. Bridges L, Sharma M. The efficacy of yoga as a form of treatment for depression. J Evid Based Complementary Altern Med. 2017;2156587217715927. doi:10.1177/2156587217715927.
26. Liu X, Clark J, Siskind D, et al. A systematic review and meta-analysis of the effects of Qigong and Tai Chi for depressive symptoms. Complement Ther Med. 2015;23(4):516-534. doi:10.1016/j.ctim.2015.05.001.
27. Sarris J, Moylan S, Camfield DA, et al. Complementary medicine, exercise, meditation, diet, and lifestyle modification for anxiety disorders: a review of current evidence. Evid Based Complement Alternat Med. 2012. 2012:809653. doi:10.1155/2012/809653.
28. Yin J, Dishman RK. The effect of Tai Chi and Qigong practice on depression and anxiety symptoms: a systematic review and meta-regression analysis of randomized controlled trials. Database of Abstracts of Reviews of Effects. 2014;(2):135-146.
29. Wang F, Lee Ek, Wu T, et al. The effects of Tai Chi on depression, anxiety, and psychological well-being: a systematic review and meta-analysis. Int J Behav Med. 2014;21(4):605-617.
30. Meekums B, Karkou V, Nelson EA. Dance movement therapy for depression. Cochrane Database Syst Rev. 2015;(2):CD009895. doi:10.1002/14651858.CD009895.pub2.
31. Loi SM, Dow B, Ames D, et al. Physical activity in caregivers: What are the psychological benefits? Arch Gerontol Geriatr. 2014;59(2):204-210. doi:10.1016/j.archger.2014.04.001.
32. Abraha I, Rimland JM, Trotta FM, et al. Systematic review of systematic reviews of non-pharmacological interventions to treat behavioural disturbances in older patients with dementia. The SENATOR-OnTop series. BMJ Open. 2017;7(3):e012759. doi:10.1136/bmjopen-2016-012759.
33. Barreto Pde S, Demougeot L, Pillard F, Lapeyre-Mestre M, Rolland Y. Exercise training for managing behavioral and psychological symptoms in people with dementia: A systematic review and meta-analysis. Ageing Res Rev. 2015;24(Pt B):274-285. doi:10.1016/j.arr.2015.09.001.
34. Adamson BC, Ensari I, Motl RW. Effect of exercise on depressive symptoms in adults with neurologic disorders: a systematic review and meta-analysis. Arch Phys Med Rehabil. 2015;96(7):1329-1338. doi:10.1016/j.apmr.2015.01.005.
35. Eng JJ, Reime B. Exercise for depressive symptoms in stroke patients: a systematic review and meta-analysis. Clin Rehabil. 2014;28(8):731-739. doi:10.1177/0269215514523631.
36. Radovic S, Gordon MS, Melvin GA. Should we recommend exercise to adolescents with depressive symptoms? A meta-analysis. J Paediatr Child Health. 2017;53(3):214-220. doi:10.1111/jpc.13426.
37. Brown H, Pearson N, Braithwaite R, Brown W, Biddle S. Physical activity interventions and depression in children and adolescents: a systematic review and meta-analysis. Sports Med. 2013;43:195-206. doi:10.1007/s40279-012-0015-8.
38. Hoare E, Skouteris H, Fuller-Tyszkiewicz M, Millar L, Allender S. Associations between obesogenic risk factors and depression among adolescents: a systematic review. Obes Rev. 2014;15(1):40-51. doi:10.1111/obr.12069.
39. Hoare E, Milton K, Foster C, Allender S. The associations between sedentary behaviour and mental health among adolescents: a systematic review. Int J Behav Nutr Phys Act. 2016;13(1):108. doi:https://doi.org/10.1186/s12966-016-0432-4.
40. Korczak DJ, Madigan S, Colasanto M. Children's physical activity and depression: a meta-analysis. Pediatrics. 2017;139(4):1-14.
41. Carter T, Morres ID, Meade O, Callaghan P. The effect of exercise on depressive symptoms in adolescents: a systematic review and meta-analysis. J Am Acad Child Adolesc Psychiatry. 2016;55(7):580-590. doi:10.1016/j.jaac.2016.04.016.
42. Schuch FB, Deslandes AC, Stubbs B, Gosmann NP, Silva CT, Fleck MP. Neurobiological effects of exercise on major depressive disorder: a systematic review. Neurosci Biobehav Rev. 2016a;61:1-11. doi:10.1016/j.neubiorev.2015.11.012.
43. Pedersen BK, Saltin B. Exercise as medicine – evidence for prescribing exercise as therapy in 26 different chronic diseases. Scand J Med Sci Sports 2015: (Suppl. 3) 25: 1–72.
44. Knapen J, Vancampfort D, Moriën Y, Marchal Y. Exercise therapy improves both mental and physical health in patients with major depression. Disabil Rehabil. 2015;37(16):1490-5.
45. Stubbs B, Vancampfort D, Rosenbaum S, Ward PB, Richards J, Ussher M, Schuch FB. Challenges Establishing the Efficacy of Exercise as an Antidepressant Treatment: A Systematic Review and Meta-Analysis of Control Group Responses in Exercise Randomised Controlled Trials. Sports Med. 2016;46(5):699-713.
46. Herring MP, Puetz TW, O'Connor PJ, Dishman RK. Effect of exercise training on depressive symptoms among patients with a chronic illness: a systematic review and meta-analysis of randomized controlled trials. Arch Intern Med. 2012;172(2):101-11.
47. Conn VS. Depressive symptom outcomes of physical activity interventions: meta-analysis findings. Ann Behav Med. 2010;39(2):128-38.
48. Ekeland E, Heian F, Hagen KB. Can exercise improve self-esteem in children and young people? A systematic review of randomised controlled trials. Br J Sports Med 2005;39(11):792-8.
49. Carter T, Bastounis A, Guo B, Morrell CJ. The effectiveness of exercise-based interventions for preventing or treating postpartum depression: a systematic review and meta-analysis. Archives of Women’s Mental Health 2019;22(1): 37-53
50. Chan JSY, Liu G, Liang D, Deng K, Wu J, Yan JH. Special Issue- Therapeutic Benefits of Physical Activity for Mood: A systematic review on the Effects of Exercise Intensity, Duration and Modality. The Journal of Psychology 2019;153(1):102-125.
51. Nakamura A, van der Waerden J, Melchior M, Bolze C, El-Khoury F, Pryor L. Physical activity during pregnancy and postpartum depression: A systematic review and meta-analysis. Journal of Affective Disorders 2019;246:29-41
52. Pascoe M C, Parker AG. Physical activity and exercise as an universal depression prevention in young people: a narrative review. Early Interv Psychiatry. 2019;13(4):733-739
53. Davenport MH, McCurdy AP, Mottola MF, Skow RJ, Meah VL, Poitras VJ, Jaramillo Garcia A, Gray CE, Barrowman N, Riske L, Sobierajski F, James M, Nagpal T, Marchand AA, Nuspl M, Slater LG, Barakat R, Adamo KB, Davies GA, Ruchat SM. Impact of prenatal exercise on both prenatal and postnatal anxiety and depressive symptoms: a systematic review and meta-analysis.Br J Sports Med. 2018 Nov;52(21):1376-1385
54. O'Connor E, Senger CA, Henninger ML, Coppola E, Gaynes BN. Interventions to Prevent Perinatal Depression: Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2019;321(6):588-601.
55. Gordon BR, McDowell CP, Hallgren M, Meyer JD, Lyons M, HerringMP. Association of efficacy of resistance exercise training with depressive symptoms. JAMA Psychiatry. 2018;75(6):566-576.
56. Poyatos-León R, García-Hermoso A, Sanabria-Martínez G, Álvarez-Bueno C, Cavero-Redondo I, Martínez-Vizcaíno V. Effects of exercise-based interventions on postpartum depression: A meta-analysis of randomized controlled trials. Birth. 2017 Sep;44(3):200-208.

**Supplementary Appendix B. Search Strategies**

**PubMed (MEDLINE, CINHAL): 2708 (25/05/2020)**

(“depressive disorder” OR “major depressive disorder” OR depress\* OR “depression”) AND (“physical activity” OR “exercise” OR “fitness” OR “Sport” OR “leisure activities”) AND (prevent\* OR incidence) AND ("effectiveness" OR “trial” OR “controlled trial” OR “randomi\*” OR “intervention” OR "efficacy")

**The Cochrane Central Register of Controlled Trials (CENTRAL): 1186 (25/05/2020)**

("depression":ti,ab,kw or "depressive disorder":ti,ab,kw or “major depressive disorder”:ti,ab,kw or depress\*:ti,ab,kw) AND (physical activity:ti,ab,kw or exercise:ti,ab,kw or fitness:ti,ab,kw or Sport:ti,ab,kw or leisure activities:ti,ab,kw) AND (prevent\*:ti,ab,kw or incidence:ti,ab,kw) AND (effectiveness:ti,ab,kw or trial:ti,ab,kw or controlled trial:ti,ab,kw or randomi\*:ti,ab,kw or intervention:ti,ab,kw or efficacy:ti,ab,kw)

**Embase: 777 (25/05/2020)**

('depression'/exp OR 'depression' OR 'depressive disorder'/exp OR 'depressive disorder' OR 'major depressive disorder'/exp OR 'major depressive disorder' OR 'depress\*') AND ('physical activity'/exp OR 'physical activity' OR 'exercise'/exp OR 'exercise' OR 'fitness'/exp OR 'fitness' OR 'Sport'/exp OR 'sport' OR leisure activities/exp OR 'leisure activities') AND (prevent\* OR incidence) AND ('effectiveness' OR 'trial' OR 'controlled trial' OR 'randomi\*' OR 'intervention' OR 'efficacy')

**Web of Science: 4106 (25/05/2020)**

TS= ((depressive disorder OR (depressive AND disorder) OR depression OR major depressive disorder)) AND TS= ((physical activity OR exercise OR fitness OR Sport OR leisure activities)) AND TS= ((prevent\* OR incidence)) AND TS= ((effectiveness OR trial OR (controlled AND trial) OR randomi\* OR intervention OR efficacy))

**PsycINFO: 1788 (25/05/2020)**

(TX depression OR TX depressive disorder OR (TX depressive AND TX disorder) OR TX depress\* OR TX major depressive disorder) AND (TX physical activity OR TX exercise OR TX fitness OR TX Sport OR TX leisure activities) AND (prevent\* OR incidence) AND (effectiveness OR trial OR (controlled AND trial) OR randomi\* OR intervention OR efficacy)

**Open Grey: 8 (25/05/2020)**

(depression OR depressive disorder OR major depressive disorder OR depress\*) AND (prevent\*) AND (physical activity OR exercise OR fitness OR Sport OR leisure activities)

**SPORTdiscus**: **202 (25/05/2020)**
(“depressive disorder” OR “ major depressive disorder” OR depress\* OR “depression”) AND (“physical activity” OR “exercise” OR “fitness” OR “Sport” OR “leisure activities”) AND (prevent\* OR incidence) AND ("effectiveness" OR “trial” OR “controlled trial” OR “randomi\*” OR “intervention” OR "efficacy")

**Supplementary Table 1. Characteristics of Included Randomized Controlled Trials of Depression Prevention**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author / Year /Country | Targetpopulation /Type of prevention a | Depressionexclusion atbaseline  | Sample(intervention / control) | Conditionsintervention –control | Characteristics of exercise-based intervention:a) intervention durationb) session durationc) formatd) frequencye) intensityf) typeg) supervision | Verificationof physicalactivity(objective/ subjective) | Type of outcome on depression(primary /secondary) | Follow-up  | DepressionOutcomes (standardized interview /symptomsscale) |
| * **Brenes et al.**
* **2007**
* **United States**
 | * Older adults
* Mean age: 73.7; standard deviation: 6.8
* Indicated
 | * No major depression DSM-IV (PHQ-9 algorithm)

  |  26 (14/12) |  **1**. Aerobic and resistance trainingd **2**. Usual care | a) 16 weeksb) 60 minutesc) Groupd) 3 sessions/weeke) Moderatef) Warm up, aerobic phase, resistance training phase, aerobic phase, cool down g) Supervised | Objective: distance walked in 6 minutes, time to walk 4 meters, and time to sit and stand from a chair 5 times | Primary | 4 months | * Symptoms scale (HADS-D and GDS)
 |
| * **Chen et al.**
* **2015**
* **Taiwan**
 | * Patients with lung cancer
* 37–88 years (mean age: 64.16; standard deviation: 10.89)
* Selective
 | * No depression

(HADS-D ≥8) |  84 (40/44)c |  **1**.Walking  **2.** Usual care | a) 12 weeksb) 40 minutesc) Individuallyd) 3 sessions/week e) Moderatef) Walking g) Unsupervised | Objective: heart rate monitor + training diarySubjective: Borg Rating of Perceived Exertion scale | Primary | 6 months | * Symptoms scale (HADS-D)
 |
| * **de Zeeuw et al.**
* **2010**
* **Netherlands**
 | * Employees of a

company* Mean age: 41.2

years* Indicated
 | * No depression

(PHQ-9 ≥10) |  30 (15/15) |  **1**. Fitness program **2**. Usual care | a) 10 weeksb) 50 minutesc) Groupd) 2 sessions/weeke) Moderatef) Cardiovascular and stretching exercises/ training/cycling/jogging/ walking/climbing/sit-ups/relaxation g) Supervised | Objective: heartrate monitored | Primary | 2.5 months | * Symptoms scale (PHQ-9)
 |
| * **DiLorenzo et al.**
* **1999**
* **Colombia**
 | * Healthy adults
* 18-39 years
* Mean age: 31.5
* Universal
 | * No depression

(BDI >19) |  111 (82/29) |  **1**. Aerobic fitness **2**. No intervention | a) 12 weeksb) 24 minutesc) Groupd) 4 sessions/weeke) Moderatef) Bicycleg) Supervised | Objective: heart ratemonitored andbicycle ergometer test (not validated) | Primary | 12 months | * Symptoms scale (BDI)
 |
| * **Lewis et al.**
* **2014**
* **United States**
 | * Healthy postpartum women
* Mean age: 31.54; standard deviation: 4.95
* Selective
 | * No major depression

 DSM -IV (SCID) |  130 (66/64) |  **1.** Exercise intervention **2**. General wellness topics support contact by telephone | a) 24 weeksb) 30 minutes c) Individuallyd) 5 sessions/week+11 telephone sessions e) Moderate to vigorousf) Varied exercises (types of exercise they preferred)g) Unsupervised | Objective: device that measures movement and intensity of physical activity (ActiGraph)Subjective: 7-Day Physical Activity Recall Interview | Primary | 6 months | * Incidence (SCID-I)
* Symptoms scale (PHQ-9; EPDS)
 |
| * **Mohammadi et al.**
* **2015**
* **Iran**
 | * Pregnant women

at 26-32 weeks of pregnancy* 25.3 years
* Selective
 | * No depression

(EPDS ≥15)b  |  127 (43/42/42) |  **1**. Home-based antenatal exercise **2**. Home-based antenatal plus  postnatal exercise **3**. Usual care | a) 11 weeks (antenatal) and 15 weeks (antenatal + postnatal)b) 25 minutesc) Individuallyd) 3 sessions/weeke) Low f) Stretching and breathing practicesg) Unsupervised | Subjective: telephone calls | Primary | 5 months | * Symptoms scale (EPDS)
 |
| * **Osei-tutu et al.**
* **2005**
* **Canada**
 | * Healthy sedentary volunteers
* 20-40 years
* Mean age: 34
* Universal
 | * No depression (POMS)
 |  40 (15/15/10) | **1**. 30 min walking**2**. 3 x 10 min walking with minimum 2h rest intervals**3**. Non-exercise control | a) 8 weeksb) 30 minutesc) Individuallyd) 5 sessions/weeke) Moderate f) Walkingg) Unsupervised | Objective: heart rate monitored  | Primary | 2 months | * Symptoms scale (POMS)
 |
| * **Pakkala et al.**
* **2008**
* **Finland**
 | * Elderly
* 75-81 years
* Mean age: 77.6
* Selective
 | * No depression
* Sub-sample excluding people with CES-D≥16
 |  501 (253/248) | 1. Physical activity counseling  2. Usual care | a) Not specifiedb) 60 minutesc) Individuallyd) 7 sessions/weeke) Lowf) Home calisthenics exercised, walking, performing every day activities and recommendation to do inexpensive exercise classes organized by the municipalityg) Unsupervised | Subjective: standardized physical activity questionnaire [Grimby, 1986]  | Primary | 24 months | * Symptoms scale (CES-D)
 |
| * **Penninx et al.**
* **2002**
* **United States**
 | * Adults with knee osteoarthritis
* 68.8 years (standard deviation: 5.6)
* Selective
 | * No depression
* Sub-sample excluding people with CES-D short form ≥5
 |  340 (115/112/113) |  **1.** Aerobic exercise program **2.** Resistance exercise program**3.** Health education related to arthritis management | a) 72 weeksb) 60 minutesc) Groupd) 3 sessions/week e) Moderatef) Walkingg) Supervised --------------------a) 72 weeksb) 60 minutesc) Groupd) 3 sessions/week e) Moderate f) Upper and lower body exercises using dumbbells and cuff weightsg) Supervised  | Objective: 6-minute walking speed test | Primary | 18 months | * Symptoms scale (CES-D)
 |
| * **Sadeghi-Bahmani et al.**
* **2019**
* **Iran**
 | * Women with multiple sclerosis
* 18-65 years (mean age: 37.36 years)
* Selective
 | * No major depressive disorders (MINI)
 | 83 (27/30/26) | **1**. Coordinative training**2**. Endurance training**3.** Active control condition | a) 8 weeksb) 30-45 minutesc) Groupd) 3 sessions/week e) Moderate f) Warming up, coordinative training (e.g. balancing on small bar, balancing balls, mirroring and imitating instructors’ movements), cooling downg) Supervised --------------------a) 8 weeksb) 30-45 minutesc) Groupd) 3 sessions/week e) Moderatef) Warming-up, stretching, exercises on treadmill/ bicycles/walking/jogging, cooling downg) Supervised | Subjective | Primary | 2 months | * Symptoms scale (BDI-FS)
 |
| * **Taglietti et al.**
* **2018**
* **Brazil**
 | * Adults with knee osteoarthritis
* 68.3 years (standard deviation: 4.8)
* Selective
 | * No depression
* Sub-sample excluding people with GDS ≥ 6
 |  47 (27/20)c  |  **1.** Aquatic mixed exercise  **2.** Educational program (‘how to deal with chronic pain’) | a) 8 weeks b) 60 minutesc) Individuallyd) 2 sessions/week e) Low-moderatef) Warm-up, stretching the leg muscles, knee and hip isometric and dynamic exercises with elastic bands, aerobic exercises, step training and proprioceptive exercises, cool down with massage and relaxationg) Supervised | Subjective | Secondary | 3 months | * Symptoms scale (GDS)
 |
| * **Vargas-Terrones et al.**
* **2018**
* **Spain**
 | * Pregnant women <16 weeks pregnant
* 32.8 years (standard deviation: 3.95)
* Selective
 | * No depression
* Sub-sample excluding people with CES-D ≥16
 |  100 (56/44)c |  1. Specific mixed exerciseprogram2. Usual care | a) 29 weeks b) 60 minutesc) Groupd) 3 sessions/week e) Moderate (intensity of 55%- 60% of heart rate reserve)f) Warm-up, aerobic exercise, muscle strengthening exercises, coordination and balance, pelvic floor exercises, stretching and relaxation.g) Supervised | Objective: Polar FT7 heart rate monitorSubjective: Borg Rating of Perceived Exertion scale | Primary | 8.5 months | * Symptoms scale (CES-D)
 |
| * **Williams et al.**
* **2009**

**United States** | * Adults with chronic low back pain
* 18-70 years
* Mean age:48

Selective | No depression (BDI-II ≥20) |  90 (43/47) |  **1**. Iyengar yoga **2**. Usual care | a) 24 weeks b) 90 min classes and 30 minutes at homec) Group (classes) and individually (at home)d) Classes: 2 sessions/week; at home: 3 sessions /week  e) Low f) Yoga exercises g) Supervised | Subjective: reports on duration and frequency of the home practice | Primary | 12 months | * Symptoms scale (BDI-II)
 |
| * Woolery et al.
* 2004

United States | * Adults
* 18-29 years
* Mean age 21.5 (sd: 3.23)

Indicated | No depression (BDI >15) | 28 (13/15) |  1. Iyengar yoga 2. Waiting list  | a) 5 weeks b) 60 minutesc) Groupd) 2 sessions/weeke) Lowf) Yogag) Supervised | Subjective | Primary | 1,25 months | * Symptoms scale (BDI)
 |

BDI= Beck Depression Inventory; BDI-II: Beck Depression Inventory version 2; BDI-FS: Beck Depression Inventory Fast Screen; DSM-IV= Diagnostic and Statistical Manual of Mental Disorders; SCID= Structured Clinical Interview for DSM; MINI= Mini-International Neuropsychiatric Interview; PHQ-9= Patient Health Questionnaire-9; EPDS= Edinburgh Postnatal Depression Scale; CES-D= Center for Epidemiologic Studies of Depression; HADS= Hospital Anxiety and Depression Scale; GDS= Geriatric Depression Scale; POMS= Profile of Mood States.

**a** Type of prevention: Indicated: patients with subthreshold depression; Selective: patients with a risk factor for depression; Universal: general population.

**b** Validated cut-off antenatal depression 15 or more (Matthey, S., Henshaw, C., Elliott, S., Barnett, B. Variability in use of cut-off scores and formats on the Edinburgh Postnatal Depression Scale – implications for clinical and research practice. Arch Womens Ment Health (2006) 9: 309–315)

**c** Data on non-depressed people were provided by the authors.

**d** Medication group was excluded in this meta-analysis.

**Supplementary Table 2. Risk of Bias**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Sequence generation** | **Allocation concealment** | **Blinding participants** | **Blinding Assessors** | **Incomplete outcome data addressed** | **Free of selective reporting** |
| Brenes et al., 2007 |  |  |  |  |  |  |
| Chen et al., 2015 |  |  |  |  |  |  |
| de Zeeuw et al., 2010 |  |  |  |  |  |  |
| DiLorenzo et al., 1999 |  |  |  |  |  |  |
| Lewis et al., 2014 |  |  |  |  |  |  |
| Mohammadi et al., 2015 |  |  |  |  |  |  |
| Osei-tutu et al., 2005 |  |  |  |  |  |  |
| Pakkala et al., 2008 |  |  |  |  |  |  |
| Penninx et al., 2002 |  |  |  |  |  |  |
| Sadeghi-Bahmani et al., 2019 |  |  |  |  |  |  |
| Taglietti et al., 2018 |  |  |  |  |  |  |
| Vargas-Terrones et al., 2018 |  |  |  |  |  |  |
| Williams et al., 2009 |  |  |  |  |  |  |
| Woolery et al., 2004 |  |  |  |  |  |  |

**Supplementary Figure 1. Funnel Plot**



**Supplementary Table 3: Subgroup Analysis**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subgroup analyses** | **N** | **SMD**  | **95% CI** | ***P a*** | **I2** | **Between-group****heterogeneity *b*** |
| ***Participant characteristics*** |
| **Country** |  |  |  |  |  |  |
|  North America | 8 | -0.434 | -0.673 to -0.196 | <0.001 | 41% | Q=13.09; d.f.(Q)=3; *P*=0.004 |
|  Europe | 3 | -0.270 | -0.746 to 0.205 | 0.228 | 75% |
|  Asia | 5 | -0.161 | -0.422 to 0.101 | 0.001 | 0% |
|  South America | 2 | -0.533 | -1.019 to -0.047 | 0.032 | 46% |
| **Sex** |  |  |  |  |  |  |
|  Only women | 4 | -0.395 | -0.634 to -0.156 | 0.001 | 0% | Q=2.40; d.f.(Q)=1; *P*=0.121 |
|  Women and men | 14 | -0.342 | -0.551 to -0.133 | 0.001 | 61% |
| **Age** |  |  |  |  |  |  |
|  Elderly | 6 | -0.172 | -0.378 to 0.034 | 0.102 | 46% | Q=11.14; d.f.(Q)=1; P=0.001 |
|  Adult | 12 | -0.436 | -0.645 to -0.227 | <0.001 | 34% |
| **Chronic disease** |  |  |  |  |  |  |
|  Yes | 7 | -0.264 | -0.429 to -0.098 | 0.002 | 0% | Q=0.37; d.f.(Q)=1 |
|  No | 11 | -0.427 | -0.716 to -0.138 | 0.004 | 71% | 0.546 |
| **Type of prevention** |  |  |  |  |  |  |
|  Universal | 3 | -0.705 | -1.084 to -0.325 | <0.001 | 0% | Q=16.97; d.f.(Q)=2; |
|  Selective | 12 | -0.203 | -0.350 to 0.057 | 0.007 | 35% | *P*<0.001 |
|  Indicated | 3 | -0.968 | -1.527 to -0.409 | 0.001 | 26% |  |
| ***Intervention characteristics*** |
| **Type of exercise** |  |  |  |  |  |  |
|  Aerobic | 8 | -0.387 | -0.680 to -0.094 | 0.010 | 71% | Q=1.74; d.f.(Q)=3; *P*=0.629 |
|  Strength | 1 | -0.344 | -0.663 to -0.025 | 0.035 | n.a. |
|  Stretching | 4 | -0.373 | -0.918 to -0.171 | 0.179 | 71% |
|  Mixed | 5 | -0.302 | -0.566 to -0.038 | 0.025 | 0% |  |
| **Walking** |  |  |  |  |  |  |
|  Yes | 3 | -0.470 | -0.877 to -0.062 | 0.024 | 0% | Q=1.50; d.f.(Q)=1;*P*=0.221 |
|  No | 15 | -0.323 | -0.510 to -0.137 | 0.001 | 60% |
| **Yoga** |  |  |  |  |  |  |
|  Yes | 2 | -0.918 | -2.068 to 0.232 | 0.118 | 80% | Q=4.00; d.f.(Q)=1;*P*=0.045 |
|  No | 16 | -0.288 | -0.452 to -0.124 | 0.001 | 47% |
| **Type of verification**  |  |  |  |  |  |  |
|  Objective | 10 | -0.412 | -0.568 to -0.256 | <0.001 | 10% | Q=11.38; d.f.(Q)=1; *P*=0.001 |
|  Subjective | 8 | -0.200 | -0.471 to 0.070 | 0.146 | 56% |
| **Supervised exercise** |  |  |  |  |  |  |
|  Yes | 11 | -0.410 | -0.604 to -0.216 | <0.001 | 36% | Q=7.89; d.f.(Q)=1; *P*=0.005 |
|  No | 7 | -0.204 | -0.479 to 0.070 | 0.144 | 56% |
| **Format** |  |  |  |  |  |  |
|  Individually | 8 | -0.203 | -0.446 to 0.039 | 0.100 | 49% | Q= 7.82; d.f.(Q)=1; |
|  Group | 10 | -0.431 | -0.642 to -0.219 | <0.001 | 42% | *P*=0.005 |
| **Duration of intervention** |  |  |  |  |  |  |
|  Up to 12 weeks | 10 | -0.480 | -0.740 to -0.221 | <0.001 | 33% | Q=7.64; d.f.(Q)=1;*P*=0.006 |
|  >12 weeks | 8 | -0.227 | -0.424 to -0.031 | 0.023 | 57% |
| **Frequency of sessions** |  |  |  |  |  |  |
|  2-4 sessions / week | 13 | -0.349 | -0.536 to -0.162 | <0.001 | 39% | Q=4.34; d.f.(Q)=1;*P*=0.037 |
|  5-7 sessions / week | 5 | -0.316 | -0.687 to 0.055 | 0.095 | 70% |
| **Duration of sessions** |  |  |  |  |  |  |
|  <60 minutes | 10 | -0.411 | -0.585 to -0.238 | <0.001 | 7% | Q=8.25 d.f.(Q)=1;*P*=0.004 |
|  ≥60 minutes | 8 | -0.277 | -0.543 to -0.012 | 0.041 | 67% |
| **Volume** |  |  |  |  |  |  |
|  Up to 150 minutes/week | 12 | -0.437 | -0.658 to -0.215 | <0.001 | 35% | Q=9.79; d.f.(Q)=1; *P*=0.002 |
|  >150 minutes/week | 6 | -0.195 | -0.400 to 0.011 | 0.063 | 52% |
| **Intensity** |  |  |  |  |  |  |
|  Low | 6 | -0.221 | -0.557 to 0.115 | 0.198 | 68% | Q=11.08; d.f.(Q)=1;*P*=0.001 |
|  Moderate | 12 | -0.387 | -0.526 to -0.248 | <0.001 | 0% |
| ***Methodological characteristics*** |
| **Subgroup analyses** | **N** | **SMD**  | **95% CI** | ***P* a** | **I2** | **Between-group****heterogeneity b** |
|  |  |  |  |  |  |  |
| **Depression exclusion at baseline** |  |  |  |  |  |  |
|  Symptom scale | 15 | -0.336 | -0.529 to -0.143 | 0.001 | 57% | Q=2.10; d.f.(Q)=1; *P*=0.147 |
|  Standardized diagnostic interview | 3 | -0.426 | -0.718 to -0.134 | 0.004 | 0% |
| **Outcome measure** |  |  |  |  |  |  |
|  Symptom scale | 17 | -0.318 | -0.494 to -0.141 | <0.001 | 53% | Q=3.32; d.f.(Q)=1; *P*=0.069 |
|  Standardized diagnostic interview | 1 | -0.543 | -0.902 to -0.184 | 0.003 | n.a. |
| **Type of outcome** |  |  |  |  |  |  |
|  Primary | 17 | -0.344 | -0.523 to -0.165 | <0.001 | 57% | Q=0.01; d.f.(Q)=1; p=0.943 |
|  Secondary | 1 | -0.244 | -0.824 to 0.336 | 0.410 | n.a. |
| **Comparator** |  |  |  |  |  |  |
|  Usual care | 11 | -0.327 | -0.562 to 0.093 | 0.006 | 58% | Q=9.27; d.f.(Q)=2; *P*=0.010 |
|  Active control | 6 | -0.282 | -0.453 to -0.111 | 0.001 | 0% |
|  Waiting list | 1 | -1.589 | -2.532 to -0.646 | <0.001 | n.a. |
| **Sample size** |  |  |  |  |  |  |
|  <100 | 12 | -0.372 | -0.587 to -0.156 | 0.001 | 22% | Q=16.28; d.f.(Q)=2; *P*<0.001 |
|  100-200 | 3 | -0.535 | -0.765 to -0.304 | <0.001 | 0% |
|  >200 | 3 | -0.084 | -0.328 to 0.159 | 0.497 | 60% |
| **Subsample** |  |  |  |  |  |  |
|  No | 13 | -0.454 | -0.651 to -0.258 | <0.001 | 28% | Q=13.47 d.f.(Q)=1; P<0.001 |
|  Yes **c** | 5 | -0.132 | -0.326 to 0.062 | 0.184 | 44% |
| **Risk of bias** (qualitative) |  |  |  |  |  |  |
|  Low  | 2 | -0.547 | -0.873 to 0.220 | 0.001 | 0% | Q=4.17; d.f.(Q)=1; *P*=0.041 |
|  Moderate-high | 16 | -0.310 | -0.491 to -0.128 | 0.001 | 54% |
| **Risk of bias** (quantitative)(range 0-12) |  |  |  |  |  |  |
|  Low (scored 0-3) | 5 | -0.290 | -0.613 to 0.033 | 0.079 | 69% | Q= 6.53; d.f.(Q)=2; *P*=0.038 |
|  Moderate (scored 4-5) | 5 | -0.161 | -0.422 to 0.101 | 0.228 | 0% |
|  High (scored ≥6) | 8 | -0.508 | -0.792 to -0.225 | <0.001 | 54% |
| **Follow up** |  |  |  |  |  |  |
|  <6 months | 10 | -0.377 | -0.667 to -0.086 | 0.011 | 35% | Q=8.34; d.f.(Q)=2; *P*=0.015 |
|  6 and <12 months | 4 | -0.437 | -0.643 to -0.231 | <0.001 | 0% |
|  12-24 months | 4 | -0.233 | -0.558 to 0.092 | 0.160 | 79% |

*Abbreviations:* ***N****: number of comparisons;* ***SMD****: standardized mean difference*

***a*** *Significance tests in which for each subgroup the null hypothesis is that SMD=0*

***b*** *Q values represent the comparison of subgroup means based on a chi-square distribution in which the null hypothesis is that the effect size is the same for all subgroups*

*c**Studies that include depressed and non-depressed participants at baseline but give separate outcomes for non-depressed*

***d.f.****= degree of freedom*

***n.a.=*** *not applicable.*

**Supplementary Figure 2. Normal Probability Plot of Standardized Shrunken Residuals of the final meta-regression model**

